



Prairie Pod Transcript

Season 6, Episode 49: These are a few of our favorite things – about prairie!

Hosts: Megan Benage, Regional Ecologist; Mike Worland, Nongame Wildlife Biologist; Sara Vacek, USFWS Wildlife Biologist; and Marissa Ahlering, Nature Conservancy in MN, ND, and SD, Lead Scientist

Guests: Jessica Petersen, Invertebrate Ecologist; Randy Schindle, Retired Forestry; Welby Smith, Botanist; Carol Hall, Herpetologist, and Bernard Sietman, Malacologist, DNR; Chris Merkord; Donna Stockrahm, Professor of Biology and Wildlife Economy, Minnesota State University @ Moorhead

Podcast audio can be found online at mndnr.gov/prairiepod

Transcript:

((sounds of birds chirping and wind blowing))

Megan Benage: Hey Prairie Pod listeners, I'm Megan Benage, regional ecologist with the Minnesota Department of Natural Resources.

Marissa Ahlering: And I'm Dr. Marissa Ahlering, lead scientist with the Nature Conservancy in Minnesota, North Dakota and South Dakota.

Sara Vacek: I'm Sara Vacek, wildlife biologist with the U.S. Fish Wildlife Service, based out of the Morris Wetland Management District.

Mike Worland: And I'm Mike Worland. I'm a wildlife biologist with the Minnesota DNR Nongame Wildlife Program.

Megan: We are part of the Minnesota Prairie Conservation Partnership and we're here to help you discover the prairie.

Marissa: Discover the prairie.

Sara: Discover the prairie.

Mike: Discover the prairie.

((music playing and sounds of birds chirping))

Megan: Hey welcome back, Prairie Pod listeners. It's another great episode of the Prairie Pod today. Isn't that right team?

Marissa: Yep, can't wait.

Mike: Yes. We're all here.

Megan: We're all here and we're all giggling 'cause it's hard like when you're zooming to not talk over each other.

Mike: I didn't want to, I didn't want to talk over anybody except for Megan. You know, that's okay.

Megan: Well we know you are. (Laughter.)

Mike: Yeah.

Megan: (Laughing) This is how you are. Oh my gosh, this is a really special episode for all of you, so we got to thinking about all of these interesting things that we've learned through our career like all these fun little facts as your studying nature and you're studying ecosystems and the wildlife that live there. There's just all these like little tidbits that you pick up, where you're like huh, am I the only person who knows this or do other people know these things? Is this a neat thing that I'm discovering or not? You guys have these. You know you do.

Sara: And just really cool things that you, you know, having a job that takes you out in the field, hanging out in the prairie for any length of time. You start to just have these crazy observations that maybe a lot of other people don't have a chance to experience.

Marissa: Yeah.

Mike: I was thinking, I was thinking if, if I were to be a guest on a podcast, this is the one I would want to be a guest on. Like, like this is the one that would be the most, the most fun and the most, the most interesting and I say that with no bias.

Megan: Mike, if you we're going to be a host of a podcast, what podcast would you choose?

Mike: I don't know maybe something about sports. (Laughter) I'm teasing, no, no.

Megan: It cuts deep. When he's honest, it cuts deep. (Laughter)

Mike: It cuts deep. No, I am lying. This is it. This is it.

Megan: Mike, you're the host with the most.

Marissa: Yeah. I'm super excited about this podcast 'cause even though I, I'm a scientist, like I love the stories. That's, I mean, I don't know. That's, I love stories, and

that's basically what we're going to hear today. Stories about some of our favorite things and very cool things out on the prairie, so.

Mike: Exactly.

Megan: Absolutely. We put this episode together last winter for you, and I don't know if it was just the time of year or something, but we were thinking, we should do an episode, you know, these are a few of our favorite things about prairie! And so that is what we have done here. We have put together a favorite things episode about prairie and so the way this is going to work is you're going to hear from a variety of experts and really neat special people, who're going to talk about their taxa and something that they learned throughout their career that they thought was neat. And we hope that you're going to think it's neat too.

Mike: For the listeners, we should just list the, the taxa in order in which they would be, in the order in which we will hear them.

Megan: Yeah. Go for it, Mike.

Mike: So first up is, is fungus, then insects, then plants, then birds, then mammals, and mussels, and finally herbs.

Megan: Absolutely.

Mike: Seven, eight, something like that, yeah.

Megan: Your counting skills are good. You're doing the math.

Mike: Thank you.

Megan: Makes me proud of you.

Mike: Anyway, you are all in for a treat.

Megan: All right. Let's jump right in. You're going to hear from Randy Schindle, retired DNR forester and the founding member of the Many Rivers Chapter of the Prairie Enthusiasts. So he's still continuing to do good work even in retirement, and he happens to be someone who is really knowledgeable about fungus.

Randy: Well, if you were expecting a mushroom story, my apologies, but I hope you're going to find this interesting. I have to give you a quick background. I majored in forest biology, which is the study of how trees grow and then what kills them. My all-time favorite class was mycology, which is the study of fungi or fungi, I'm not sure exactly how you're supposed to pronounce that, but I'll call it fungi today. You ever take mycology, you may be disappointed to know that most of the subject matter isn't mushrooms, the studies in the fascinating world of slime molds, water molds, and dung-loving fungus. Did you know that fungi are more closely related to animals than plants? It's something I just found out the other day. My favorite prairie fungi story happened pre-COVID at our office in Mankato. Several of us had created a small pollinator garden with native prairie plants in front of our office. As I fled my email to break time one day, I walked out our garden looking for interesting buds. Stiff goldenrod where several grasshoppers clinging to the stems near the top of the plants. They made no attempt to

flee and I noticed that they were all dead. In closer inspection, I noticed many structures growing out of their body segments. This is the work of entomophaga. If you are up on you Latin, entomophaga means insect-eating, fungus lives up to that name. The grasshoppers were hollowed out having been disgusted from the inside out. Perhaps now this is where you should start that shrieking music in horror movies when bad things are about to happen. The fungus zombifies, and I'm not sure if zombifies is the right word, but it zombifies the grasshopper's brain, makes it climb to the top of the plant, hold tight to it, and then die. This aids spore dispersal. Interesting this pathogen of grasshoppers is being tested as a natural control and has been applied to several areas in the eastern United States. If you want to see a little more interesting things on zombifying fungus, check out cordyceps on ants on YouTube. You'll find it immensely interesting yet somewhat macabre and not good to the ants. I just want people to remember when you're out in the prairie to look close at what's around you. Sometimes I want to be out there just watch the blue stem blowing in the breeze, but there's other times when you just get down on your hands and knees and look close at the flowers and what's on the ground and anything else interesting you may find.

Megan: Randy, how did you puzzle out that it was this fungus in particular?

Randy: I kind of knew a little bit about Entomophaga and some of the other ones we had studied a little bit of that. How many hundreds of years ago when I was in school. And I kind of figured that's what it was, and then I just started snooping on the internet and tracking it down to this particular fungus that attacks grasshoppers. It doesn't attack people, so relax.

Megan: You're a fungus aficionado, basically.

Randy: It would be a bad way to go if people caught this. (Laughter) There are ones that attack houseflies, you might find houseflies in your window in the window, window stuck to the window. You can look around and you'll see this little white pattern of spores fly also zombified and crawl up on the window and stuck to it.

Megan: That is so, nature is so neat and creepy.

Randy: Yeah, it's, might say it's bad news to the grasshoppers and maybe not an uplifting story at the time of the year, but I find these things very interesting and it's all part of the natural web out there.

Megan: Absolutely. Sara, I'm so excited because we've got one of the originals here with us today.

Sara: The OG. (Laughs)

Megan: The OG. Jessica Petersen, or should we say Dr. Jessica Petersen, who is an invertebrate extraordinaire. She knows all the things. Okay, nobody knows all the things, but she knows a lot of things about invertebrates.

Sara: Knows a lot of things.

Megan: She knows a lot.

Sara: About prairie invertebrates

Megan: She does, and she is going to tell us the story about some of her favorite things. Take it away, Jess.

Jessica: Well, thanks so much for the opportunity to tell a brief story about an insect that I adore. So I have a degree in entomology, but I, I often do not consider myself an entomologist because I, it's like huge. Being an entomologist is huge, and part of the thing I argue about this with other entomologists all the time, what makes an entomologist. And some people think what makes you an entomologist is your ability to identify a whole bunch of insects. And I'll be honest with you, I really can't. I'm not very good at it. And so any opportunity, because my title says invertebrate ecologist, that really is more of what I feel like I am. I love the interactions of between insects and insects and the environment. So the story I'm going to tell you today is about just that. I'm going to teach you a new word, it's myrmecophile. Isn't that a crazy word? It's super long and I don't even know if I'm saying it right, but it just - -

Megan: I feel like we need to clap it out with you. Myrmecophile.

Jessica: Myrmecophile. So it describes the interactions between ants and their guests. There's a really cool book called *The Guests of Ants* that I just encourage people to check out. It's not a light reading kind of thing here, but it has all you would ever want to know about ant relationships. So, so this myrmecophile that I'm going to tell you about is called *Microdon megalogaster*, and as usual, I really have absolutely no idea what the common name is. I think it's like black-legged fly. It's a fly. So this is a fly, two wings, diphtheria, it doesn't look like a fly as an adult, it looks like a bee. So it's a fly that looks like a bumblebee, and interacts with ants. Like how, how cool is that? So I didn't know this thing existed, right? Had no idea. It's a syrphid, it's a hoverfly. So I'm out in the yard, this is during COVID, and in June, 2020, and I'm out in the yard, and looking around, and I see this insect land, and I'm just baffled. What is this thing? Initially, I thought it was a bee. And then I look at it closer and I realize it's a fly. And then it's just I notice that it's hovering around this ant nest, and I call my husband out, who's also an entomologist, Matt Petersen, and I said, what the heck is this thing? And he's a much better entomologist than I am. And so we figure out that it's a, a syrphid, and start to understand this, the relationships it has with these ants. So, many of these, these *Microdons* and other myrmecophiles are very specific to a specific species of ant. So this one I think uses a couple of different ant hosts, but what this, what this fly does is it lays its eggs in an ant nest, and then it uses pheromones, chemicals to make it so that the ants don't notice that it's an invader, and then it eats them, right, it eats ant larvae, and it, they can eat like six to eight larvae a day. So over the course of their lifetime, you know, if there's a couple of these larvae inside the ant nest, they're just chowing down on these ant larvae, but not enough to obviously kill the ant mound. So this particular species, this *Microdon megalogaster* uses field ants, I do know the common name of that one, don't know the Latin name, so it uses field ants as its host. So now I want to know like all more about this, these ants, and so every year it's this kind of tradition that we have in our house now to go look for these *Microdons* in the yard, and we now find them all over our yard. And it just shows me that, you know, we don't, we don't always pay a lot of attention to what's right under our noses, and this thing has been there all along, right? And it's probably way more common, but it, than we realize, but we, it's just out for this one week in June when if we aren't out there hovering around the ant

nest with this fly, we aren't going to see it. They're never terribly abundant, we only see a couple a year, but it was just so much fun to learn about this ecological interaction during COVID, massive COVID lockdown, where we were just trying to get by and noticing the things in our yard. So as usual, my take-home message from things like this is just everybody should be noticing insects more than we all are, myself included, so - -

Megan: This is your hashtag, Jess.

Jessica: Notice insects. Hashtag notice insects.

Megan: Hashtag notice insects more. (Laughs)

Sara: I love how complicated nature is. Like, it's just any time you think you understand a thing, there's something more going on that you would have never imagined, and ahh it's just crazy.

Megan: I know. So how - -

Sara: So one thing - -

Megan: do you know, Jess, I'm curious. So they lay their eggs in the ant hole, basically, and then the larvae hatch out, and they eat the ants like as they're in there, and then so how long are they, the adults last for one week, they're alive for one week, but what about the larvae? How long are they sitting in?

Jessica: A year, right? Then they'll pupate at some point. I have no idea. So I really wanted to dig up these ant mounds but I also don't want to destroy them. We know where the, we have three of these ant mounds in our yard and we're very careful to like mow around them and I really want to dig one up to find the larvae, but I don't want to destroy the ants, - -

Megan: Yeah.

Jessica: - - so I don't, I don't know. I don't know as much about the life cycle as I would want to. The other thing I didn't mention that is like super wicked cool is that the larvae of this fly, this *Microdon*, was first described as a mollusk because that's what it looks like. It has this like mounded mollusk, like they're really cool looking, and so it wasn't until much later that they were just associated with, you know, it's often difficult to associate the larvae with the adults unless you can rear them, which in this case would be difficult without the ants, so you have to like pick all the pieces to understand the whole.

Megan: It just goes to show you when we hear in ecology that everything is connected in this world, and we also know that this is also a world belief for many of our indigenous communities, right? And our tribes that everything is related. It just, this is just such a perfect, beautiful example of that, that we don't even necessarily understand all of the ways that we're connected and related to all of these things that are happening. It's neat. Marissa, I'm so excited. Are you excited?

Marissa: I'm super excited for our next guest, yes.

Megan: I know. I can't wait. He's, he has many books. He is the author of all of these different plant books that you can purchase. - -

Marissa: Yes.

Megan: Trees, orchids, sedges--

Marissa: So he has many books, but I have many of his books.

Megan: Yes, I do as well. So we're not going to tease you guys anymore. We're just going to go right into it. Welby, you want to just get started?

Welby: Yes. Hi. I'm Welby Smith. I am state botanist, work with the Minnesota Department of Natural Resources, I have for many years, and I am here to talk to you about one of my favorite prairie plants. And it is called whorled nutrush, sometimes called low nutrush. Latin name is *Scleria verticillata*, which has no particular meaning. Now, the name nutrush is a good name, but it's not really meaningful for this plant I'm going to tell you about because it doesn't produce nuts and it's not a rush. It is technically a sedge, and it is low-growing, about ankle high, and it grows in wetlands, exclusively wetlands. It's kind of a thin spinney looking thing, no one really is impressed the first time they see it, but it's got a lot of very, very cool things about it that you can appreciate. Now, it's, it's a wetland plant, it's considered endangered in Minnesota because it is, grows exclusively in calcareous fens. I'll tell you about that in a minute. The key to its distribution in Minnesota and outside of Minnesota revolves around a single key element in the soil, or the water in this case because it's a wetland plant, it is calcium. It's a threatened species in Minnesota, it's not threatened everywhere, but it's kind of a, a rare thing exclusively in North America. And it's got some, the key thing with distribution everywhere is the element calcium, which occurs in soil pretty much everywhere. It's a common element in the soil, but it's not evenly distributed. And it's not one of the high priority elements that plants need, like calcium, potassium, and nitrogen, but it is a, I'm sorry, phosphorous, potassium, and nitrogen. Calcium is a second tier of elements. It's used in, in construction of the cells and things of the plant. It's, it's - - but some plants make a very special use of it. Most plants that occur in bog like the big peatlands in northern Minnesota where you don't have access to much calcium, so they have to make use of a very small amount, and they're well-adapted to that no problem. The plants that occur in calcareous fens, which are these very special, small little pockets of unusual wetlands that are scattered across the prairie, they are just loaded with calcium. So the plants that occur in calcareous fens have a different approach to calcium, and the two habitats really don't share species because they both have very specialized requirements. Now, in calcareous fens, actually there's an abundance of, of calcium, and our plant here, whorled nutrush, makes special use of it you rarely, rarely see in plants. It takes up the calcium, but then it uses it to secrete a shell around each seed, much the way a snail might secrete calcium to create a shell, and this can only happen in calcareous fens, which are alkaline. Can't happen in a bog because they're acidic and they would dissolve the shell around the seed just as they would dissolve the shell around the snail, which is why you don't see snails in bogs, but they are chockablock in calcareous fens. So what is, what is important about this? Well, *Scleria*, whorled nutrush, is a, an annual species, so this time of year in December, the entire species, the entire range everywhere exists only as seeds in wet soil. There are no

growing nutrushes anywhere right now. So kind of like Thoreau says we have to have faith in the seed because they will germinate in the spring, they better, or else that species is doomed, and they use that calcium covering over them, over the seeds to protect them. This does work in calcareous fens, would not work in other wetlands, but it only works in calcareous fens, at least in Minnesota. And when you see these out in the field, they're these tiny little pure white balls about 2 millimeters across. Remember, this is a very small plant. There isn't much to it, especially this time of year, it's just a collection of seeds scattered across, you know, eastern North America. And there are a handful of other species in other habitats that do this to make this use of calcium, but whorled nutrush is in my mind special because there isn't much to it except for that one kind of unique thing, and you can show it to a person out in the field sort of like an aha moment like I didn't know that. You can hold these little nutlets in your fingers, roll them around, they're hard as a rock, it's basically they are rock, they are calcium, and it's created as a defense mechanism. I think that's very cool. So that's my story, Megan.

Megan: I think it is very cool, and they look like tiny little white snowballs. So even if you were trying to find one now, I wonder if you'd, you'd be able to find it in the winter months.

Marissa: Yeah, I could see it would be very well camouflaged. I'm wondering, I'm wondering how easily, I mean, you describe it as rock and very hard. Like, and then the seeds got to germinate out of the, this, this calcium shell. How hard is that for those little seedlings to, you know, break through? Is it, does the water, does something help dissolve that in the spring or how does that work?

Welby: That's a good question. And I would love to hear a good answer to that because I don't know. Except it works and they do it. They, they germinate every spring, they can't afford to sit and wait, so they do germinate. Again, water is very alkaline, so that does not dissolve calcium, so I think there must be some internal mechanism in the seed to break dormancy and to break out of that hard shell. But I'm not sure anyone has ever, you know, looked that closely at them. I certainly haven't.

Marissa: A very strong seedling.

Megan: So now somebody's got to figure it out. I love when we make a discovery, we're sharing our favorite thing about this cool little plant, and now somebody has the opportunity to make another discovery to answer Marissa's question, so there you go. The learning never stops.

Marissa: That's so true.

Chris: I'm Chris Merkord. I'm, I'm an associate professor of biology at Minnesota State University Moorhead. I've been here for about six years in western Minnesota, but I've been bouncing around the prairies for about twice that. One of the nice things about my job is that I get to introduce a lot of young people to prairies for the first time. It's amazing, even for kids who grew up around here, how few of them, have walked through a grassland, let alone, you know, laid down in one and listened to all the stories that, you know, that you can get from it. My research, yeah, focuses mostly on birds, and a lot on grasslands nowadays. I usually have a number of groups of

undergraduates doing research projects in the spring and summer. A lot of bird stuff. But I did not start out as a prairie person, at least I didn't think so in my mind. I started out as a desert person. My family bought a little patch of Chihuahuan Desert in west Texas when I was a kid, and our idea of a fun weekend getaway was to, you know, pack up our popup trailer and spend a couple of days hiking around the desert. The Chihuahuan Desert, you know, in my mind, it's really just sort of the southern extension of the Great Plains. You see a lot of the same, you know, the same plants, a lot of the same birds as we see in the grasslands up here. I mean, we're talking, you know, western meadowlarks and vesper sparrows, and lark buntings, you know, but then they're sort of all mixed in with Chihuahuan Desert birds, like canyon towhees and cactus wrens. I mean, you know, growing up, I didn't think of those as grasslands birds; I thought of them as, you know, desert birds. You know, growing up in Texas, I got to see a lot of grassland or at least what passes for grassland down there nowadays. Mostly Gulf Coastal prairie, Texas Blackland prairie, but sort of like here, you know, most of it's, you know, been converted for agriculture. So, you know, I spent just hours and hours wandering around, you know, Central Texas looking for longspurs and Sprague's pipits and burrowing owls, you know, these things that, you know, that breed up here but winter, you know, down in Texas. One of my favorite memories when I kind of really started to get into, to, you know, grassland birds, I was visiting this park, the north fork of the San Gabriel River in Central Texas. I later, I later learned that this place, it was just like a hop, skip, and a jump away from where, my great grandparents had actually bought a ranch and built the house where my grandmother grew up, but at the time I had no idea. I, I just, you know, I was 17 and all I really wanted to do those days was just get out and go birding. So it was this warm, sunny weekend in February, and my target was sparrows, so I had called the local Audubon chapter's, you know, rare bird alert the night before, listened to the audiocassette recording, which was, you know, what you had to do in those days. It was 15 minutes long, so you got to kind of be patient, you know, scribble down notes, and, and if you miss something, you got to call back again, you know, and listen to the whole thing again. And someone had reported Harris' sparrows and fox sparrows at this particular park. You know, so not exactly grassland birds, but, you know, had never seen these two before, and so I was excited. So I headed out there the next day, you know, had a great day birding, the scrub and the riparian forest was just all full of birds and, I mean, I think I ended up counting, you know, like a couple hundred Harris' sparrows and, you know, several dozen fox sparrows, so it was, it was great. On the way back to the truck, I decided I'm going to walk through these little grassy patches, you know, and see what I can, can scare up out of here. And, you know, in about a half of mile of walking, I think I had flushed like 15 LeConte's sparrows. And I was totally stoked. I mean, you know, these are like, you know, among birders, these are one of those, you know, at least maybe not up here, but, you know, down on the wintering grounds, you know, these are not easy birds to see. They're sort of, you know, legendarily, you know, hard to get a good look at. You know, I'd seen them before, but mostly just a sort of a glimpse as they dart away, you know, here or there. So for folks who aren't familiar with those, they're these sort of small, secretive sparrows, they're hard to get a look at, especially during winter when they're not all hopped up on testosterone and sitting up at the top of, you know, some grass, you know, you could definitely overlook them, they're, but they're really actually

really beautiful when you, when you get a look, they're sort of straw colored with black streaks on the sides and the back and like this really beautiful orange buff color across their face and chest. I think of that color as sort of like sunset on like a field of Indiangrass, you know, it's just a beautiful color. Anyway, these suckers, you know, they really made me really work for it on this day of birding, but I eventually got some really good looks at them, and, you know, I was just, it just really, you know, I was really surprised that they were here in the same landscape where, you know, I'm out looking for boreal breeding, you know, forest birds, and they're in here mixed in with, you know, grassland breeding, you know, Great Plains birds, you know, and so, you know, that was kind of a, a surprise to me and, and kind of an intro to grassland birding. And then I was just like really hooked on it, you know, after that. So another thing that I remember this, this, this time it was 2004, I was walking along this road in this cloud forest in El Cielo Biosphere Reserve in northeastern Mexico. This was on a trip with my graduate research advisor, John Faaborg and we were in the middle of some great birding, these amethyst throated mountaingems coming to these red flowers. There's mountain trogons calling from the trees and blue mockingbirds are, you know, skulking from the underbrush, and, you know, all of a sudden we see this bird and it's hiding on the side of the road, you know, it's ducking behind the grass and, and just generally trying to pretend like we couldn't see it, and, you know, we're envisioning some amazing tropical bird that we haven't seen yet, you know, and we kind of get up closer, and then when we finally, you know, it hops out on the road and gives us a great look, and it's a savannah sparrow, you know, and, I mean, you know, they're, they're sharp-looking birds. I, I like savannah sparrows, you know, but it was, you know, it was just sort of the juxtaposition with all of these tropical birds that we were seeing. It was sort of unexpected to find here in the cloud forest. And, you know, I, I remember thinking at the time I was just really struck by the story that this sparrow could tell, you know, not only did it contend with all of the threats to prairies that we're familiar with, you know, up here in Minnesota, but it had this whole other set of issues to deal with throughout the rest of the year, you know, it's, it's, you know, getting filled with botfly larva and becoming dinner for, for ferruginous pygmy owl, you know. So, I mean, you know, there's a, there's a, there's a lot that goes on during the, you know, the, the life or even just a year in the life of a bird, you know, that we see here on our, you know, on our grasslands that, you know, we often don't really think about. Nowadays, you know, when I'm outside birding, I kind of, I kind of feel like I've been doing this for a long time, so I kind of feel like I'm visiting old friends, you know, I'll hear some chips over in the grass and oh, there's, you know, there's those, you know, those clay colored sparrows or whatnot. And, you know, I just can't wait for spring to get here every year, you know, so I can see all these birds again. You know, I hear a meadowlark and I'm like hey, there's a, you know, there's that, there's the meadowlark, and I think about, you know, seeing them in the Chihuahuan Desert or, you know, I'll hear a Sprague's pipit, you know, and, and, and be like oh, hey, there's a Sprague's pipit, you know, I haven't, you know, he probably spent the last, you know, eight months in some muddy plowed cottonfield near Houston that used to be Gulf Coast prairie. It's funny because, you know, I don't think about forest birds like that, you know. For me, I think about forest birds and I'm not envisioning, you know, where, where they came from. But for grassland birds for some reason, it's just always kind of, you know, hooked me thinking back to all of the places,

you know, where I grew up where, you know, we get these wintering, you know, grassland birds kind of coming down to visit for the winter or, you know, flip it around, you know, there for most of the year and then coming up here to Minnesota to visit, you know, for a couple of months each spring, so. That's, you know, that's the story I wanted to tell about, you know, about prairies and, you know, I'm sure some of, you know, some of the listeners out there, you know, probably have some of the same, you know, thoughts, you know, grasslands cover such a huge area of, you know, the central U.S., you know, I just think it's just great to always sort of think about, you know, all of the other things that happen during the life cycle of these birds that we don't, you know, we don't necessarily think about.

Mike: Chris, that was awesome. I could listen to you talk about birds for hours. I really could. That was wonderful. Okay. So Chris, are you, are you, are you a poet?

Chris: You know, no. Definitely not

Mike: You should be. What did you say? A sunset on a field of Indiangrass describing the LeConte's image?

Chris: Well, I mean, you don't, you know - - -

Mike: Awesome.

Chris: - - what color I'm talking about, right?

Mike: Absolutely. That's why it's so beautiful. Yeah.

Marissa: Yeah. That was great. I do think it's really great to think about where, and birds are a really good connector for the Great Plains, right? Like a lot of our Minnesota species spend almost, spend almost all of their life in Minnesota, but our grassland birds connect the grasslands up here with grasslands across the Great Plains, and I don't think we, we think about that as often as we maybe should or could.

Mike: I agree. That was a really good point, yeah. The adventure that they live, you know, in their life and we, we, we probably don't fully appreciate that enough just seeing them up here.

Donna: Okay. This is Donna Bruns Stockrahm. I'm a professor of biology at Minnesota State University up, up here at Moorhead, so kind of on the northern edge of our Minnesota prairie. But I was born and raised in southern Indiana, so this was a pretty far cry from, from Minnesota. And anyplace that didn't have a cornfield or beanfield or wheatfield was mainly trees, so I, you know, you hear the word prairie, you know it's supposed to be a lot of grass and, you know, the closest thing we would have would be like a pasture maybe. But after completing my biology degree at Indianapolis in right in the middle of Indiana, I went to Grand Forks to get my master's degree in wildlife biology because they had a really good reputation in, in wildlife biology stuff, so but, but I still remember my dad drove me up and pulled a U-Haul and all that and, and saw Grand Forks for the first time, it's like it's my god, it's so flat. It's like I, it's like it's supposed to be the prairie, it's like 100 miles, you know, most of the cities, I used to have skyscrapers and all that, but, you know, Grand Forks is like all one level, so anyway, that was my first view of the prairie really I guess was the reality was there for

me then. But, but turned out that I did my master's work on prairie dogs out in the Badlands, and I truly fell in love with the Badlands. I just to this day, they're just one of the most special places and, and prairie dogs are still my first love, you know, so, so I was pretty much hooked on the prairie and since then, you know, fast forward a little bit, I went to Ohio State and got my PhD and, and my research there was in Upstate New York in the apple orchards. And, and again, I worked on rodents, there's two big pest species, pine voles and meadow voles. And so, so I had all this rodent research, which I never would have expected as a kid, you know, I'm going to grow up and be a rat biologist, you know, a rodent specialist, is just but, but it's just, it's a fascinating group, you know, and I, and I just loved the whole, whole thing about it. But anyway, so I got my PhD and of course, I'm looking for a permanent job somewhere, and I interviewed a number of places and, and one of them was Minnesota State University Moorhead, which, you know, used to be Moorhead State. And with no intentions of ever moving north again after living in Grand Forks for two or three years. It's cold, it's windy, it's dark, it's dark at four o'clock in the winter anyway. But as it turned out, you know, I, I interviewed at, at MSUM and I liked the people, I liked the teachers, I liked the kids, the kids were great, Minnesota, you know, just had all kinds of wildlife. And so I just decided to buy some really good boots and a really big coat and here I am 34, 34 years later, you know, loving my Minnesota. My husband and I also had a farm down by Rollag, so we're, we're surrounded by wildlife, you know, all the time, so anyway, so getting back to MSUM, over the years we've taken students out, we've done research again on prairie dogs out in North Dakota but also another species down in Colorado, and but here closer to home, we actually got a few grants from the DNR actually from the nongame research grants that they had, and one of the first ones was to study for small rodents here in Minnesota because they were contemplating putting them on special concern list, and the four species were prairie voles, which at the time actually were on the list, but also they wanted to look at, for us to look at northern grasshopper mice, the plains pocket mice, and western harvest mice. And turns out that we were hoping, you know, our recommendation 'cause we found so few or not of any of these to get them on the special concerns list and even hoping to get the grasshopper mouse on the threatened list. It turned out that we, we did help get the plains pocket mouse on the list, so my students and I were really, were really proud of that. You know, that was a neat thing that our research helped contribute to that, but at the time they didn't really want to put the, the grasshopper mouse on the list because Minnesota was really the kind of the, the edge of the distribution, you know, so, so by definition the numbers are going to be lower there. But it turned out that this turned out to be one of our, our favorite species and in fact, I was getting ready for this podcast, I looked back on the web and, and, and now all four of those species are on the special concern list, so we are right to begin, where they should have listened to us darn it. So, time will tell I guess. But, but anyway, so, you know, prairie dogs and, and all kinds of ground squirrels here we have in Minnesota. In fact, I have a lot of 13 liners in my front yard and I just, I just love to see them out there chewing up my grass. They remind me of my little prairie dogs. But, but anyway, you know, we just need - - with my students and I, prairie work here in around Clay County up here in Minnesota and one of our very favorite ones of all time is the northern grasshopper mouse. And I'm going to just tell you a few things about it because it's just, it's so cool, just one of the neatest species that probably hardly

anybody that knows it's here, and it has some really unusual biology. They're just about as big as a, a deer mouse, maybe a little chunkier. They kind of have a coloration close to them kind of brownish on the back and white on the belly, but they weigh a little more, they're, they're about 35 to 40 grams, they're a little bit chunkier, and, and their tail is much shorter and fat, kind of fat sausage on the end of their tail, so you could definitely tell them separate from, from a deer mouse. But, but the things that are really cool about them, well, there's many things cool about them, but one is they're monogamous, they help the mama raise the kids, which is kind of neat, but for a rodent, they're, they're carnivorous, and you don't hear about that very much with, with rodents, but they eat, well, they call them grasshopper mice because that's what one of their favorite foods I guess, but they'll also eat worms and sometimes even attack other mice and, and eat them. And I guess they kind of stalk their prey, sneak up on them, and then pounce. But they're pretty aggressive, they defend their territories, but something else that's really cool is they have a little, a vocalization, and some biologists call it with quotes a "howl," almost like a little wolf howl, like they put their little, their little face to the sky and give this high-pitched little, little bark or squeak, whatever, and I guess it's characteristic of the, of the animals especially I guess the males after they make a kill some sort, you know, to basically to feed a family, you know, and I think also may be territorial but tell other ones to, you know, just hit the road. But anyway, so that's, that's kind of a neat thing but one of the reasons why we actually found them here in Clay County, Minnesota is, and if you look at the literature, they have to dustbathe. Their fur is thicker, it's almost like a luxurious little pelt, their fur is much thicker than a deer mouse, and they need to sunbathe or dustbathe in the sand, and so they, you don't really find them in loamy soils. They really like the sand, and it turns out here in Clay County, of course, we got the Glacial Lake Agassiz sandy beaches, and we got all these gravel pits and sand pits and a lot of them are no longer in use, and in the old days, they didn't have to reconstruct anything. They just left the old spoil piles of, of hillocks of sand, you know, pretty much all around the areas. But it turns out the grasshopper mice love that sandy soil and especially almost always where we found them was in old spoil piles of sand in these little gravel pits. And, and they just make like a little, a little burrow in the side of the hole, and then we, we had some live trapping and actually caught some, and we had these little baby radio telemetry collars that weighed like less than a dime, put them on them, and also did a little powder tracking at night with UV light, and because they're nocturnal, we would also radio track them at night. I even had one student, he, he was so into it, he took a tent out there and pitched it for overnight so he could every few hours go out and do the radio telemetry, you know, so, so it's a big adventure, you know, to, to get to do this. But anyway, so they're just really neat, and then, you know, after we studied them a few years and, and put out some reports on the state of the grasshopper mouse in Minnesota I guess, we did recommend to the DNR that if there's going to be any, sometimes they do reclamation of old mining sites and old gravel pits, but before they do that is to maybe check these little sand pits or the especially the, the spoil piles of the sand to see if you had these holes that are about two inches in diameters, it's almost always I think they like the hillocks just because probably drainage for water that it would, you know, not drown them out. But anyway, we recommended that if they're going to do any reclamation is to, to check them for grasshopper mice first, you know, before the, the habitat is destroyed. So, so, you

know, to us it looks like a total mess to the grasshopper mouse that looks like a pretty nice, pretty nice place to live. So, so anyway, you know, all in all really happy I landed in Minnesota, I love the prairie, I love all the little animals that live in the prairie, like the birds and the turtles too, but you know, mammals are, are my thing, so that's my story.

Marissa: That's amazing, Donna. Thank you for sharing that. And that is so much fun. I never knew any of that about grasshopper mice.

Mike: I didn't either.

Donna: Most people don't because they're, they're just, they're not real common unless you happen to be in a gravel pit, who would know?

Marissa: Yeah, but it does make me think about like, you know, the importance of all the heterogeneity of that we need in our prairies to make sure all those species have a place, right?

Mike: Right.

Donna: Exactly, yep.

Mike: I love that image of, of the little mouse tipping his head back and howling - -

Donna: Yeah, yeah, they - -

Mike: - - after a kill he howls or they howl, yeah.

Donna: Yeah, I guess they got video, you go on YouTube and watch it, you know, the, watch the little howl, what they, what they call a howl, or like a not a wolf howl but it's likened to that, you know.

Mike: Sure, that was wonderful.

Megan: Sara, more stories, more fun.

Sara: I love story time.

Megan: I know. I'm really excited we've got Bernard Sietman here with us today, and he's a fabulous malacologist, which he already taught us what that was back in the Musselmania episode, so check it out if you have not listened to it, you're going to want to hear all of it. There's a lot of open and shut stories that they tell you during that. Just little, little bivalve joke. Don't worry.

Bernard: So yeah. I'm going to tell you a little story about a trip that I took with a colleague, Mike Davis, to St. Croix River. So like Megan mentioned, we work on freshwater mussels here at camp, the Center of Aquatic Mollusk Programs, and, and at any rate, you know, one of the, one of the cool things that, that we work on is trying to figure out details of the mussel life cycle, mussel life history. You know, I sometimes say I'm kind of, you know, into sort of old school natural history. And so, you know, freshwater mussels have a unique lifecycle where their larvae have to attach to a, a host fish to complete development into a, a juvenile mussel. Somewhat similar to the, somewhat similar but different as the, you know, the butterfly, the, the caterpillar to a butterfly. You know, it's a complete metamorphosis kind of situation. So they have this

association with fish. So one of the cool things related to that is that, you know, this doesn't happen all the time just by chance. Mussels have these, you know, fascinating and unique ways of getting their larvae on the appropriate host fish and one of those is by putting on a little lure to attract the right host. So, you know, we spend a lot of time doing surveys around the state, monitoring mussels around the state, and it was always curious to us that, you know, we had, you know, a lot of diversity for example, in the St. Croix River. It's one of the most diverse rivers for mussels in the Upper, the Upper Midwest and actually probably is the most diverse in the Upper Midwest, and Interstate Park is, is a great spot for that. And I was talking with Mike, you know, and like man, you know, we just don't see, we just don't see many lures of, of things. I mean, occasionally we'll see one, you know, good example that, that, you know, I guess you would call it the classic example is the, the minnow lure that plain pocketbook puts out, so, you know, they put out this little lure and uses that to attract basses and walleye and things like that. So I think Mike was listening, he was listening something about, you know, when coral spawn, well, you know, corals only spawn, you know, when the, when the moon is full on a certain night or so, you know, maybe mussels do something like that too. Maybe they do their business at nighttime, we should go up to the St. Croix River and do a night dive, and we did back in 2004 as a matter of fact. We decided to go out, you know, we got some underwater lights, and took the boat up there, and it was in mid-May, and we dropped down into the river, and the world changed for me from that point forward for, you know, the next I don't know how many years after that because we were absolutely stunned by all of the brooding behaviors, if you will, that mussels at this site had. I can't remember how many exactly different types of displays or mantle lures we saw that particular night, but it was several. And many of them were for species that, that there were no, there were no recorded lures known for those species. And so it was all new. I mean, everything was new that night, and, and so from that point on, we started going back at nighttime about every, every two weeks during that, that first spring, early summer, and continued that work for, oh, it was probably four or five years after that we would begin, you know, early in the season, and it does matter about what time the season it is because, you know, these mussels, they, they brood their larvae at different times of the year, and so it, some of it starts as early as, you know, mid-April, and so we were out there in the snow, you know, one night, and, you know, when it was, when the water was a little bit high and, you know, whatever it took to, to go out and do that as long as it's safe and everything, of course, but at any rate, I think that we recorded in the neighborhood of eight or nine mussel species that, that did a specific type of mantle lure, and we, you know, did follow-up work on that for determining what the host fish for some of these species were because we didn't know figuring out what the, the season of the larval brooding was. So it was a combination of, of studies that we did on them, and, you know, got some papers out on that, so it was very, it's been very fruitful and I guess fortuitous, you know, just by on a whim I guess somewhat like on a whim going out and you just never know what you might run into, and yeah, everything, everything changed from that point on. The trajectory of my work changed. I know that.

Megan: Bernard, what was your favorite lure that you saw that night?

Bernard: That night, I think that it was the pistol grip, which is, it's a really neat mussel, it's a threatened species in, in the state, and they put out this lure, it's just, well, it's just a big, it's, it's, it's kind of a big mass of flesh, you know, there's really nothing I can't even describe, you know, if it looks like something that, you know, what does it look like? I don't know. It looks like a piece of, of meat I guess in the river and, you know, that, that mussel is, you know, the host for that is flathead catfish, so, you know, they know, flathead catfish normally go after live food. They're known to do that anyway. So but apparently this is close enough 'cause it definitely puts out a pretty big and conspicuous lure that doesn't, you know, flap or move like some of the other ones do, but yeah, that was, that was totally new to me and, and it was big and, you know, I guess I would call that my favorite of the night. I guess the monkey face would be second, and it looked a little, a little polyp and (laughter) a polyp the kind that live in the ocean, that is. (Laughter) It looks like a little anemone. It's a miniature little anemone. And we were doing kind of interesting, you know, we, so like I said, some of these things wiggle and, and flap, and so one of the, but, you know, we, some of these things just kind of sit there and you really don't know what they, what the deal is. So as part of the work, you know, we would take our lights and flicker them a little bit, you know, kind of just move them around, see if we could get something to happen, and you know, and would touch you know, the lures to see if we could induce some kind of response and for the monkey face mussel, if you how many times I did this but, you know, I would rub my, the, my fingertip, you know, I would just kind of, you know, touch it a little bit and it would just in an, an explosive release of larvae from just touching this little lure. These things are small, we're talk, you know, we're talking, you know, not, not even half inch. I mean, they're you know, a little over about a centimeter in size roughly, so they're pretty small, and their host is minnows, so I can just imagine, you know, minnows are pretty, you know, for, for a small fish, they're really aggressive and they're very curious. And so I can just imagine a minnow seeing this little white or little pinkish, you know, the, the, the morphology of these little things, they weren't all exactly the same but it looks like something that a minnow would go up to and, and check out because I mean they will check out anything and try to eat whatever is edible in my experience at least. So you can imagine a minnow going down and picking around on this thing and poof, shooting out a big bunch of, of larvae.

Megan: I, I love that. I just looked it up to see what it looked like, and it does, it looks like a little starfish anemone a little bit, as it's coming up--

Bernard: Yeah, yeah, and you know, I mean, I mean, you know, minnows will eat flakes, I mean, you know, whatever, whatever looks good, you know, so you know they also, I mean, there's also some mussels that put out little, little packages that, that, you know, these mussels are minnows or are the, are the primary host and so they release little packages that will float in the river that eventually stop. I've, you know, it's interesting that, you know, the species that use that method of, of, of getting their larvae onto minnows, and there's a lot, and there's, you know, a lot of these mussels out there, so we're talking, we're talking big pig toes, round pig toes, wall bash pig toes in Minnesota at least. I, I rarely ever see these little packets laying around. I mean, my guess is.

Megan: So it's working is what you're saying.

Bernard: You know, this is very, it's speculative, but I'm guessing that they don't last that long in the wild.

Mike: Hi, this is Mike. I just wanted to interject quickly here and introduce our next and final guest. This is Carol Hall, she's a herpetologist with the DNR and the Minnesota Biological Survey.

Carol: So my favorite thing is easily overlooked, and on the surface, it may not seem significant. But as you dive deeper into it, you realize how critical this feature is within the prairie landscape. What is it? It's a burrow. Basically, a hole in the ground. Burrows are easily overlooked as you glance at an expansive grassland, but these small areas of disturbed soil can provide many important functions for both animals and plants. In this podcast, I'll focus on two species, one reptile and one amphibian, that may not persist in the prairie community if burrows are not present. Snakes in general are not able to tolerate long periods of freezing temperatures, so they need to go belowground to survive Minnesota's winters. In some places such as southeastern Minnesota where they can enter rock crevices, they can go deep into the ground without burrows and find safe refuges. But in the deep soil of the prairie, they often rely on other options such as burrows created by mammals. Old rotted tree roots also provide a good option, but not all burrows are created equally, and in the depths, in the depth of a burrow is an important factor. To escape the frostline, snakes need burrows that are at least three feet deep. And in the winter of 2013, portions of Minnesota had extremely cold weather and lacked the insulating snow, so that year the frost was nearly eight feet deep near Ottertail in northwestern Minnesota. Every year differs in the amount of snow and temperature extreme. So a snake that survived a three-foot burrow in 2012 may not have survived the winter of 2013 in that same burrow. So really every year is a gamble for the snakes, and the longer they survive the odds, the smarter they get. Adult snakes often have high sight fidelity, and in the fall, they return to tried and true overwintering sites. Hatchling snakes instinctively follow scent trails or pheromone trails of adults to reach overwintering sites. Without this guidance, young snakes that are learning the lay of the land may make poor choices resulting in high mortality of young during winters with extreme conditions. In addition to depth, the abundance of burrows is another important factor. Since they provide refuge from fire, predators, and intense summer heat, now imagine you're a snake in the spring. The frost finally went out of the ground and because you are an ectotherm, you emerge from the burrow to bask in the sun and elevate your body temperature. It's been months since you felt this warmth. Let's say you're a male snake and you decide to move away from the safety of your burrow to seek a mate. You flick your tongue to taste the air, trying to pick up the scent of a nearby female or a rival male. You move around with your head up, scent trailing, but instead of detecting another snake, there's smoke in the air. It turns out it was also a great day for a prescribed burn. If it is a backburn or slow fire, you may be able to return to your burrow or you might be lucky and find a different burrow nearby. But if it's a fast head fire, you may not have time to escape. If burrows are abundant on the landscape that follows the snakes will have more opportunities to find refuge and the local population will be more resilient. This is also true when escaping from predators, especially after a fire when the black landscape leaves little cover for protection. Soaring hawks in particular can easily spot a large snake on a dark surface, and if there

aren't burrows to provide refuge, the snake could easily become lunch. The bull snake is a large-bodied snake that occurs in open landscapes, such as prairies and savannas, and spends a good portion of its life belowground in burrows. In Minnesota, the bull snake, which is also known as the gopher snake, is considered a species of special concern due in large part to the loss and fragmentation of grassland habitat. I know it sounds ironic since bull snakes lack limbs, but they are really built for digging. The head of a bull snake is relatively pointed compared to other snakes. Their spade shaped head has a sturdy, large scale at the tip of its snout called rostral scale, which the snake uses to poke at the ground until the soil breaks up. It can then flatten its head to function as a scoop, push its flattened head into the soil, and place the soil in a nearby dump pile. Alternatively, it can create a hole by poking its head into the ground and dragging soil out with its chin. Gravid females select a sunny area in June and excavate a shallow burrow where they will lay their clutch of eggs. While bull snakes have the ability to excavate such shallow burrows, they rely on mammals for the deep overwintering sites. Regarding the abundance of burrows, it may be a coincidence, but we know a few sites in Minnesota where both snake populations appear to be relatively healthy and coincidentally burrows are abundant and readily available at these sites. These burrows are primarily created by pocket gophers, which also provide an important food source for bull snakes. Alternatively, another site where we track bull snakes lacks the high abundance of burrows, and the future of this population is questionable, particularly given the high mortality that occurred during the winter of tracking snakes at that site. Burrows are also important for the survival of tiger salamanders, another member of the prairie community. People are often surprised to learn that this amphibian is dependent on burrows, but like snakes, tiger salamanders do not tolerate long periods of freezing temperatures. And during Minnesota winters, they also take refuge in burrows that extend below the frostline. Burrowing into compacted soil may be beyond their abilities, but they can easily dig into fresh pocket gopher mounds to access the burrow opening. Adult tiger salamanders emerge from burrows in early spring, then migrate to shallow wetlands, where they breed and females lay loose clusters of gelatinous eggs. After breeding, the adults return to nearby uplands and spend their active season moving throughout burrows in search of foods such as worms and other invertebrates, as well as young mice, small snakes, and lizards. Back in the wetland, the young guild salamanders called larvae transform into air breathing land dwelling salamanders and emerge from their natal wetland in late summer or fall. At that time, these juvenile salamanders and adults travel overland to seek out deep burrows, where they can overwinter below the frostline. Keep that in mind in the fall if you see a salamander crossing a road. It is in search of a burrow to overwinter, not a wetland. To conclude, burrows are an important part of the prairie landscape and burrowing rodents have historically acted as ecosystem engineers that provide essential community housing. In regards to amphibians and reptiles, pocket gophers, and ground squirrels are likely the most important species that provide this refuge. However, given efforts to eradicate burrowing rodents from farm fields and pastures, the presence of burrows on the landscape is much reduced. Is that impacting our snake and salamander populations? Well, we don't know for sure, but given the significance of burrow systems, the lack of these rodents likely does impact some species of amphibians and reptiles and indirectly the greater prairie community. Where burrows are few and far between on a prairie

landscape, especially on restored prairies, encouraging the presence of burrowing rodents may result in a more resilient and diverse prairie community. The end.

Megan: I love it. It's ecosystem engineers that's such a great term. (Laughter)

Mike: Community housing. I like that term. Carol's talked more about burrows than most people. I think it's safe to say.

Megan: That's probably true.

Mike: I wasn't expecting that for a favorite thing.

Carol: Yeah, I, I figured I'd kind of throw you there.

Mike: You made a, you made an excellent case on of their importance, though, and more than I thought about in the past, so well done. That was, that's was a really cool story, Carol. Thank you for that. Carol asked us to let the listeners know that if you see bull snakes or gopher snakes, or other rare wildlife that the DNR should know about, there is a place to report that online. Actually, it's an email address. You could email mbs.report@state.mn.us. We'll put all this on our, on our page, on our podcast page online. Yeah, so please do that if you see something cool or something rare really that we should know about. Also, there is, we'll put a link there that helps you identify bull snakes and distinguish them from other snakes because it is tricky. It can be tricky.

Megan: Awesome. And if you don't remember this email address, like we said, we'll put it online, but you could also just remember to email any of the nongame wildlife biologists or regional ecologists at DNR, and we can help you out. It's what we're here for. We're here to support and help. Gosh, what cool stories from everybody, right? Like.

Mike: Amazing, yeah.

Megan: There's just some, I like when Randy kicked us off and he's talking about zombifying grasshoppers with fungus like literally eating the grasshopper from the inside out. I was like oh yeah, like we love it. I mean, nature is wonderful but like that's wild, like that is wild, and then I did go look up, he mentioned to go look up cordyceps and ants, and the BBC and David Attenborough did a special on it, so we'll add a link to that too because holy buckets, fungus, this is a whole world of weird that you're going to jump into, weird and wonderful.

Marissa: I was just going to say. I think they're all examples of how like being out in the field, I mean, the things that you see and learn and just by observing, right? Like and take somebody to be out there spending the time like watching these things to really, to learn these really cool things about all these organisms.

Sara: I do think Jess' example of the fly that looks like a bee that lays its eggs in ant nests, and then the larvae eat the ant larvae, and it's this whole crazy world happening underground, and she even said she wouldn't have noticed that except that they were stuck at home during COVID spending a lot of time in their yard, and just having the time to really sit and look at that little patch of ground, the things that you can discover.

Megan: I know. I remember when Welby was telling me, when he first told me about whorled nutrush and that it does this, I was like this is so cute, so it uses calcium and makes this outer crust of its seed because there's just too much calcium in the fen, well, not too much, but there's, it's so much that it makes it hard for a plant to grow there, so it's found these unique ways to use the calcium like that it's literally sweating out and turn it into its little seed coating so it looks like tiny little snowballs that the plant is holding, I mean, snowballs in the middle of summer when the plant is making seeds, but still, and I looked in his book, Sedges and Rushes, and it's not in there, so he's got to do an adapted version and add it in there, and now if you listen to this podcast, you know this information too, but we got to make sure that that's recorded and written down.

Mike: Hey Sara, what was Jess' word about for regarding ant ecology we were supposed to.

Sara: Myrmecophile. Megan and I had to clap it out to learn it. Myrmecophile.

Mike: Myrmecophile.

Megan: Myrmecophile. It's an organism that lives in association with ants, a myrmecophile. So there could be all different kinds of species with the bee.

Sara: I mean all kinds, all kinds of things, fungus, eels, all kinds of things.

Mike: I mean are we a myrmecophile because we live in association with ants, they're in my kitchen, you know.

Megan: I don't think that's the kind of association that we're looking for here.

Mike: Got it, okay. I wanted to comment on Donna's story about the grasshopper mouse. That, that was I think the ult - - for me it was the ultimate indication of how cool something can be when you start digging into its, its life history. Like it's a mouse and so I think we, as guilty as anybody, even as a nongame ecologist, I, you know, I can dismiss these little brown animals, you know, it's just another mouse, right? But then this thing is so cool, it's, it howls, when it gets its, after it has a kill, right? It's a carnivorous mouse and it has a kill and then it howls. Like how awesome is that?

Megan: I know. I had to look it up because I wanted to hear it make that noise.

Sara: Yeah. I feel like we need a video of that somewhere. But one of the, one of the things that I really enjoyed of all these stories is just the different perspectives that, that you can get from just listening to how other people have seen the world and their stories. And for instance, this story Chris tells about like grassland birds and thinking about how grassland birds, I, I think of them as our like northern grassland birds, and they spend a good amount of time in the deserts in the Chihuahuan Desert and in Texas or, you know, just south of here during the year, and the other species that they live with at that time of year just thinking about them interacting with like cactus renovates and all of the desert wildlife down there and, and all the issues that they also have to face there, which are, you know, somewhat similar because it's kind of the southern Great Plains, but also really different from, from what they have to deal with in our grasslands, which is very cool.

Megan: It is cool. It just highlights to me how everything really is connected. We know this as ecologists, right? But like it's connected in Minnesota, it's connected across this bigger landscape, and something that I definitely didn't realize were connected to each other are fish and mussels. Like I just did not realize how like how so many mussels need fish as a host species so that they can essentially carry their offspring for them into other places in our rivers and streams. I thought that was so weird, and then they went snorkeling at night so they could see the different lures that are put out. I was like what did you do for your job yesterday? I went snorkeling in a Minnesota river looking for lures.

Sara: Two in the morning.

Megan: Two in the morning. Like, and then just the level of excitement they have because they're discovering this, you know, for themselves for the first time, and then of course, when you have that moment of discovery, then you want to share it with everybody else. So I just think of like not just these little snippets of information that we've learned today, these really cool stories, but like all the stories that are playing out all the time on the prairie that someone's not necessarily there to sit there and witness, and it just makes me feel so much better about our world because there's all these intricate connections that are happening. Like it's so complex and so beautiful and also wild when you think about some of the things that are going on.

Mike: For sure.

Megan: It just makes me really happy like brings me a lot of joy.

Sara: Marissa was talking at the beginning about how we all love stories and storytelling and that was one thing I really took away from this whole episode, just the like level of enthusiasm of all of these, I mean, let's be honest, some pretty serious well-respected scientists in their various fields and get them talking about their favorite thing, and there's just this almost kind of young childlike enthusiasm that starts to bubble through. I mean, even Carol just talking about burrows and all the things that live in burrows and the, the engineering that's going on underground within whole ecosystem happening under there that you may not even realize is there.

Mike: That's why I was saying I wanted to be a guest on this one, not the host, yes.

(Laughter)

Megan: Mike, what story would you have shared?

Mike: Don't put me on the spot. I got to think about it here. But, but I, I could not top the stories that were here. So it is probably for the best that I was on there, that I would have, I would have been a distant, distant ninth place or whatever. It was awesome. Whoever, whoever had that idea to do this podcast that was a great idea.

Megan: I think it was all four of us, so congrats to us. I think we - -

Sara: Maybe we need like a, a Prairie Pod StoryCorps or something like a - - I don't know, a place for people to submit stories or something.

Mike: Ooh.

Marissa: Good idea, that would be really fun.

Megan: Good idea. That's a good idea.

Mike: Listeners, we'll let you know if we can make that happen.

Megan: (Laughs) And in the meantime, just stay curious because there's so many things for you to discover out there on the prairie, and we can't wait to hear from you so that you can tell us everything that you found, whether there's a StoryCorps or not, we still want to hear from you.

Mike: Very true.

Sara: Marissa was talking at the very beginning about enjoying hearing stories and how we all love to hear stories from our friends and coworkers and family, and I just, that's one thing I really enjoyed about this podcast episode was hearing the enthusiasm that came out when we asked some of these, I mean, let's be honest, pretty serious, well-respected scientists in their field, you get them going on tell us a story about something really cool or one of your favorite things, and it's just this childlike enthusiasm starts to bubble through that they love what they do and that's pretty infectious.

Mike: Yeah. Well said. That's why I wanted to be a guest on this one instead of a host, you know, it's, it's not fair. I should have been, I wanted to be a guest.

Megan: Mike, yeah. It's definitely not fair when you control how this podcast happens and who's on it. Like, wow it's really large injustice that's been done to you here. (Laughter)

Mike: It's for the best probably 'cause I wouldn't have, I wouldn't have held a candle to these stories. I would have been like a distant ninth place or whatever, but anyway. It was just, it was an awesome podcast I thought and really, it was a good idea. Whichever one of you three had this idea that was a great idea.

Megan: It was all four of us, Mike.

Sara: Team effort.

Mike: Okay.

Megan: Teamwork.

Mike: All right. I'll take some of the credit.

Sara: And I think we just need to keep telling our stories to each other, right? And learning from each other's stories.

Mike: It's a great way to learn.

Megan: Absolutely.

Mike: Yeah.

Megan: We need to keep sharing so that we can keep the learning going. Prairie Pod listeners, stay curious because we hope what you're taking away from this is not only

sharing your stories, but that there's so much to discover on the prairie. And on that note, as always, you can find all of the resources we talked about today on our website at mndnr.gov/prairiepod. This episode was produced by the Minnesota Department of Natural Resources South Region under the Minnesota Prairie Conservation Partnership. It was edited and audio engineered by the fantastic Dan Ruiter. Our web production team is led by Bobby Boos. And our social media lead is Kelly Randall.

((sounds of birds chirping and wind blowing)).