EPISODE 1 - Prairie Dogs required

Rachel - Hello from your favorite Grasslands PR team. This week, we're back with another reason, or the first reason, why these overlooked and underappreciated ecosystems are objectively the best biome. I'm Rachel.

Nicole - I'm Nicole.

Rachel - And because this is the first episode of The Best Biome, we're gonna jump right into Nicole's thesis because I hear that you have something really interesting and very predictable to share with us.

Nicole - Honestly, I'm kind of offended, but yes, I do have something very predictable, if you know anything about me.

Rachel - Predictable for you.

Nicole - I'm not sorry. Yes, yes. I'm not sorry. I'll never be sorry. We're talking about prairie dogs. I'm so excited about this.

Rachel - What a great way to kick off a podcast about why grasslands are literally the best to talk about prairie dogs. Which are, at least I've heard you argue that they are objectively the best.

Nicole - It's true. Like, yeah, yeah, objectively. Like you said, they are the best. And you know, without prairie dogs, we would have no prairie. Sure, they're only found in prairies. They're only found in North America, but they are a keystone species in that prairie. They're very, very important. Without them, the whole ecosystem would collapse and everything would be ruined.

Rachel - Gosh, okay. And just to clarify, when you say they are the keystone for the prairie, is there a specific prairie region they are critical to, or is it all of them or like?

Nicole - Critical to every single kind that they are native to and belong to, which historically was most of North America, but currently has shrunk as the prairies have. And we will be talking about mostly black-tailed prairie dogs just because there are five different species of prairie dogs. So the black-tailed prairie dog lives primarily just in the Midwest, so Kansas, Nebraska, a little bit into Oklahoma and Colorado. They used to extend way up into Canada and even down into Mexico, but not anymore.

Rachel - Oh, wow, that species?

Nicole - Yes.

Rachel - Just that species? Oh, that's really sad.

Nicole - Yeah, they might only cover about 2% of their historic ranges. So like I said, without prairie dogs, we would have no prairie. I'm here to just convince you of that if you need convincing. I don't know why you would, but if you need convincing, that is my job today.

Rachel - I have an objection.

Nicole - An objection?

Rachel - Yeah, because we still have quite a few preserved prairie ecosystems in those regions and beyond those regions that don't have prairie dogs. So couldn't you say then that prairies can exist without prairie dogs?

Nicole - No.

Rachel - Oh.

Nicole - Thanks for asking.

Rachel - Oh. Oh, okay. Well, go on. I'm intrigued.

Nicole - Thanks. Thank you. Like I said, I just want to, real quick, talk just some fun prairie dog facts that I found.

Rachel - Okay.

Nicole - Feel free to edit them somewhere else if you would like.

Rachel - Now we're going to start the episode with just everything great about prairie dogs. Let's go.

Nicole - Okay, let's do it. So there are five species of prairie dogs. There's the black-tailed prairie dog, which we'll be talking about today, the white-tailed prairie dog, Gunnison's, Utah, and Mexican prairie dog. The white-tailed prairie dogs live a little bit more west than the black-tailed. Gunnison's live in the Four Corners area, and are mostly in Colorado, Utah prairie dogs live in Utah, and Mexican prairie dogs live in Mexico.

Rachel - Okay.

Nicole - It's pretty self-explanatory.

Rachel - It's considered of them to stick to the political boundaries that their name describes.

Nicole - I know, right? How amazing.

Rachel - Hey, earlier you made a comment about prairie dogs being critical to the regions that they're native to, which made me, in my brain wonder, are there invasive prairie dogs? Is that an issue or you just mean like historically because they're so reduced now?

Nicole - I meant more in like a historical perspective, especially since, I mean, there are so few prairie dogs now. I highly doubt that they're really invasive anywhere. At least, I've never heard of them as really being invasive to an ecosystem.

Rachel - I feel like we would have heard about that.

Nicole - Surely. I mean, do farmers not like them? Yes, but that doesn't mean that they are invasive.

Rachel - Oh, yeah. Right.

Nicole - Okay. Of these five species of prairie dogs that we just talked about, the black-tailed prairie dog and Mexican prairie dogs are by far considered the most social of the prairie dog species and are the only species to show mutual grooming. They're also the weirdos that do the little jump-yip noise, which is super cute. And I will talk a littlebit more later about some more fun noises that they make. We will get there. Don't you worry.

Rachel - Oh boy

Nicole - But I found this really, really weird thing that black-tailed prairie dogs do. And I just really wanted to make sure that it made it into the podcast because it's just weird. It's not anything that I've ever heard of them doing before, despite my extensive prairie dog research in the past. So black-tailed prairie dogs... go ahead.

Rachel - Is this from your book by Con Slobodchikoff?

Nicole - Yes.

Rachel - Okay.

Nicole - So Con Slobodchikoff is like, at least as far as I know, the king of prairie dogs, and has done a ton of research with these guys, both in the field and in the lab settings. And he found these prairie dogs, and this is a quote from his book called Prairie Dogs. Let's see how many times we can say prairie dogs until it doesn't sound like a word anymore. But in his book, he says that prairie dogs will do "a greet kiss, where two prairie dogs will come toward one another, open their mouths, and press their tongues together."

Rachel - How mad would you be if I said that I knew that?

Nicole - Wow, why have you never told me that prairie dogs French kiss?

Rachel - I don't know, but I definitely told a room full of community members sometime about that.

Nicole - Amazing.

Rachel - Oh my god, though. That's such a cool thing. Casual, platonic Frenching in the prairie dog community.

Nicole - Yeah, I love it. It's kind of beautiful, honestly. Apparently, after doing this, the two prairie dogs go back to whatever they were doing previously and, just, if they're of the same social group, sorry, if, however, they do not belong to the same group, then one prairie dog would chase the other one out of its territory after the Greek kiss.

Rachel - So they'll still greet each other with the kiss even if they're like sworn enemies? Wow

Nicole - Yeah, two stranger prairie dogs will still French kiss, don't you worry. Like, yeah, it's still gonna happen. It's just that then they run away from each other. So yeah, bizarre.

Rachel - Oh my gosh. Are they getting some kind of information? Are they just fringing because they like to? Like, why? Why?

Nicole - Thank you for asking. Thank you for asking. I was hoping you would. I did write down the three reasons that Con Slobodchikoff gave.

Rachel - Oh! Sorry, I didn't expect there to be actual reasons. Let's go.

Nicole - Oh, yeah. So, reason number one, that kissing can help identify individuals, which sounds weird. They have really good eyesight. Why do they need a French kiss to figure out who's enemy, who's not? But they spend a lot of their time underground. So if you can't see, then I guess the next best thing you can do is just French kiss. So, you know, why not?

Rachel - Yeah, well, I'm going to hold back until you go through the other two reasons. Okay. I'm just like, this isn't making sense to me just yet, but let's keep going.

Nicole - Ok. Reason number two, this French kiss can transfer information about the other prairie dog and what they were eating.

Rachel - Ohh.

Nicole - I don't know if there's like, I don't want to think about it too much. Never mind. I changed my mind. But it can transfer information about what the other prairie dog has been eating. We'll just leave it there. Number three - It is possibly a way of maintaining dominance within the

group. So prairie dog colonies have dominance hierarchies, and you know, ones on the higher end of the totem pole probably get more food, things like that. So prairie dogs French to identify each other, transfer information about what they've been eating, and to establish dominance, apparently.

Rachel - How does a greeting kiss establish dominance, though?

Nicole - That's a really good question. So he had several pages on this, and ultimately, evidence for all three of these hypotheses are super slim, and really, no one knows why they French kiss. But there's just been these hypotheses put forward by various different authors, and especially, I think, the dominance one had the least evidence behind it. I think one person posited that theory. So you know.

Rachel - Well, it's good that in the interest of being thorough and not leaving any rock unturned that the ones that don't have as much support are still being posited as like, you know, maybe it does need a little bit more research to be able to say whether or not there's anything here, but yeah, okay. That's fascinating.

Nicole - Yeah, I love it. It's so funny. And all ages of prairie dogs and all sexes do this greet kiss. It can even be found in other species of ground squirrels. And in case you didn't know, dear listeners, prairie dogs are squirrels. So are marmots, groundhogs and chipmunks. It's so weird. Genetics are weird. So like I said, without prairie dogs, we would have no prairie. And I kind of broke this down into five, I forgot how many, five different subtopics, kind of. We'll go over them fast, have no worry. This won't be like a two hour long thing.

Rachel - You say with confidence, knowing full well that you could talk about a prairie dog for an entire day straight.

Nicole - I purposefully made sure that I didn't get too distracted, but we'll see what happens. You're not wrong.

Rachel - I love you.

Nicole - I love you too. But like I said, five different subtopics. We got soil health, plant diversity, animal diversity, burrows as safe havens, and tasty snacks.

Rachel - Excellent. I love that we saved the big potato prairie dog stuff for the end.

Nicole - Yes, yes, yes. So number one, soil health. We'll try to make the soil exciting, I promise. So a prairie dog moves a lot of soil. They have these huge burrows underground that on average are maybe only five to ten meters long, but can be up to about 30 meters long, which is just insane. Yeah, so big. A ton of prairie dogs move literally tons of soil each year. Each burrow is a movement of about 500 pounds of soil or 225 kilograms, and each hectare can have 20 to 40 burrows in it. So I don't know what the math is there, but that's a lot of soil being turned over.

Rachel - Wait, no, we need more math. I want to know exactly how many elephants that is. Please.

Nicole - Well, 225 kilograms times 40, go.

Rachel - 9,000 kilograms.

Nicole - And that's just, that's one hectare. So 9,000 kilograms on one hectare. And that's not accounting for, you know, prairie dog towns that cover 10 - 15 hectares. So pretty impressive. That's a lot of dirt being moved around. And all of that is also moving, you know, nutrient rich soil from down below up to the top where animals and plants are then able to use it, and particular prairie dog towns are often hot spots for nitrogen. All that digging also helps to aerate the soil and allows water to reach deep underground and again, is then able to be used by the roots of plants. One caveat is that, you know, if the deep soil is nutrient poor, then all of that digging can actually have a slightly negative effect on overall soil health. So, okay, okay, you know, they do their best. But in general, it is widely regarded that prairie dogs, as they're doing this, are adding nitrogen to the soil and improving soil health.

Rachel - And adding in nitrogen to the soil, like through their urine and feces and waste, right? And not just from moving the soil or is that like strictly from moving dirt?

Nicole - It's a little bit of both. Yes. Good question.

Rachel - Yeah, because they have like really specific latrines within their communities, right?

Nicole - Yes, they will have a specific little area of their burrow where, you know, one spot is for sleeping, one spot is for storing food, and then one spot will be a little bathroom. So yes, absolutely."

Rachel - So maybe you'll... Sorry, my brain is just trying to figure out how many latrines does a prairie dog town need to adequately infuse nitrogen into the soil? I am not a soil ecologist either, but I think most people who have been through some kind of basic ecology courses will recognize that nitrogen is one of those things in soil that plants like really need and that's why those plants that can add nitrogen to the soil, like beans and stuff, are considered like, oh, really important or really disruptive or whatever. So that's a really great benefit that prairie dogs are providing to the plant communities.

Nicole - Yes, absolutely. And nitrogen is also one of the biggest proponents, or I'm sorry, one of the biggest components. Will I ever learn how to talk? Who knows? One of the biggest components of fertilizers. So you know, if you have prairie dogs, theoretically, then you're not having to put down a ton of fertilizers onto your land to make it be able to produce food for things like cattle and stuff like that. I also found some people, and this is a bit contested, but when you look out over Prairie Dog Town, you'll notice that, you know, at the beginning of each

burrow is a nice little mound of earth, especially with the black-tailed prairie dogs. Some of the other species don't really have mounds at the burrow entrances, but most of them do. Yeah, I thought that was really interesting. I can't remember now exactly which species it's a little bit less obvious in, but some of them don't have the big mounds like the black-tailed prairie dogs do.

Rachel - Oh, that's so interesting, because I've always kind of just assumed that was a basic quality of being a prairie dog.

Nicole - Yeah, but especially with those black-tailed prairie dogs, these mounds of earth tend to be really tightly compacted so that few plants can grow on them. And around those mounds are clipped lawns that allow plants other than grasses a chance to grow, especially those that like disturbed areas. And prairie dogs make these lawns around those mounds of earth in order to help spot incoming predators and so it's really beneficial to them. There's been a little bit of controversy as far as, you know, this low area of grass can also increase soil erosion, especially with the constant prairie wind that we know and love if you live anywhere near a prairie. So yeah, just another caveat there.

Rachel - How mad do you think my neighborhood association would be if I brought in prairie dogs to automatically trim my lawn for me?

Nicole - Probably really mad because then they would also have tons of little mounds of dirt everywhere. And you know how mad people get about like, you know, molehills and stuff.

Rachel - There's big native lawns that are better because they have biodiversity, you know, constantly being made fun of, not made fun of, it's a constant presence in our like wild green meme type circles. But imagine, imagine if your lawn had both native biodiversity and prairie dogs.

Nicole - Amazing.

Rachel - I mean, does it get any better?

Nicole - It doesn't, honestly. Like, yeah, that sounds great.

Rachel - I could get through several more months of pandemic if I had prairie dogs in my backyard to watch in addition to bird feeders.

Nicole - Yes. That's, yeah. Dream come true, honestly. Other than, you know.

Rachel - Other than not having a pandemic, is that what you were going to say?

Nicole - No, I was just, other than like...

Rachel - Birds.

Nicole - Yeah, stick to birds.

Rachel -Holes.

Nicole - Please don't introduce prairie dogs where they shouldn't be. It's not a great idea. Please, please, please don't. And I will say that prairie dogs, whenever they are associated strongly with a human settlement, they actually have some really negative effects on diversity.

Rachel - You're kidding.

Nicole - No. So point number two, plant diversity. We'll go into the bad stuff first, because that's just where we are now.

Rachel - Oh, sorry, sorry, sorry, I'm just over here like, ah, tell me more, please.

Nicole - So it's very, very widely accepted that plant diversity goes up whenever you're on a prairie dog town. However, there was a 14-year-long study that was based in Boulder, Colorado, in a very urban setting, and it's by Stower C. Beals et al. They found some really interesting trends. So, and I quote, in the absence of prairie dogs, vegetation in this region exhibited declines in native grasses, no changes in introduced grasses, and increases in native and non-native forbs, which are just flowering plants, and bare soil over the ‘study interval’. In the presence of prairie dogs, these observed directional changes, so did it go up or down, were nearly all amplified at rates four to ten times greater than when prairie dogs were absent.

Rachel - Wow. And that's only in or around human settlements?

Nicole - As far as we know. So this was kind of a unique study. As far as I know, nothing else quite like this has ever been done before, and they even mentioned that in the study. They were like, you know, this is not saying, yes, absolutely, this is the case. It's just that, you know, whenever we're thinking about introducing prairie dogs into new areas, we kind of can't just assume that they're gonna do what we think that they should do. Normally, prairie dogs increase plant diversity, they decrease non-native plant life, they do all of this stuff. But that's not the case whenever they also have to compete with human factors in an urban setting.

Rachel - Oh, that is fascinating. Yeah. So cool. Sorry, I'm just reeling over the implications of this. But it's very interesting to think that, you know, like many things in our backyards, the place for these animals is out on its like native rangeland and grassland. It's out in the landscape, you know, with the native vegetation and the grazers that we expect. And it's maybe not necessarily, you know, outside the Walmart in Hutchinson or whatever.

Nicole - Yeah, definitely. Absolutely. Like I said, in general, native plant diversity really goes up. Plants love being in prairie dog towns. All that digging, all of the grazing, they love it. But plants

naturally, especially on a prairie, are used to high disturbances such as grazing, such as fire. So all of these beautiful mowed lawns just makes the prairie plants just go crazy.

Rachel - Yeah, because that's really what they thrive for. And it's a really intensive form of grazing because these animals are clipping it down so far. Isn't it also true, and maybe you planned on getting to this at some point, but the large megafauna that graze on the prairie historically would have also been attracted to those areas. So there was an even greater intensity of grazing there because of the bison and ungulates that would preferentially visit prairie dog towns?

Nicole - Yeah, absolutely. Yeah. And what's actually kind of interesting is, you know the frequent grazing of the plants on these prairie dog towns, both by prairie dogs and other large herbivores, actually leads to graze-resistant strains of plants, which is super cool.

Rachel - Wait, what do you mean, graze-resistant strains of plants?

Nicole - So the plants on a prairie dog town are even better at resisting grazing and bouncing back from grazing than the plants, like, you know, 100 feet off the prairie dog town. So even if it's the same species, even if it's the same species, they, they, yeah, there's so much grazing pressure that, you know, the little bluestem here can bounce back and grow super fast after a grazing event compared to the little bluestem 100 feet away.

Rachel - Okay. So you're talking specifically about, like, their recovery from grazing and their growth after grazing?

Nicole - Yes.

Rachel - When you say resistance to it. Okay, cool. Because I was like, there's, there's other plants that resist grazing by, like, adding spiky silica to their cells and making themselves unpalatable or, like, having noxious chemicals and stuff.

Nicole - Nothing that exciting, no.

Rachel - But no, this is exciting, though, because if they're better at sprouting back after grazing, then, like, you're kind of cultivating “a plant that's going to continuously produce fresh green growth for those grazers, which I'm instantly obviously thinking about the **ag implications** of that because primarily the grazers on our grasslands or our prairies where those guys are is, like, cattle. And people are so concerned about, you know, being able to provide nutritious growth for them and it's, yeah, that's really interesting to think about.

Nicole - No, yeah, absolutely. And that's actually kind of leads us into the animal diversity found at prairie dog towns. So, you know, those grazers, like domestic cattle, like pronghorn, like bison, love prairie dogs and that constant clipping encourages, like we said, new tasty, tasty growth and it is high in nitrogen, which is something that is really, really helpful for grazers

because it actually helps with digestion. So the soil is nitrogen rich, the plants are nitrogen rich, there's just so much nitrogen on a prairie dog town.

Rachel - Nitrogen is better for digestion?

Nicole - Yeah, apparently. I learned that too while doing this.

Rachel - Oh, I wonder if that's just for ruminants. Well, I guess we wouldn't be out there eating these guys. But that's so cool.

Nicole - And there's a ton of other animals that have been really closely linked to prairie dog towns. I've seen various statistics, either 150 species, 200 or 250 species of animals alone have been very closely linked to prairie dogs and their towns. Yeah, and that's anywhere from beetles, toads, hares, lizards, to birds, and like we said, the pronghorn, bison, etc, etc. And especially for birds like killdeer, mountain plovers, horned larks, those ground nesting birds that just kind of dig at the ground a little bit and then plop their eggs down. They really like prairie dog towns and they again are benefiting from that lawn of really short grass. They can see when predators are coming in and other birds like the burrowing owl will use prairie dog burrows and they will only use active prairie dog town burrows. They will not use abandoned burrows because a lot of times those abandoned burrows are super overgrown because you don't have the prairie dogs mowing down that lawn anymore and taking care of it.

Rachel - Yeah. Gosh, that just made me think about how so many artificial burrows are being installed in places where prairie dogs are now extirpated and no longer exist. How sad it is that we have animals that would provide this free resource because that's what they're supposed to do. We've had to pay a lot of money to figure out how to replace them in an ecosystem. And it's not even providing the other benefits like trimming down the vegetation. And so it's not even just the structure and that's even more interesting. I didn't realize burrowing owls preferred active ones.

Nicole - Yeah, I didn't either. And did you know that those man-made tunnels have been in the use since 1970s?

Rachel - No, you're kidding me. Oh my god, I thought it was something that happened more recently than that. Oh no.

Nicole - I thought it had to. But that was part of my like part of what I researched into was those man-made tunnels. And like, I had no idea that they were used way back in the 1970s. Like you said, they're very much still in use today. They're like, people are actively putting them out to try to help these poor little burrowing owls. And I guess like, technically, it's no different than, like, an Eastern Bluebird nesting box. But I don't know. It's extra sad.

Rachel - Sure.

Nicole - Yeah.

Rachel - Like you said, it's extra sad because like, these prairie dogs are doing this for free. And yeah, now we don't have them.

Nicole - So yeah.

Rachel - Man, that's really sad. I'm sure we'll at some point do, and by we I mean me, an episode that's probably focused on burrowing owls both in North and South America. But I know there's some really interesting, coevolutionary stuff with burrowing owls and the sounds that they make, in particular the males, because a lot of them mimic prairie dogs and the sounds that prairie dogs make.

Nicole - That's awesome. I love that.

Rachel - So, ah, God, that breaks my heart.

Nicole - Me too. Tell me about it.

Rachel - I just want, I want the band to get back together, Nicole.

Nicole - I understand. Me too. So much. I love that you brought up that the burrowing owls mimic the prairie dog noises, because all of the different noises that prairie dogs make is actually one of the reasons that their burrows are such a good safe haven. So prairie dogs have an amazing communication system. It's super, super complicated. “And Con Slobodchikoff says that it is one of, if not the most complicated language that we know of in the animal world. And that's including things like apes, things like dolphins. He says that they are just as good at communicating, even though they're never given any credit for it. But whatever, that's what this podcast is for.

Rachel - I was gonna say, we are here to change that and we are here to create the credit that they need. Just like all the other grassland things that are so overlooked and underappreciated. This is the start of something new and better for prairie dogs and all of the others that benefit from a grassy ecosystem.

Nicole - Yes, yes.

Rachel - That started off really strong and then ended up somewhere not strong.

Nicole - That's okay. And if you go on YouTube and you search prairie dogs, America's meerkats, you can find a whole video series about Con Slobodchikoff's work and some of his, especially the language work in more detail. But essentially they have a ton of different communication that's going on. They do tail flagging, which is basically just they wag their tail around and tell what's going on by that. We don't really know what all of that tail flagging means,

but it's very obvious that it means something to the prairie dogs because they do react to it and they will tail flag back. We have done, there's been, I say we, like I've done any of this. There has been very in-depth research on specifically the alarm calls that prairie dogs do. They have different calls for different kinds of predators and can even describe the predators and where they are to other prairie dogs in the town. By being around all of these eyes constantly looking for prairie dogs, it means that you kill deer or a pronghorn or whatever, also get the benefit of that alarm system.

Rachel - Yeah, yeah, no, absolutely. And one of the things that they're the most famous for is their predator alarms. So there's a lot of communication that goes on, but they do make it really clear if you ever have a chance to watch prairie dogs when they've spotted danger because not only will they sound the alarm, but they'll kind of react to it if there's an actual threat. I don't know, do you think or have you seen any indication that other animals can pick up on what the prairie dogs are meeting, whether it's by the types of sounds they're making or just by their behaviors?

Nicole - I mean, yeah, absolutely. And this is something that's very well documented across the globe. There's a lot of other animals that will be in mixed species groups and as one animal in that group gets spooked, everybody else gets spooked too. Maybe they don't know exactly what's going on, especially with the prairie dogs and how they can say, oh, it's a hawk, oh, it's a coyote, oh, it's a person being weird and staring at us with some binoculars. The killdeer don't know that it's a hawk versus a coyote, but they know that something is wrong and that they should take cover.

Rachel - But what if they do know?

Nicole - I mean, maybe, who knows? Thats the cool thing about animal language is there's so much going on, both verbally and also just physical signals that they're giving to each other as well. We have no idea what most of it means. One other really, really cool example of “those towns being a safe haven is during periods of fire. Like we said earlier, fire is super important to grasslands of all types, and those burrows that the hardworking prairie dogs have made, which again can be up to 30 meters long, super long, offer a really easy, quick, safe route to escape the heat for many animals. Those prairie dogs don't really defend their burrows super aggressively, so other animals can go underground and take shelter. A lot of times it's just smaller things like snakes and toads and lizards, but it's not unheard of for smaller animals to kind of duck in there real quick.

Rachel - Wow. Yeah.

Nicole - Not only will other animals go down inside the burrows, but the, again, beautiful clipped lawn outside of the burrows will help provide a haven for larger animals that can't fit down inside the burrows. So as fire is roaring across the prairie, they, you know, the fire is either going to slow down or even stop once it hits that super, super slow grass. And there have been anecdotal stories told about how, you know, bison will naturally go to prairie dog towns and, you

know, sit on top of the towns while the fire goes around them and they're perfectly safe. But things like cattle who have no real experience and have not evolved alongside these animals don't know how to do that and they will just perish in fires. And it's kind of sad, but it's really interesting as well.

Rachel - Yeah, it's cool to think that these behaviors are so innate to the native prairie animals that even something as massive as a bison knows that it can find shelter from a fire on a prairie dog refuge. Yeah. That's so cool. And it makes sense because with the lawns being trimmed so short, there's no fuel for the fire on that town and it's likely to extinguish.

Nicole - Yeah, absolutely. It's the same thing, you know, if you've ever been a part of or you've ever seen a controlled burn, there will be areas around the part of the grass that you want to burn where it's mowed or somehow is much, much shorter or even tilled to get to bare earth. And that way, once it hits that short grass, you can extinguish it really easily. You can't really stop flames that are 20 feet tall, but you can stop flames that are two inches tall. So it makes a huge difference and that fire is going to slow down so much on top of those prairie dog towns.

Rachel - Yeah, man, that's wild. And you've actually participated in burns.

Nicole - Yes, it is so fun.

Rachel - I'm not a fire person, so I don't know that I would have a fun experience. I feel like I'd be stressed out, but I would be really interested in watching it happen and watching the animals react to the fire. And I'm not meaning that in a weird morbid sense. I mean, like, you know, hawks are known to hunt at the edge of the flames to find easy prey to pick off. And there's a lot of animals that just have these, like, natural relationships with fire. But this actually makes me wonder if the decline of prairie dogs across, at least for the black-tailed prairie dogs here in the tall grass prairie and the mixed grass prairies, has that decline contributed to animals really struggling to survive fire events? Because I know that a lot of other... We haven't got to the potato part yet, where prairie dogs are like just a food source. But a lot of other animals have kind of replaced that niche for them, like rabbits. So there's, you know, food sources, but none of those animals are providing the tunnels and burrows. And I wonder if that's really impacting fire recoveries for wildlife in a way that we haven't seen before.

Nicole - Yeah, I have no idea. That's a really interesting thought. And I wouldn't be surprised if there is a little bit of a connection there.

Rachel - And that's really worrying because wildfires across our country and especially, you know, in Kansas, we've been going through some periods of drought. They're becoming a lot more common and widespread. And, you know, we burn the prairie on a regular basis just for maintenance, because that's what the prairie needs and is used to. But these uncontrolled wildfires that are kind of devastating right now, they're going to keep becoming more devastating. And, yeah, it's probably a good conversation for ecologists to be having about

whether the lack of prairie dogs in the landscape is going to contribute a lot to some wildlife losses.

Nicole - Well, that's sad.

Rachel - No, but here's the thing. Here's the thing, Nicole.

Nicole - Yeah, yeah.

Rachel - Like, sometimes it's sad, but if you're able to identify more specific problems, then a really massive, almost intangible problem, like the loss of wildlife diversity in an entire ecosystem, becomes a lot more manageable. You know, like, hey, if we can find a way to introduce a few more prairie dogs and we know it will have these specific positive impacts on the ecosystem, even if some of the diversity factors of plants or whatever are a little unknown and confusing or not confusing. What's the word for that?

Nicole - I mean, they are confusing, because we don't know. Like, if we suddenly introduce prairie dogs, like, across as much of their historic range as we possibly could, like, what would that mean? What would that mean for farmers? What would that mean for, you know, pronghorn and everyone else? All the foxes and things. Like, we don't know. We have no idea what that would do.

Rachel - But imagine if we could stabilize something like the Lesser Prairie Chicken, in part, you know, in addition to other conservation measures, by introducing prairie dogs so that, you know, when these devastating fires... I know I had some friends working on prairie chicken projects for Lesser Prairie Chickens during the time when a wildfire swept through the entire study site. So they are being impacted by these things. And like, what if this is a measurable thing that could help? I don't know. It's just cool. It's cool being able to identify problems because it makes you feel a little less helpless. Does that make sense? I don't know. I'm going to take it as a positive because we need more positivity.

Nicole - No, I like it. That's an interesting way to think about it. And I love Con Slobodchikoff. I would die if I could meet him one day and just talk about prairie dogs. But in his book, he was talking about how unbridled pessimism is bad. Whenever you're talking about conservation, you have unbridled pessimism, then people just don't know what to do and they feel like they can't do anything and then nothing happens. But unbridled optimism can also be just as bad, if not worse, because you have to find a middle ground somewhere. You have to look at the small chunks and figure out what you can do and realize that things are bad. If you're just always optimistic and thinking that someone else will take care of it, it's not a big deal, that's not happening, then also nothing will get fixed. So finding those little chunks that you can maybe do something about, that's a really good way to think about these kinds of issues that are at the moment almost too large to handle.

Rachel - Yeah, yeah, I feel like that's a huge problem in conservation generally. How many times have we been to conferences recently about science communication where people are having to have the same conversation about how we talk to kids about conservation over and over again, because it's just like people can't handle the pessimism, but we can't just be like everything's great when we're trying to teach people the realities of our field. So yeah, like everything, neither of the extremes paint a full picture.

Nicole - Yeah, absolutely. I love it. Me too.

Rachel - We haven't even got to your potato chips. I keep saying these things as if anybody who listens is going to know what I'm talking about with you. You know what I'm talking about.

Nicole - Yes. Prairie dogs are tasty, tasty snacks. We've called them potato chips, potatoes.

Rachel - Baked potatoes.

Nicole - I'm trying to think of all the different ways we've referred to them in this episode. But we're finally at that part.

Rachel - Yes. That's a little too much enthusiasm for the death of prairie dogs.

Nicole- Yeah, thank you so much.

Rachel - But it's an important role that they provide, okay?

Nicole - It is. And I think that it's overlooked a lot. Like, okay, cool, they, you know, protect animals during fires and they increase animal diversity and plant diversity and who cares? Like, that's cool. But like, also, they're just really tasty snacks. Did you know, the mortality rate is extremely high in prairie dogs, with only about half of them even making it to their first birthday.

Rachel - Oh, That is somehow both unsurprising and also a little surprising. That's a lot.

Nicole - Yeah, it's a lot. It sure is. There was a really fascinating 15-year study by Hoogland in 1995, which unfortunately was quite a long time ago, but most of these were, and we'll get to that. But the study in 1995 followed a black-tailed prairie dog colony, and him and his team observed 587 male prairie dogs emerge from their burrows as pups because prairie dogs spend the first month or so underground, hanging out where it's nice and cozy, getting fed by mom, and he observed 587 males emerge from their burrows, and only 8 live to be 5 years old, and none live to be 6.

Rachel - Oh, that's not very many.

Nicole - That is not very many at all. Females have a slightly higher survival rate. He observed 523 pups emerging over the study period, again 15 years. Four of them lived to 7 years old.

One lived to 8, and that lone survivor never made it to her 9th birthday. And it's not just that prairie dogs have a short lifespan. In captivity, prairie dogs have been known to commonly live to 10 or even 12 or 13 years old. So it's not just that they always die young, it's that so many things eat them. So in the wild, they are very common prairie resources to things like black-footed ferrets, swift foxes, coyotes, badgers, golden eagles, and a whole host of other birds of prey. In particular, badgers and swift foxes have been found to rely on prairie dogs for over half of their diet, while some animals, like that beautiful black-footed ferret, are almost completely reliant on prairie dogs, with up to 90% of their diet being these little potatoes.

Rachel - Yeah, fascinating. And what I'm noticing as you're listing them off right now, is that all of the aerial predators tend to be the daytime predators, and all of the underground predators are the nighttime predators. And that makes sense, because aren't prairie dogs pretty strictly diurnal? They're only active during the daytime?

Nicole - Yes, so it's going to be hard to sneak up on them on the ground, because again, short, super clipped lawn... What? Short, super clipped lawn and so it's really, really hard to sneak up on them. If you're in the sky, it's a little bit easier. You dive down, catch a prairie dog, you're good to go. But all of these nocturnal predators, all the guys that are on the ground, just kind of dig them up out of their dens at night.

Rachel - While they're sleeping?

Nicole - Yes, while they're sleeping.

Rachel - And that makes so much sense because they probably, I mean, they certainly are a little bit of an easier target when they're all sleeping and nobody can see the predators and set off the alarms.

Nicole - Yes, 100%.

Rachel - Do you think more prairie dogs die in the day or the night?

Nicole - I don't know. It's a good question. I bet at night. I can't remember the exact numbers, but it's interesting that so many are taken by aerial predators, considering that they do have these alarm systems in place and they are hypervigilant. And the success rate on these attacks isn't super high. It's not like every single time a hawk goes after a prairie dog, they're going to get one. And I can't remember the exact success rate, but it wasn't super, super high. And it's just that there's so many, there's so many of these aerial predators that are attracted to these towns with so many prairie dogs, you know, hundreds if not thousands, depending on what town you're looking at. You know, that's a lot of food, just hanging out, eating some grass. So a lot of the larger hawks and things will preferentially build their nests near these prairie dog towns. So they're feeding, you know, at least two adults plus young. And so there's just a lot of mouths to feed.

Rachel - And then there's not only all the prairie dogs, but potentially other small animals in the area too, because they're also attracted to the prairie dog town. So it's kind of like, yeah, the ecosystem equivalent of having a shopping mall where all the stores are just kind of packed in one location.

Nicole - Yes, definitely. And that's another reason why, you know, those ground nesters that we talked about earlier, the ground nesting birds, are attracted to those towns, not only because of the safety, but also because there's a lot of fun invertebrates to eat.

Rachel - Oh, yeah. And ironic that we keep saying like, oh, it's a super safe place to be, while also describing how many predators go there just to eat things.

Nicole - Right? Yeah. And it's kind of, okay, a side note.

Rachel - Oh, boy.

Nicole - I was skimming through a book that my man who I was just talking about, what was his name? I was skimming through a book. Shhh.

Rachel - Hooglund.

Nicole - Yes I was skimming through a book that Hooglund made today. And he was talking about, you know, the pros and cons of community living and stuff like that. Like, yes, you get this really cool alarm system. Yes, you can work together to, you know, find food and all this fun stuff. But you're attracting a lot of predators. So you kind of have to, I mean, they don't literally decide, but you have to decide if the pros outweigh the cons. And at least for Prairie Dogs, they do.

Rachel - Fascinating. That's really cool. I'm glad that somebody has looked into that because I feel like too often these questions may be asked, but they haven't been investigated. I like that he tried to qualify it to some extent.

Nicole - Yeah, it was like 20 pages. I'm not gonna lie. I didn't read all of it, but it was interesting. Despite being such very, very important members of the prairie community, like we said earlier, many estimates put prairie dog decline from historic numbers at about 98%. We have about 2% of prairie dogs left, which isn't super surprising considering we have about 2-4% of the prairie left. And many prairie dog colonies are still seeing really drastic declines. There's been a lot of more recent studies that went back to sites in the 80s and 70s and saw that a lot of the sites were either not homes to prairie dogs at all anymore, or that they were still facing those same declines that the studies in the 80s were finding. It's not something that's getting better, but it is something that is slowly gaining more national attention. The Utah prairie dog is listed as threatened, and the Mexican prairie dog is listed as endangered on the Endangered Species Act, and a few other states such as Colorado have listed species of prairie dogs as a special concern species or species in need of conservation. Different states have different names, but

basically they're just saying, oh, hey, something's going on here. We should probably try to fix that.

Rachel - And that's the quickest legal way to get people to pay attention.

Nicole - Yes, absolutely. But in states, especially like Kansas, where there's a lot of farmers, there's a lot of pushback to getting prairie dogs any kind of listed, because once they are listed either by the state or by the federal government, then they have protections in place legally that, you know, you can't kill these animals, you can't destroy their habitat. And these, especially with the farming community, worry about these prairie dogs competing with their cattle.

Rachel - Yeah, so we should say farming and ranching, because farmers who are planting crops on their land versus ranchers who are stocking cattle and grazers and stuff, they both have valid concerns, but they're for different things.

Nicole - Yeah.

Rachel - Different reasons, yeah.

Nicole - You're right. I mean, there actually has been some evidence pointing towards prairie dogs, you know, destroying crops. It's not something that is numerous in any way, but having even one example does scare people. I get it. Like, that's their livelihood. Like, you don't want to take that risk. My heart goes out to them. It really does. But especially with cattle ranching, a lot of those fears are not supported by evidence. So, you know, historically these prairie dogs were with pronghorn, they were with bison, and they got along just fine. And we have found that cattle and prairie dogs do like to eat some of the same grasses. But again, in a prairie dog town, as it's getting mowed down, those grasses are growing back so strong that that kind of makes up for any competition that might be there. But it is really hard to define exactly how much competition, you know, a prairie dog has with things like cattle or bison. But historically, they've gotten along with bison, so theoretically they should get along with cattle. People also worry about cattle tripping in prairie dog holes, but there's been, again, very, very little anecdotal evidence of that. Of course, I don't know of any big studies that have looked at that, so maybe it is more of an issue than we're aware of. But as it stands right now, we don't have any strong evidence that that is an issue.

Rachel - Right. It's probably really hard to study these things because nobody really wants to be the guinea pig that finds out, yes, stocking prairie dogs and cattle and making your neighbors pretty upset with you in the process does, in fact, make your cattle lose weight.

Nicole- Yes. I found one really cool study. I can't remember who it was by. I'm so sorry, random person. But they looked at lands that had cattle and prairie dogs and then lands where there was just cattle and they tried to make them, you know, otherwise as close, you know, as possible. And they found that the cattle on prairie dog lands did not significantly change in weight. They did lose a little bit of weight in the winter versus the summer, but most ranchers will

supplementally feed their stock anyways. So as long as they're supplementally feeding, it's like, you know, the evidence suggests that it should not be an issue.

Rachel - Except in the winter. That's very interesting. Well, good. I'm glad that that's being studied. And I know that there are ranchers even here in Kansas that do stock, I say stock prairie dogs as if they're like putting them there and managing them the way they would their herds of cattle. But, you know, they do have to be at least a little bit proactive about it because, you know, there's so much pushback from the community because they have the concerns named before. I've also heard concerns more recently, at least from Kansas ranchers, about plague.

Nicole - Yeah, and that is... So not only are prairie dogs tasty, tasty snacks, but all of these animals living together in close proximity also means that, you know, illnesses such as plague can very quickly wipe out a colony. And there was, in Con Slobodchikoff's book, Prairie Dogs, he looked at this and he said, you know, whenever plague hits a town, within a week, I believe he said, 98% of the prairie dogs will be dead. It destroys them. So, I mean, if you come across a town with plague, they're going to be dead in a week. So just, I don't know, don't put your cattle near them, and it'll be fine.

Rachel - Is that sylvatic plague though, or is it like the black plague? Because they're susceptible to both. Sylvatic plague is an introduced disease, which like mega sucks because it's not even supposed to be here anyway. The fact that they do get black plague, I know, definitely makes some humans nervous because, you know, there's all the scary tales from the past. Although we're forgetting that simple hand-watching would have solved it all those years ago. So it's probably not as detrimental to humans. But, you know, that one at least can impact humans. I don't know about sylvatic plague. So I guess I don't like to go roll around in a prairie dog town and pick up their fleas.

Nicole - Yeah, that's the big thing is these burrows are home to a lot of fun fleas. And the fleas can survive the winter a lot of times because, you know, those tunnels are basically air conditioned. They're warm in the winter. They're cool in the summer. So all of these lovely pests just hang out and multiply and get the prairie dogs sick. So yeah, even though prairie dogs French kiss, just don't French kiss a prairie dog. It's not recommended.

Rachel - No, I imagine they'd leave a nasty scar too if they did not comprehend what you were doing. So I want to hear you make a full conclusion of the case for why prairies can't exist without prairie dogs.

Nicole - Despite being plague-ridden varmints, I just really love prairie dogs. And these dedicated little tunnellers affect the plains and all of the plants and animals in them in a multitude of ways. Not only are they tasty snacks, they increase animal diversity, plant diversity, they improve soil health, and those burrows are a huge safe haven for a multitude of animals. If you're in college and looking for a thesis, boy howdy, do prairie dogs need more attention. Like I said earlier, a lot of this research is a little old. A lot of it's from the 70s and 80s, and it makes

me very sad. So please, please, please, please, if you need something to study, prairie dogs are here for you and will always be here for you.

Rachel - Hopefully.

Nicole - Don't say that.

Rachel - Well, they will be here. Because without prairie dogs, there wouldn't be a prairie. Yeah. At least not the way we know it.

Nicole - Yes. Even though many people dislike prairie dogs, it's my hope that once they learn a little bit more about them and all the services that they provide, that people will be more likely to fight for them.

Rachel - I'll fight somebody for the prairie dogs.

Nicole - I love it.

Rachel - If you want to fight us for the prairie dogs, you can contact us by going to our website, grasslandgroupies.org.

Make sure to follow us on Facebook and Twitter. You can email us at info at grasslandgroupies.org. You can even give us a phone call or a text.

We'd love to hear from you. 316-512-8933. We'll leave all of you guys with this beautiful quote by Con Slobodchikoff. He writes, “The first step in conserving anything is an awareness of the value of its existence. Without getting to know an animal, plant or person, one can intellectually respect its right to live, but one cannot truly feel its worth or know what is required to save it.”