



Prairie Pod Transcript

Season 4, Episode 34, Part 2: Invasive Species Support Group: how to cope with Kentucky bluegrass and smooth brome

Hosts: Megan Benage, Regional Ecologist and Mike Worland, Nongame Wildlife Biologist

Guest: Managers talking through their struggles with these species: USFWS: Sara Vacek; DNR: Cory Netland; BWSR: Dan Shaw

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

Transcript:

((sounds of birds chirping and wind blowing))

Megan: Welcome back to the Prairie Pod, we are super excited to offer you part two of our Invasive Species Support Group, so that you can still feel supported and have some helpful tips and tricks and I don't know, just contribute to your overall well-being.

Mike: Just breathe deep, take deep breaths, we'll get through these invasive species together, I guess.

Megan: We will get through them together. It's important to have a family in conservation, a family of folks working together for the prairie.

Mike: You know, maybe I should just quickly review and, especially if a listener didn't hear part A of this theme.

Megan: Absolutely, I love that you're calling it part A and I'm calling it part 1. That's not confusing at all for our listeners.

Mike: Part A1.

Megan: Part A and part 1 are the same, which aired last week, just so everybody knows. Go ahead, Mike. Give us the overview.

Mike: Yeah. I was just going to say I was, I was initially uncertain as to whether we should have two episodes focused on this topic. Now I'm totally convinced we should

have a whole season focused on this topic, like it's just super relevant, super important to managers and interesting to think and talk about.

Megan: Absolutely, and so we've got kind of a progression for you, so last time we talked through this concept of rest is death, which talks about the importance of mixing your management up and it's not saying that you should never rest the prairie, - -

Mike: Right.

Megan: - - it's just saying that in the bigger scheme of the prairie landscape, they are disturbance-based habitats, and then Rhett, who Mike wished was his botanical instructor, and - -

Mike: Botany teacher.

Megan: - - botany instructor, went over some of the plant biology and why these C4 and C3 pathways make a difference when you're trying to control Kentucky bluegrass and smooth brome, and then Dustin talked about a particular management strategy for smooth brome, which is hay management, so you should check that out last week, it's up on our website, mndr.gov/prairiepod. Now we are going to hear, so for those of you who didn't hear how we're doing this, it's similar to our holiday episode, where we prerecorded these mini-interviews with our fantastic guests and so we're just going to introduce them to give you some context, and then you'll hear the interview that we had with those folks. So we're going to start out with Sara Vacek, who's a wildlife biologist with the US Fish & Wildlife Service out of the Morris Wetland Management District in, unsurprisingly, Morris, Minnesota. And so she is going to talk about some super important themes. First she's going to back us up that diversity in your management both in the timing of your management, how frequent your management is, and the type of management you're doing are super duper important, and she's going to talk about a particular aspect of timing, how to time your management so that you are most impactful and effective on these two prairie beasts, and I don't mean beasts in a good way, I mean these two, that's a terrible, that's a terrible insult to beasts everywhere. These two prairie nonnative invasive species, Kentucky bluegrass and smooth brome.

Sara: I'm the wildlife biologist with the Morris Wetland Management District, which is part of the U.S. Fish & Wildlife Service in Morris, Minnesota.

Megan: Do you have a last name?

Sara: Vacek, Sara Vacek, I'm a wildlife biologist with the Fish & Wildlife Service. I work at the Morris Wetland Management District, west central Minnesota.

Megan: Perfect, tell us about, yeah, welcome, welcome back, Sara.

Sara: Thanks.

Megan: Tell us a little bit about some successes that you've had with either Kentucky bluegrass or brome.

Mike: Or not necessarily successes, Megan, right? This is a therapy session, this is all about honesty here.

Megan: We're here to support you, so maybe even some failures, you know, things you wish you could have done differently. Just tell us your story. We're here to support you.

Sara: Right. Well so my job as the biologist at my office is to do our, to run our inventory and monitoring program. So what I have is less of a management story and more of a monitoring to help us make management decisions story, if that makes sense.

Megan: Perfect, right up Mike's alley there, right?

Mike: Absolutely.

Sara: And you're going to love this Megan, too, but my sort of take-home as I was thinking about this getting ready and thinking about the things that we've learned over the last decade of doing a bunch of monitoring in prairies is that as we often realize when we're thinking about this stuff, there's no silver bullet to fixing your brome problem or your bluegrass problem, and just like you're always preaching diversity and reconstructions and diversity in prairie, I think my take-home message for people is that when you're thinking about monitoring prairies with brome and bluegrass problems, diversity and management is really important. So I'll have a couple of - -

Megan: So there you're just - -

Sara: - - I know you love me.

Mike: You just had to butter her up. Yeah.

Megan: I do. That's what I was going to say, I was just going to say you know how much I love you right now. I mean, always but right now especially is a lot of love for you.

Sara: Yeah. Well, and it's, I mean, I have a couple of examples I guess to that I kind of sort of pull on to, to support that idea of diversity and management, and just one disclaimer is really the projects that I'm pulling from for this were the Grassland Monitoring Team or GMT and then another big adaptive, GMT is the one that we - - Marissa and Daren, and I were talking about in a previous podcast episode, and then the other project is called Native Prairie Adaptive Management or we call it NPAM for short, and both of those are big grassland adaptive management projects, lots and lots of different offices involved, and the idea of them is to provide decision support or management recommendations to managers as they're managing prairies, but they both are focused on remnant prairie, so I have stories about reconstructions in brome and bluegrass too but I'll stick to remnants today.

So we've been doing GMT and NPAM for over 10 years, both of them, and you know like I said, we do give as part of that, managers get some management recommendations and some like assistance from the models and making decisions as they're doing their management. But one cool thing about them too is after having done them for this long, we have, you know, 10-plus years of data that we can also take and look at in sort of more traditional statistical analysis type ways, and started asking other questions of the data and learning things in sort of just different ways. So couple stories. One is with NPAM, one of the things that we built into that project for the tallgrass was this idea that comes from a publication that Wilson and Stubbendieck put out in I think like 2000 or 2001, so like 20 years ago, that is just engrained. They have a model in that

publication about managing brome with fire, and this is where even if you don't realize it, almost all of our managers use this idea of burning when brome is at the three to five leaf stage, and you hear people talk about that a lot and I bet a lot of them don't even realize that this is the research that gave them that mental model.

Mike: Sara, you said, can I just interrupt you? You said three to five leaf stage?

Sara: Right, so for brome phenology, their study or their model that they developed after some research basically said that there is a period in the spring, if you track the phenology and the development of brome, there's a period in the spring when it's the most vulnerable to burning. And that period is called tiller elongation, which is just the botanist term for when the plant is shooting up that stem, and that's the time when it has kind of used up most of its energy and it's the most difficult for the brome to recover from that fire after that stage, but it's also the timing of burning at that point is also sort of a one-two punch on the brome because it is also a time that really favors the warm season grasses when you burn at that stage when the brome is in elongation is also a great time to favor warm season grasses, it warms up the soil and then they also don't have that competition of the brome and the thatch on the surface, and so the warm seasons go crazy, but then what that does is it also makes it harder for the brome to recover because they've got extra competition for the whole rest of the growing season. So the theory here, the model that Wilson and Stubbendieck developed is that it's like this magic window of vulnerability for brome, that if you can do your fire at that time, you're going to have the best success at reducing brome and increasing native cover on your prairie.

So like I said, that's like engrained in most of our tallgrass prairie managers' minds, they, it's almost like not even a question that we think we need to test, it's just part of how we do business, right, is that that sort of late spring burn is really the best option that we have out there. What we found was that when we actually tried to nail down that window and find good bookends for how to measure that, what we ended up using was growing degree days or like they use for corn, and basically just certain, I'm not going to try to explain it, but we use growing degree days and correlate that with the development stages of brome throughout the spring, and so, I mean, we really went all out and tried to figure out how to identify when that window is happening, and what we discovered is that that window is later than we expected it to be and it's also shorter than we expected it to be. It sometimes is only like seven to ten days.

Megan: Oh, interesting.

Sara: Yeah, it kind of makes sense when you think about it because a lot of the work that Wilson and Stubbendieck were basing this idea off of was done in Nebraska, so much further south than our prairies. Just logistically speaking, even if you can identify that window, it gets very hard for us to get burns done the later you get in the spring, and especially the further north that you get in tallgrass prairie, that magic window is almost impossible to hit with burns or maybe.

Mike: I mean logistically it's hard to get a burn done any given year, right?

Sara: Right.

Mike: - - so never mind seven to ten days, yeah.

Sara: So then that can make it feel a little maybe disheartening to some managers that, you know, this is the best time, this is when I should be doing my burns, but it's hard to hit it, so I guess kind of the lessened learned for us was that you can't just count on that magic timing. Like I said, that's not your silver bullet to fix your prairies that have brome, and you know, a lot of people probably haven't read that paper but one thing they talk about in there is that the part of the sort of foundation of this concept is they sort of preface it by saying in prairies that you can't manage every year, this is what you should do, so when you're limited to really infrequent management, then the timing becomes super important. And I think that still holds true but to me, that was just a good reminder that we can't just count on that one magic window to be the end all, be all. And even if it did work, it's so narrow and so late, that we can maybe burn a handful of our prairies, but we've got lots of prairies that need our management attention, so that's one story.

Kind of related to that I think, we had a grad student that was working with some of our data for Grassland Monitoring Team, Hugh Radcliffe, and he took some of our data and looked back at it and sort of summarized it in some different ways than what we had been doing, and he was looking at the effects of burning specifically on brome and bluegrass, where in GMT we're just sort of thinking much bigger picture about invasive plants and we don't necessarily analyze and summarize by species, but he was able to do that, so one kind of little nugget is that he found that burning fire, prescribed fire does reduce the cover and the frequency of both brome and bluegrass, so like how much of it you see covering the ground when you look straight down at the prairie, but then also how many individual plants out there or how often do you see those plants across the whole prairie. Are they clustered? Is it everywhere? And so he found that our burning programs are reducing both of those measures of brome and bluegrass in the first year after the fire, and then that effect of reduction continues for cover, so like the, the like how much ground are those plants covering, kind of the robustness of them I guess would be a way of thinking about it, that effect of reduction persists for cover but it doesn't persist for frequency, so what that tells me is we are kind of setting back those plants with our fire but we're not getting rid of them, which we know, but it's a good reminder that they're always hanging out there, and I think that kind of goes hand in hand with that idea of not trying to depend on this one magical time and he's limiting the frequency that you can manage.

Megan: Absolutely. I always talk a lot, Sara, on the podcast, sorry Mike, I'm going to do it, but I always talk about how if you do the same thing over and over again with your management and you expect a different result, it's kind of a measure of insanity. So what you're describing like burning in this magic window or trying to time stuff just right in these late, late spring burns is wonderful, but then we need to know the next step after that because you can't continue to run fires through that system every single year for the life of the prairie because it's going to be at the detriment of something else, whether it's the wildlife that are there, you know, all the way from a skipper up to a prairie chicken or a pheasant or whatever, to the plants themselves, and so I always ask people like okay, so after you've done that and you've knocked it back, what is left in the system to fight the battle for you? Do you have those native cool seasons? Do you have that cover there to help fight that frequency? Because you're never going to like you

said, you said it so well, you're not going to get rid of it, that shouldn't be the goal. The goal isn't to scrub every single brome and Kentucky Bluegrass out of the prairie, it's to make sure that the natives are dominant, resilient, and can persist through time in their dominance, and so after you hit them with that management, you need the next step, like what is the next step I'm going to take after this to make sure I have my cool seasons filling this niche for me.

Sara: Right. And you know, I mean I could go on and on about all the cool little nuggets of information that we're starting to get from looking at these, you know, long-term monitoring data sets, but there are other, I mean, I won't get into it but we found out other things like your starting state matters, so how much brome or bluegrass you have out there at the very beginning is going to have just as much influence on how sort of successful it is, your treatment is, and the climate patterns and weather seem to be really having a big influence, we're seeing some differences in treatment effectiveness, following a wet year compared to a dry year, for example. I mean, you can just kind of go on and on, like some treatments seem to be a little bit more effective against Kentucky bluegrass than they are against smooth brome, and then the timing questions and, I mean, that's exactly it, Megan, that's kind of my take-home from all this is that when you start to take all of those things into account, all of those different factors that influence how the plant community looks in a prairie, really the best thing you can do is to mix it up, and I mean like timing of your management and the style of your management, and the management tool that you're using, and the management frequency that you're using, and I think rather than trying to like dig into every little detail and come up with like the perfect prescription, the best thing we can do is to really encourage that approach to our management and that in, you know, if you mix it up like that, just like diversity benefits the, you know, diversity is good in all other ways, it's the same thing, you're covering your bases, so you aren't just burning at one time every year and possibly reducing something desirable that is trying to grow at that time of year, and yeah, so just like mixing it up seems to really be the answer to being able to kind of take into account all of these different influencing factors that we have to think about. It can get overwhelming, like super fast, it can get overwhelming when you start thinking okay, but there's weather, what was the weather last year and this one has, this prairie has a little bit more Kentucky bluegrass and I know that burning is better for Kentucky bluegrass but it also has some brome, so how do I take that, and it has some dry prairie and it has a wet prairie and as a manager, it can get very overwhelming, and so that's like my simple answer is mix it up.

Mike: Sure. Gotch ya.

Megan: And if I could offer for Mike 'cause as he's listening to this, when Sara says mix it up, what she means, Mike, is adaptive management. The prairie is constantly in a state of change. We need to allow it to, we need to allow it to change and then we need to be ready to adapt with that change, like we need to give it space to move into its new self and not, you know, we always hear managers I don't want to make a mistake, I don't want to fail. If you make a mistake, you adapt, you change, you learn from it so that you don't do that again, so there you go, Mike, adaptive.

Mike: Nice, beautiful. Thank you, Sara. That was, man, she's great, isn't she?

Megan: Of course she is. That's my friend.

Mike: I can listen to her talk a lot.

Megan: Yeah, because she's super knowledgeable.

Mike: She's fun.

Megan: Well yeah.

Mike: She's fun and knowledgeable.

Megan: The best combination, a winning combination. She's a scientist by golly. Fun and factual. That's how we like to be, okay. So we are going to jump right into Cory Netland, one of our area wildlife managers, he works for the Department of Natural Resources, he covers the New London area of Minnesota, and so we are going to hear a little bit from him and Mike, I think you'll like this because he first talks about some strategies that he tried that he didn't really like, he wasn't a big fan of, yeah, and then he adapted, changed it up, and improved what he was doing for some better results. He also mentions our favorite D word, diversity, diversity, you need it, remember it, diversity, diversity.

Mike: He's a smart guy that Cory. (laughter)

Megan: Super smart. Take it away, Cory.

Cory: Hi, my name is Cory Netland, I am area wildlife supervisor for the Minnesota DNR based out of the New London field office, covering Kandiyohi, Chippewa, and Meeker Counties, and I'm here today to talk about brome and Kentucky bluegrass management, trying to keep them at bay within our prairie reconstructions and case that I wanted to talk about was Regal Meadows WMA. This is a unit that's up near the small town of Regal, population 34, so I will reference, yeah, as next to Paynesville basically, about eight miles west of Paynesville, Minnesota. And Regal Meadows is 306 acres but it's part of a larger complex of Stearns Prairie Heritage, Foley WMA, Tribute WMA, and Burbank WMA, so altogether 3000 acres of public lands in that area, and it's part of the Glacial Lakes Prairie Core area, a lot of remnant prairie in that area, and we did acquire this property back in roughly 2010, and there was some old CRP on that that's basically brome grass and we set to converting that brome grass to natives and the process was set in motion with working with the Nature Conservancy and their prairie recovery specialists November of 2012, the first action took place, and that was to mow fire breaks around the unit, and to prepare for a prescribed burn in the spring, which would burn off that brome, get rid of anything that's in the way too, so it's able to receive chemical because that was going to be part of the deal here, it's very, very difficult to impossible to convert brome without using chemicals, so to me, it's an essential item. Once those fire breaks are mowed, literally a day or two after that, a wildlife sparked off of the railroad basically the entire area that we were looking to burn through in the spring, so.

Mike: Convenient.

Cory: Yeah, it worked out all right for us, so at that point it was too late in the season to look at applying glyphosate, Roundup is the chemical of choice, we're not picky here, we wanted to get rid of all vegetation there and start over. So fast forward to spring of 2013 and the plan, which was developed shortly before I started here, I started in April of 2013, but the plan was to use one quart per acre of roundup and so they did that, and there was no tillage involved. A lot of times brome conversion projects will have tillage involved, especially on heavier soils. Anyway, the one quart of Roundup, no tillage, and then that spring, it was spring drilled by Habitat Forever was the contractor. I'd call it a moderate diversity, I wouldn't necessarily call it high compared to the standard of what I'm doing today, it probably had somewhere in the range of 40 species, just the number of species. First thing we saw after that was, of course, a lot of annual weeds. That's to be expected and I explain this to a lot of people when they're wondering what's wrong with their seeding, it failed, it had to have failed, and fairly good at identifying seedlings, so I can go out and find your partridge pea and black-eyed susans are the easiest ones, but there's more besides that to identify, and it was drilled too, so you can find it coming up in rows, that's another convenient thing about drilling is you can point to the rows and say hey, it's right here, it's coming, but in this case I was just talking to myself but which is an uncommon thing but.

At any rate, first year we did, this is kind of the program that was done for many, many years up to about that point, basically you go in and you spring drill in May and you come back and you mow it two to three times that year, and you just don't think about it whatsoever until the following year, and maybe you clip additional times that second year or maybe it's not required, but that was basically the program for restoring native grasses up to about 2010-2012, right in that range, and I do things a little bit differently now, but we did see in the following year in 2014, a good flush of, or a bad flush, if you will, of sweet clover, sweet clover, red clover, and of course, the brome was coming back, and I attribute that largely to too of rates on the glyphosate. I'd like to go with two quarts per acre at least once, maybe even twice if I have that luxury, you know, give it time to resprout I guess between the first and second application, but I don't think there's much of a good substitute for doing it right on the front end, but we have been trying to make up for that ever since, so 2015 - -

Megan: Cory, this is all your preplant site prep that you're describing here.

Cory: Right, right, right, yeah, yeah. Preplanting. I like to make sure we have a good kill on the brome with chemical. Tillage alone is definitely not going to do it, but even at that, you know, the tillage aspect of it, there's a lot of variation in that too if I'm doing a brome conversion. I have a good local contractor here that has a very big, heavy disc, and he'll run two passes with that, two passes with a medium sized disc, and two passes with a finishing disc, so by the time it's done, it looks like a sandbox or a field ready to receive sugar beets or something, it looks fantastic. So in other cases where we are doing tillage, that's the route I'd like to go, and it's, you know, 25 to 35 dollars per pass, it gets expensive, but to me, that's well worth the investment to get that on the front end. But yeah, we basically saw some annual weeds, sweet clover, red clover, brome, things like that through 2015 and 2016, and then in 2017, late winter I guess it'd be, so I think it was in March of '17, we got grazing fence installed all around the exterior of this unit along with Stearns Prairie Heritage, which is managed by the Sauk

Rapids office but it was a cooperative project because they're adjacent units, so we fenced in 525 acres and we did graze the south half of this brome field that I'm referencing, which is an 80-acre field, in that first year, and it was, the timing was May 15th through June 15th, and it did set back both the red clover and the brome.

Megan: And how many cows did you have in there, just out of curiosity?

Cory: I believe it was 50 cow/calf pairs.

Megan: Okay.

Cory: And it was more than, so that I said we grazed the south half but that'd be roughly 40 acres, but there was another 40 acres that's part of another field that was restored at a different time, so they were on 80 acres. And yeah, good response out of that, but that's the one-year deal, so then in 2018, we did conduct a prescribed burn on that entire 80 that had the brome conversion on it, learned some things about burning with exterior grazing fence, that's something we hadn't done before, we learned some things out of that but we also did after that graze part of that, that would be the north half of that, so it was kind of like a patch burn graze type thing where we burned that off but then we had 80 acres fenced in but only 40 of it was that was burned, well they definitely concentrated on that 40 acres, and the timing was the same, it was a little bit later, I think it was the full month of June I want to say because things had to get going after that fire, but even better response on that when we had the two different management techniques there working in tandem, both the fire and then the grazing following up that, so to even fast forward to today, I think that north half looks better than the south half, but there's not a great discrepancy, but we're a couple of years removed from that and by this spring, it'll be three years removed from it, so.

Mike: Right now, Cory, your recipe that you followed here was discing, chemical, fire, and grazing all, am I following that right?

Cory: It would be my preferred method but we did not do any discing on this one. What I'm basically highlighting is that I think we could have done better to avoid this brome situation if we would have done it right on the frontend, and to me, that's really my take-home is that if it's a brome conversion project, there's no substitute from doing it right from at your first option, you know. Now we're left trying to address this problem with ongoing management, whereas I don't believe it had to be that way if we would have done this properly from the beginning.

Megan: Cory, will you summarize for me just quickly here? So doing it right, you've mentioned that a couple times. What is the recipe for doing it right? And I know everybody who's listened they're like uh oh, she's talking recipes and she always tells us not to use recipes.

Mike: That's right, Megan.

Megan: Quick caveat, every piece of land is different and you need to be adapting, but this is just a guide of what Cory believes would have worked on this site better, so caveats. Go ahead, Cory.

Cory: Sure, so on this, I will just assume that that wildlife had happened, as it did, in November of '12, so ideally in the spring, it's going to green up fairly early on that field, it would have been blackened already, getting some additional heat out there, and the nutrients that are being cycled back in, so you know, I think we'd be able to spray Roundup fairly early and I would two quarts per acre on that, and then due to that being so early, I think we'd have probably had time to wait it out for another month and possibly get a second round of two quarts per acre if necessary, if it resprouted. If we're not seeing anything come back, then we got it good, so that's part of the adaptive management right there is that we may or may not need that second application, you know, when it's already burned off, and we're sure that everything that's alive is sprouted and is up and we sprayed it with Roundup, and it's also very short, we may not need that second round, but it's if needed, the second round. In this case, I don't think I ever, I don't think tillage was necessary. Like I said on other sites, I think, you know, if it's heavier soils that are going to be more productive cropland, you know, if they're more productive for cropland, they're also more productive for brome and annual weeds, so I have the easiest time restoring something that is just completely sand. The weed competition just isn't there and it takes off much more readily, so yeah, so I guess I wouldn't have - - I don't think tillage was the thing that was lacking. I would say that it was the rate of the chemical is what was done to lower rates in this case, so.

Megan: Gotcha. And how do you, so when you use tillage, how do you account, we often talk about how tillage is like setting off a bomb in the soil, you know, it breaks the structure down, it makes all the microbes go away, it essentially, it makes it look nice and fluffy on top but your structure is essentially destroyed below ground. Have you had any projects where you're dealing with this persistent brome conversion or Kentucky bluegrass conversion where after you do the tillage, you know, to try to disturb those roots and everything, is there anything like a temporary cover or something that you're adding in there to try to boost that soil system and structure back up?

Cory: Yes, exactly. That's the exact way that I've gone about it is to actually have a cover crop cocktail, if you will. I like to have a diversity in there, not just straight oats or something, for example, but try to have a mix of things, and then maybe have that all season long and then terminate it and then do a dormant seeding, perhaps, but terminated, I mean, it's using chemical again, so, you know, that's something that right now it's I think oats is all I could get a hold of for out on Benderberg WMA, so we just have oats on 64 acres there, but basically that's what we did in that case is to, we did do the tillage and then I didn't have the seed availability is a whole other deal, but we didn't have it this year but I also had another issue there that even if had the seed, I would not have been comfortable using it because they had used I think it was Flexstar within 12 months, so there's - -

Megan: Ah, herbicide carryover.

Cory: Right. Carryover and residual impacts where, you know, even 10 years ago we didn't really think much about that or maybe know a great deal, plus those chemicals just weren't on the landscape like they are now, so all new acquisitions I definitely ask for a three-year chemical use history from the landowner or renter, and at least half of the time, maybe more than that now, we have some stuff in there that just will not allow

us to be able to restore prairie at this time. We got to use the cover crop, the main reason being those residuals will impact the forb expression and growth on those units and we're spending way too much on seed to be able to put it in the ground and have it not grow, so.

Mike: Gotcha.

Megan: Yeah, wonderful. I love what you said about doing it right, so you gave us the, I like how you gave us the example where you're like this is how I learned, like I tried this, we did this, I didn't like it, this is how we do it differently, and this is how we're adapting with it now. I think that's a really good story and Mike, I was chuckling when you were like okay, so you use this tool, this tool, this tool, and this tool, and I mean, sometimes you just, that's what it is, you need all those tools in the toolbox, and I, what's struck me too is that really you're killing the aboveground expression of the brome but the goal is really to damage the roots, and so whether you use chemical or cows or mechanical means to do that, then you have to deal with what you have left, so depending on what tool you use to make that happen, just like you said, then you might need to build your soil structure back or you might need to delay a season before you plant. There's all kinds of like calculations that you're making as a manager, it's impressive.

Mike: It is impressive.

Cory: Well in this case too, that the grazing is actually part of that building the soil back component, you know.

Mike: Sure.

Megan: Absolutely.

Cory: so that's, we didn't use the tillage but yet, you know, this soil was farmed for many years and then it was in the brome CRP for many years, it's not what we would like to see in a, it's not close to what a remnant prairie is as far as microbe activity and things like that, and it's not probably even what we'd like to see in a reconstructive prairie to this point, but incorporating the grazing into it has been a good thing for us, and I'm working with a guy that's, he's an organic operator, so he's got organic cattle too, and they've been very cooperative and they also have, my grazing plan has an option in there where each paddock is divided into four subpaddocks and you could potentially graze on each one for a week, and then shift them to the next one, and they're willing to explore that as an option. We haven't gone down that road yet but I would like to see, you know, we'd get more diversity out of that in terms of the height structure and, you know, just expression of plants too. You know, you graze it hard in one area for a week and then move them on, we're going to have more variety out there than we would otherwise just by having them have free reign over all 40 acres. If they're doing 10 at a time, I'm excited to give that a whirl.

Mike: That sounds cool.

Megan: Nice. Thank you, Cory. That was wonderful, just like all of our guests, it was fantastic, and I know that Mike was extra appreciative of the adaptive management focus, and we just want to do a quick reminder for our listeners to remember because

there was some herbicide context and offerings in there that it is very important that you always read and follow all label instructions and restrictions, and if possible, you might need a pesticide applicator's license to handle some of these products, so just make sure you're safe out there in following your proper protocols for personal protective equipment. I wish there was a P word in front of equipment but I don't have, equipment. So then you can make sure you're safe because that's important to us.

Mike: I appreciate Cory's on-the-ground very applied practical experience. A prime example of the experience and the wisdom of some of our managers, I think, right?

Megan: The quality, that's the words you're looking for, Mike.

Mike: The quality of that too, okay.

Megan: Prairie grows them excellent down here. Okay, all of our guests aren't just from down here, but we're doing a fine job in Minnesota I feel like and we're featuring some folks who are doing really fantastic work and asking good questions. Speaking of folks who are doing fantastic work and asking good questions, like many of you know, prairie and prairie conservation, it takes a village, right? It's a partnership, we talk about that all the time, in order to meet our mutual goals, we are going to have to work together across our agencies, across our organizations, and most importantly, across our land borders. So Dan Shaw is a senior ecologist and vegetation specialist with the Board of Water and Soil Resources, and he is going to talk about some things that they're doing on farm, their family farm, it's actually located in Wisconsin, for prairie conservation, and one of the things I love that he mentions is he talks about how they accomplish some of the management and it really just sounds like the way we do a lot of things in the rural parts of the world, right? You call your neighbor, you get a bunch of folks together, and you make sure that you feed them after. You work hard, get some laughter in, you play hard, and then you make sure you get fed. Important parts of conservation that we don't often talk about.

Mike: And he mentions butterflies, so.

Megan: Yeah, he definitely talks about how this is important, you know, it's important for the entire community, right, the entire prairie system, but there are certain things we can do to enhance host plants or other connections to make sure that our smallest wildlife is thought of and taken care of.

Dan: Good to be with you all. I'm Dan Shaw with the Board of Water and Soil Resources, a state agency in Minnesota. So I've been working there for the last 13 years ago. I've also worked for restoration companies, native plant nurseries, nonprofit organizations doing restoration, so I've been doing restoration work for about 25 years.

Megan: Aren't you like the ecologist for the Board of Water and Soil Resources?

Dan: Yeah, I'm the one person with the title ecologist for the agency.

Mike: Very nice.

Megan: A good title to have.

Mike: You bet.

Megan: Fellow ecologists stay together. Okay, anyway, sorry. I was going down a road, but (laughter) - -

Mike: Ecologist love there.

Megan: Share with us some of this 25 years of experience that you have. Talk to us a little bit about smooth brome, Kentucky bluegrass. What are you seeing? What are you learning?

Dan: Well I've been fortunate enough to be able to work on a lot of different types of projects across the Midwest. We do a lot of wetland restoration with our agency but we also have different conservation programs, our RIM program restores many acres every year, I coordinate a couple other programs. We have a cooperative weeds management area program that is focused on forming partnerships to address invasive species across geographic areas. So we're always looking for innovative ways to manage invasive species. In the case of brome and Kentucky bluegrass, they definitely seem to have a competitive advantage right now with our increasing precipitation, nitrogen deposition, early springs, they're all things that those grasses really like, and they seem to be on the increase in many of our landscapes. I think, you know, one key thing I wanted to stress is patience. I think when I started at the agency and managing projects, I was pretty uneasy about a lot of our sites that they weren't on track right away, we had invasive plants coming in, and you know, over time, some of these landscapes tend to adjust, and they seem to kind of work with us in some ways, that the nitrogen levels and nutrient levels decrease a bit in some of these sites over time, so that can help us in managing some of these invasive plants. I think, you know, one other - -

Megan: I just want to interject here. It sounds like what you're saying is, is that nature has an inherent ability to sort of heal itself if we give it the time to do that, as long as we've given it the tools and the structure and the pieces, you know, as we're searching to build this stuff back, it sounds like to me you're describing it's fixing the broken nitrogen cycle, fixing the broken carbon cycle through time as those, I'm assuming their diverse, you know, plantings are kind of recovering, if you will, on landscape.

Dan: That's correct, and the soil health is a big part of it too. It's not always just about the vegetation. You know, we've been using cover crops and other methods to rebuild the soil health before we do some of our seeding on sites, and we think that's helping kind of skip some successional stages that are weedy. And so if we can get the soils in good health, it's probably going to favor our native vegetation over some of the weeds, and then that's going to provide some long-term benefits.

Megan: I love when you talk about soil health. These are money words on the podcast. All right, go ahead. Didn't mean to interrupt you.

Dan: Yeah, soil health is something that's I think an emerging topic in restoration. I think we're just starting to understand it, understand all of the microbes that are involved with these prairies and other ecosystems, so it's something that we're pretty excited about, learning more about, figuring out how we can better help those bugs that provide so many benefits in the soil.

Megan: I love that. That needs to be a bumper stick. Better help those bugs. That's what I'm doing. Okay, go ahead.

Dan: You know, one other thing I wanted to talk a bit about was just the fact that our landscapes, you know, they don't have to be pristine, right? I think we tend to have this idea that, you know, we're going to create these super highly diverse landscapes, and that's our ultimate goal, and we're always working to get there, but for landowners, it can be pretty nerve-racking, you know, when they have invasive plants moving in to their landscapes, you know, and that's true when we see, you know, remnant prairies with invasive expanding, we get really concerned, but, you know, with everything that we're dealing with, with climate change and all of the impacts on our environment, you know, we're all working towards similar goals, but, you know, again, it goes back to the patients. We're not, we can't necessarily solve all of the issues on these sites and, you know, through our partnerships that we're forming, we're doing a really good job I think figuring out best practices and figuring out how to work together on sites.

Mike: So you're saying it sounds like to me that you're saying don't let the perfect get in the way of the good when it comes to management, right, and our ultimate goal is are different functions when it comes to these prairies. Providing wildlife habitat, protecting water quality, restoring water, restoring carbon, and so forth, and if we're doing that, we're doing some good, right? And so the goal in my mind is to battle the invasives to the extent that they prevent us from doing those things, does that seem like a good philosophy to you, Dan?

Dan: Yeah. Megan, you had something else you're going to add?

Megan: I was going to add two quick things. So the first thing.

Mike: Thanks for being a host, interject being a host there, Dan.

Megan: Yeah. I was just going to add two quick things. The one thing is that your goals might be different depending on who you are, so those are our goals in terms of building a resilient, functioning, connected prairie landscape across Minnesota, but those might not be your individual goals for your site, and so it's very, very important that you define what those are, so that you have a metric where you can actually measure success, and say okay, I really want a pollinator habitat. All right, well for which pollinators? There's thousands of those guys. So you need to be clear with yourself so that you can set reasonable expectations with what you're trying to do. So Mike, you're right, those are certainly our goals for this bigger landscape than the functionality, but they might not be an individual person at an individual level, those might not be their goals, and then the second thing I was going to say is that I think in order to make sure that we are funneling into those larger goals, we need to make sure that the natives are dominant, and so you're absolutely right. Like fight the invasives to the point that we have these functions but a key part of that is making sure that the natives are dominant. If you're setting out to destroy every single blade of brome or Kentucky bluegrass or whatever, name pick your poison here, whatever invasive species it is, that's not a great goal because you're going to fail. You're never going to fully eradicate it and you're going to eventually do more harm than good to the whole to the prairie. So you need to sort of

adjust your expectations a little bit and get natives dominant, that's one of our measures for how we get all of those functions that Mike's talking about.

Mike: Makes sense.

Megan: That's all.

Dan: I agree. I think with our family farm, you know, I think it's a good example of looking at goals for different areas. We converted the corn fields and hay fields into prairie probably like 15 years ago, and some of the areas are really highly diverse, other areas not as diverse. You know, they're meeting the requirements of CRP, but we're always trying to increase diversity into them, and using prescribed burning a lot because of brome grass and Kentucky bluegrass doesn't all disappear. When we did the conversion and that's not uncommon for fields that were in hay fields before, and so the burning has been helping a lot. We actually have community-prescribed burns where neighbors and family and colleagues come and burn. Sometimes we'll have 40 to 50 people out there doing these burns, and then they'll move on to another property and do burns. It's been a good opportunity to do burns about every three years or so, and so it's been a good opportunity for me to watch these prairies and see how they change over time with the percent of brome and Kentucky bluegrass. Really I think the timing of the burns has been important, where we burn too early, sometimes it really doesn't stress those grasses very much because they're not green, may actually be fertilizing them a little bit. So the timing is an important thing. And then the burning sometimes can really help the warm season grasses, like the big bluestem and Indiangrass, maybe more than some of the forbs, so we've been trying to do some seed collection and spreading up seed in different areas. This farm is in Central Wisconsin and we have Karner blue butterflies on this farm too, so we've been trying to think about the management for those butterflies, and so we don't actually burn as much in those areas. I'm actually out there with a mattock sometimes getting clumps of grasses that are just starting to keep them from spreading, so looking at different management methods in different areas, depending on what the goals are, and so, you know, it's been a good learning opportunity whenever you can be at a site so much and really see it change over time.

Megan: Nice. When you say you're collecting some seed, are you trying to collect some of those early season species, like early season natives, so that way you can kind of fill in as you impact the brome or the Kentucky bluegrass, you're also trying to spread and expand and make sure that the natives that are going to fight that battle for you are spreading in the system? Are you basically giving them a boost or what are you doing when you're collecting seed? What's your goals?

Dan: Yeah, really it is collecting through the season and then storing that seed, and then dispersing that seed out usually late fall. You know, we might do it after a spring burn as well. The lupine seed is one that we're trying to get in different areas of the farm to create, you know, a stronger population of Karner blue butterflies, so we really focus in on collecting seed of that species, finding spots that are really good niche for them to grow, and then passing some of that seed on to neighbors as well, so that they can do some seeding and hopefully create a bigger network of habitat through the neighborhood.

Megan: For folks who may not realize this, when you say lupine or lupine, as you say, that must be the Wisconsin way to say it.

Mike: I'm going to say that from now on, lupine.

Megan: Okay, lupine. I like it, it's nice, it's like a tinny pine tree of purple flowers, I love it. So anyway, this is a host plant for the Karner blue butterfly, so for folks who might not have made that connection there, so the adults feed on the nectar of flowering plants and then the caterpillars only feed on the leaves of the lupine, or lupine, depending on who you are. So they need that plant for their survival, not all lepidoptera butterflies and moths need host plants, some can use lots of different plants, but in the case of the Karner blue butterfly, they really need lupine in order to persist, and so you're trying to manage specifically for the Karner blue by expanding caterpillar food for them.

Mike: Dan, I want to commend you and your family on managing, I mean, first of all, I'm very jealous and probably many Minnesotans are jealous of the fact that you have Karner blues on your property, but to me, this drives home the, maybe this is off topic, it drives home the importance of private lands when it comes to prairie conservation, like here you guys have this really highly threatened species on your property and you're helping it persist, and so nice work and nice job there.

Megan: And helping the neighbors. You basically developed a miniature, not only have you developed like a roving crew of your own for people to burn, yeah, like kind of. I was going to say a little cooperative there, you've got a seed cooperative where you're sharing seed in a nice little seed sharing exchange there, and then you've also got like a prairie enthusiast chapter in the works there just through your neighbors. Are you feeding these people when they're coming and burning your site or how are you making that work?

Mike: That was the first - - I mean if you're gonna say something about me, that was the first thing I thought about.

Megan: I was like is there a hog roast as part of this? Because I can see some Wisconsin farm travel in my future here, so.

Dan: They're potlucks, so everybody brings a dish, - -

Megan: I knew it.

Dan: - - and so after all the burning is done, then everybody eats and drinks and so it turns into a party after the burn.

Megan: I knew it.

Mike: Sounds fun.

Megan: It does sound fun.

Dan: You know, I think for any landowner that has prairie, you know, I think it's important to think about partnerships and finding ways to find assistance. There's a lot of people passionate about prairies and biodiversity out there, you know, so I think there's opportunities to kind of build these networks. You know, in our case, my dad

was a natural resource professor and we got this network of like-minded people, but, you know, throughout the Midwest, there's really passionate people, there's, you know, groups like the prairie enthusiasts, wild ones that are all very interested in working with landowners, so I think there's maybe more opportunities out there for these kinds of partnerships.

Mike: Excellent point.

Megan: I love that you mentioned partnerships because the whole reason why this podcasts exists is because we wanted to showcase the partnership and the work that's being done for prairie conservation and how it's no one single individual, everybody can take part in this. How do you become part of the prairie plan is the question people often ask me, and I just say plant a seed, it's that simple. Like plant a seed, talk to somebody about how important prairie is, and you are taking part in a whole cooperative of people that you hear on this podcast over the seasons, over the different episodes who are passionate like Dan said about prairie and who are working together in many cases to help the prairie persist. How many P words did I get in there? Bonus points.

Mike: Well done. Well done, Megan.

Megan: That Dan Shaw, he's fantastic, and I will say he's brought - -

Mike: Yeah, it was a good note to end on.

Megan: It was a good note to end on because I love that it tied it all together with the partnership piece. They're really not going to meet our goals whether it's on farm, on our personal private property, or on our public lands without partnership and making sure there's diversity in our partnerships too. It can't be just the same folks out there. We've got to make sure that we're really doing a good job of being connected across everybody who's contributing to the wholeness and wellness of the prairie landscape. Wholeness, is that a word?

Mike: Absolutely it's a word. I've got a lot of good out of these two episodes, I'm glad we did them.

Megan: Me too, and I hope that our listeners.

Mike: And I hope the listeners feel the same way.

Megan: Oh, gosh. We're getting so good at this that you're in my brain, wow. That was.

Mike: It's kind of spooky.

Megan: That was beautiful, Mike, together, together we're better. Connected Mike and Megan for the prairie, it's a scary, okay. (laughing) Oh, boy. All right. As always, you can find all of the resources we talked about on this episode, on our website mndnr.gov/prairiepod, the lyrics to these original songs are the proprietary to Megan Benage, you are welcome. This episode was produced by the Minnesota Department of Natural Resources Southern Region. It was edited by Dan Ruitter and engineered by Jed Becher. We're going to be back next week with our regularly scheduled programming and formatting, where we are going to be talking about the legacy of

restoration in Minnesota. We've got fabulous guest, as we always do, Dr. Sue Galatowitsch was Mike's instructor and she's going to be - -

Mike: Former professor.

Megan: Yeah.

Mike: She doesn't remember me.

Megan: That either means he was a really bad student and she doesn't want to remember it or he was really great and unremarkable.

Mike: That's contradictory, but yeah, she doesn't remember me.

Megan: Just kidding. Yeah, so she'll be on.

Mike: It was a great class and she was a great professor, so it will be a great episode.

Megan: And she still is, and she's going to be joined by another student of hers now graduated and moved on to contribute to the field of prairie restoration, Gina Quiram is the Minnesota DNR's restoration evaluation specialist and she is going to be with us as well because their program is responsible for evaluating the success of restorations across the state of Minnesota, so we are going to learn some common mistakes, some lessons, and hopefully give you a pretty positive message about the future of restoration in Minnesota. Key tagline, don't be afraid to try new things, we learn from failure.

Mike: Philosophy that I live by.

Megan: I was going to say something about you, but then I was like no, I'll just won't. I think we both live by it. You can't be afraid to fail, that's how you adapt and improve and get better at life, and a prairie conservation, it's a journey, it's a journey. It's got billions of organisms in it, so we're not going to do everything right the first time, we're constantly learning. All right. We will catch you next week. Bye friends, bye prairie peeps.

Mike: Goodbye. Goodbye.

((sounds of birds chirping and wind blowing))