



## Prairie Pod Transcript

Season 3, Episode 10: Land Manager Takeover Part 2, answering listener questions!

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

Guests: Paul Charland, Fire Management Specialist/Prairie Reconstruction Initiative co-Coordinator, Nina Hill, TNC Science Fellow, Ian Lane, UMN PhD Candidate, and Gina Quiram, MNDNR Restoration Evaluation Specialist

Podcast audio can be found online at [mndnr.gov/prairiepod](http://mndnr.gov/prairiepod)

### Transcript:

((sounds of birds chirping and wind blowing))

Mike: Hey Mike Worland here. Cohost of the Prairie Pod with Megan Benage. I can't join Megan today on the bonus episode because I am out here conducting bumble bee surveys at Blue Mounds State Park. I tell ya, this place is absolutely gorgeous. If you haven't been here, I highly recommend it. You may be able to pick-up the gentle prairie breeze blowing around me now. There was a Kingbird singing next to me a minute ago. We will see if he starts up again. Yeah, it's awesome out here. These days make me so thankful for this job because they are such a pleasure. Not every day is like this. Some days we are sitting in meetings with partners talking about or figuring out the best way to conserve prairie in the state. That's a big part of my job. For much of the Nongame Wildlife Program, it's a big part of others jobs as well—conserving prairie. So, if you are a prairie advocate please remember the Nongame Wildlife Program. We are basically completely dependent on donations so your dollars will be put to work, I promise you. You can go to our [website](#) or donate on your Minnesota State tax returns. I will stop babbling. Please enjoy the rest of the podcast. Thanks so much for listening. Bye-bye.

((sounds of birds chirping and wind blowing))

Megan: Welcome back to the prairie pod, (sings) the fun doesn't stop on season three, episode 10 land manager takeover. Why is there so much singing? I don't know, but I'm Megan Benage. I'm a Regional Ecologist with the DNR and I am joined again by my

fabulous prairie people, the prairie and pollinator restoration field day team. This is going to be part two of our land manager takeover. Let's go ahead and round robin introduce ourselves just cause you are still some new voices on the podcast so folks know who you all are.

Ian: I am a Graduate Student at the University of Minnesota studying native bees and the landscapes that they live in.

Megan: Good work, Gina.

Gina: Hi, my name is Gina Quiram and I am with the Minnesota Department of Natural Resources with the Legacy Fund Restoration Evaluation Program.

Megan: Nina.

Nina: Hello I'm Nina Hill. I'm a science fellow with the Nature Conservancy talking to you from Fargo North Dakota today.

Megan: Paul.

Paul: I'm Paul Charland. I'm a Fire Management Specialist with the US Fish and Wildlife Service Interior Region 3 and I'm also a co-coordinator for the Prairie Reconstruction Initiative.

Megan: Perfect, Ok we might all be on a little bit of a struggle bus because it is close to lunch time for us while we are recording this but we are going to make sure that we get out of the struggle and bring great prairie knowledge to you. So, if you missed our last episode we kind of broke this up into two parts for our land manager takeover. For our first part we covered establishment phase, cost and climate change. In this one we are going to talk about management so we are going to answer all of your burning questions. (sings) Recycling a joke from last time, recycling jokes is good for the environment too.

As always you know that we would rather be in the field with you. We learn so much from you and I am so appreciative that you submitted to us all of your land manager questions you have so we could build this podcast around stuff that you want to know because we want this to be useful to you. That's the whole goal of the Prairie Pod, sharing in the partnership and learning from each other. So hopefully we will be back on the prairie soon so that we can continue that learning from you, which is an important piece of this puzzle.

OK let's jump right in. Gina you want to read this first question.

Gina: I would love to Megan. So this is a question that we go from one of our fabulous managers. The question pertains to a 10 plus year old reconstruction. The current thinking is that it should have been short grassed based on the remnants in the area. Bull snakes have been extirpated from the area etc. More is known today than back

then, that's fine, however the quality of the reconstruction stinks. That's a technical term. It's primarily Big Blue stem and Indian Grass and basically forbless. Megan.

Megan: I'm just laughing. Laughing first at the word forbless, the technical term and then I also thought this while we were recording the last episode but you just have the best radio voice. I want you to read me a stories. I want you to come over here and be like Megan I am going to read you this bedtime story so you can go to sleep. Gina, you've got a future in radio sister. You've got a future in radio.

Gina: I like it.

Megan: It's always good to have a backup plan.

Gina: I am going to pause for a minute then finish the question because there is a little more.

Megan: Alright, I messed you up.

Gina: No, that's OK. It is basically forbless. Last season we did a fall burn in an attempt to promote forbs. Any other ideas? Also we cannot disturb the soil.

Megan: OK, I like this. I mean it is sad. I have a very short answer for this one and we can go into a lot more detail. Really the short answer is an answer that you are not going to like, and I apologize for that, but you are going to have to start over. And the reason why I say that is basically just like we talked about in the last episode, all of those grasses have been given a huge head start and they have taken up space. They have taken up space above ground and they've taken up space below ground and the only way you are going to get these little forbs in there so you don't have a forbless situation, and it can become forbulous in a good way, Nina I'm using you word from last time, forbulous, is that you are going to have to start over. Because there is just pretty much no way to without disturbing it that you can create that space. The best way to do it since you can't disturb the soil, and I actually think that is a good thing I don't like disturbing soil I try to avoid it as much as possible because any time you disturb the soil like if you cultivate it or you till it it's basically like a bomb going off underneath the soil and you are incredibly destroying the soil structure that's been built through time and your also destroying all these connections between the microorganisms that live in the soil. It takes a while for those connections to be built back, it takes time. There's lots of different factors that are involved in how long it takes, and you can learn more about that in our roots episode that just aired a couple weeks ago. That's how we wrapped up the main part of the season when we talked about prairie roots here in season three. These are sad day answers brought to you by Megan and Gina, but you pretty much have to start over. I would do it by mowing the site and then treating it with herbicide. I know that some folks who are listening they don't like to use chemical and I totally understand that. But I assume you are talking about a fairly large site, and so you could also use other things to site prep the area like putting down, you could use the smother method so you are basically trying to put down plastic or cardboard, anything that

prevents sun from getting to everything that's growing on the prairie. You still have to mow first so you can get those structures down. It takes a full season for that to work using the smother method for site prep because you are not just trying to kill the vegetation you are trying to kill the seeds that are in the soil and that takes time. It is not a bad thing that it takes time, I just want to be clear so if you wanted to do it faster I would recommend a couple broadcast herbicide treatments and then seed into that. In this case because you can't disturb the soil at all, the smother method and doing it in pieces might actually work really well for you because one of the challenges even with using herbicide is that you are going to have this sod that is still connected right, and even if it's dead sod it's going to create a barrier for you to get good seed to soil contact. I know the smother method is one that we don't often think about but the Xerces Society, for example, has come up with some pretty interesting ways to do large areas and to get large coverings that basically go over top of the soil for the season. Gina you look like you have things that you want to say.

Gina: I was just thinking about the Xerces Society and you know there's a lot of people that have tried interseeding into these really dense well established basically grass fields. The evidence that's coming out of Minnesota is that that's really hard. It's not working super well. Sue Galatowitsch and Julia Bohnen at the U of M looked at a number of prairies in the state and how things have progressed over time as people have tried to introduce more diversity. Their answer was basically if it doesn't start well it's not going to get better over time. So like you were saying, kind of going back to laying down the ground work and starting over might be the best plan.

Megan: Yeah and the Xerces Society has a really great guide about interseeding, and essentially when interseeding works is when you can introduce disturbance into the system so you can give what you are interseeding a chance so that it's not fighting everything else that has such a head start in front of it. It's a great guide, I love it because they used research and practitioner experience. To me that's the best when you combine the real knowledge of the people who are working on the prairies every day and you combine what's been proven through research. Then I feel like you really start to understand the puzzle and you can figure it out. It's a great guide. I know there's a couple folks from DNR who contributed to that from the practitioner experience side so I think they did a really nice job of covering lots of scenarios and situations and how you might make it work. In every case you have to create seed to soil contact. You have to create that connection. A lot of times I hear people say oh I can burn it and I overseed it and that works. The thing you have to remember is that most of your prairie is below ground. Most of the action is below ground. So even if you burn it you still have two-thirds of the biomass below ground that you are asking those seeds to compete with and find root space. So you really need to do something to kind of break through it. So that's why in this case I think the smother method might work for them really well. Actually, I'm changing what I said initially. You might use herbicide but I don't think you can just use that alone because like I said you are going to have that dead sod mat. If you can't till, even lightly till to get some of that soil exposed, I think you are going to

have to do something like the smother method that basically kills everything dead then you do end up with bare soil underneath. I am doing this in my yard right now. It's kind of fun to see how this works.

Gina: Alright Megan, are you ready for this?

Megan: I'm ready.

Gina: I want to plug caution around using plugs. ((laughter)) Right? So we as an evaluation program have seen a number of places where people have tried to introduce forb diversity by planting plugs. I think there's this assumption that if you are planting a plug it is a plant that has a little head start, it's got some root mass, you can get in there and get a little bit more competitive with that sod mat. But, plugs can be really finicky too and they are expensive. It takes a lot of investment. If you are planting them when it is really dry you are hauling water all over. You got to keep them in really good shape. Um, we have just seen people not have the success with plugs that they were hoping for. I would just caution listeners who are thinking I'll just dig up some small places, throw out some plugs and they will take really well. That is something that people are struggling with in some areas. It's working in others but there not magical, unfortunately.

Megan: Most things aren't. I think the key with plugs, and what I would encourage people to do, if you are seeding into already established grass that's not going to work. Because again you need that disturbance, you need water, you need all of these other things. What I am promoting is bare root prairie plants and try to do it in the fall. So, again not like this scenario where you have established grass. I still think you have a space issue there going on. But if you are talking about a brand new reconstruction, or something that is not fully established yet, I think that there is a lot of benefit using bare roots cause those plants are already dormant and you can give them a head start that with without having to water them every day or weekly or that kind of thing. Do you guys have any other thoughts about this one? Ian? Paul? Nina?

Ian: I was thinking about what you said about fire and if it could be a tool used in conjunction with other tools. If you herbicide and then burn would that help open it up too or would that not be useful? I was thinking about that.

Megan: Actually that's a really good point Ian. I think it could because then you are killing the top part and the root and you are getting rid of that biomass so you are getting more of a bare ground kind of setting. You have to be careful too because sometimes with burning it doesn't take it all the way to the ground. The goal here is seed soil contact. That's the goal. I think you can definitely use burning as a tool but you have to look at how much vegetation did your burn up kind of thing.

Paul: I guess the thing I would add too is that fire tends not to be particularly surgical. So it depends if you are looking at creating that effect over a broader scale there is some contribution. But if you are looking at a geographically narrow scale that may not be the best way to go.

Megan: Yeah so I think if you have time I am loving this smother method. But I also can see utility for a big area for having herbicide and burning sort of take the place of the smother method.

Ian: And I know that we need to move on, but I do have one more question that may seem silly because I am an ecology person. Does anybody ever use something like a roller to press seed into the ground to get better seed to soil contact? Could that be a potential tool in this scenario?

Megan: Some people have used it. Sometimes it is an equipment access issue where we don't have that kind of equipment. The other thing is even if you are pressing it and you still have that covered sod layer, are the seeds able to get through with that compression? That's the struggle and I honestly don't know. I don't know how that would work out.

Things to ponder as we move to question 2. What do I do about weeds in my prairie reconstruction? They gave a whole bunch of example weeds like Hoary Alyssum, Pigeon Grass aka Foxtail, Mullen, and the big one Canada Thistle. So this question wasn't submitted when we asked for questions, but this year I have gotten so many of these very similar questions from our managers that I felt like I wanted to throw it in here and just blanket cover the response because I have gotten it so many times this season. I think it's because we are having a really humid, pretty wet in most parts of the prairie, obviously there's going to be differences if you are at the far Western part of the prairie or the far Northern part, but here in Southern MN it's hot, it's humid and it's been abnormally wet. We are just getting quite a bit of rain. So with those conditions you see a flush of a lot of weeds because that makes things grow when it is humid like that and it is moist. Weeds are going to come in and they are going to take advantage. So my short answer is stop worrying about weeds. Stop worrying about them. They are not a problem. It's fine, fine, everything is going to be fine. Most of the weeds I mentioned are pretty common in new plantings, they might persist in patches in remnants and reconstructions but one of the things you need to remember is they are part of the successional stage. We mentioned this last episode too, but these kinds of weeds, some of them are really good wildlife food while you are waiting for your prairie to come on. One of the things I would caution against is broadcast spraying your reconstruction. A lot of times you can do more damage than good when you take that approach. Because any time you spray, no matter what you spray, you are favoring one thing. So if you spray a grass specific herbicide, for example. It's important that you don't spray this early on in prairie reconstruction unless you are spot spraying in a very targeted way. Please stop broadcast spraying. You are doing more harm than good by killing all of the things that are going to end up fighting these weed battles for you. So you are creating a negative feedback loop instead of a positive feedback loop. The other thing is that some of these species are annuals or they are week perennials and they typically fade out once you move through that successional stage and your perennials come on. So again they are not things that I worry about too much. If you want to, you could mow.

There is a good paper out from the Tallgrass Prairie Center in Iowa. Basically what mowing does is you are advancing your successional stage. If you are going to mow, you want to do that once every month through the growing season so once in June, once in July, once in August, once in September. And you want to try to mow at a height that is at least above 5 inches. The goal here is that you don't want to top some of your baby prairie plants that are growing. You can do that, but some of the things to think about when you mow, and this is from that paper, is that it definitely will increase the number of weeds you have, but it does not increase their density. One of the things it also does is it increases the size of the grasses and wildflowers that you planted, which is good. But another thing that it might not be so great is that it increases grass richness but not forb richness and we already know that when we are in a reconstruction we got problems with walls of grass. We got problems with that. So we want to make sure that we are not setting ourselves up for a situation. I was just talking to somebody online about this and they were really struggling because they were like look, I'm a landowner. My mower doesn't raise that high. I don't know what to do. How do I do this? OK I am going to use a cake analogy and it is not just because I am hungry. When you are making a prairie, you are baking a cake. Gina might be making a lemon cake. I'm going to make a chocolate cake because it's more delicious ((laughter)) but that's OK. Lemon cakes, chocolate cakes, whatever they are both delicious cakes. You need the same basic ingredients so you need flour, sugar, salt, baking powder so that you can get a cake. The additional things that you add like mowing, or burning, or a couple more plugs, or bare root plants planted over here, and a couple of things planted over here are going to change how your cake looks. When Gina bakes hers she is going to have a delicious lemon cake. When I bake mine I am going to have a delicious chocolate cake. But we got to stop thinking about prairie reconstructions as if there is only one recipe and one way to make the cake. There's lots of choices. Gina you look like there are so many things you want to say.

Gina: So many, so many. Megan, what about managers who are struggling because they have noxious weeds like Canada thistle and they are having to manage and trying not to make them angry or more abundant.

Megan: So we talked about Canada thistle, in particular, earlier this season in our diversity episode. Go check that out if you haven't yet. We give a long overview of Canada thistle, and this is true for pretty much any problem in a prairie, there's two very important things that you need to remember. Number one, there is no substitute for diversity ever, ever. If a functional group is not filled, the number and severity of functional problems including invasive species, noxious weeds, or temporary species like foxtail, they are going to be large because you have nothing in the system to fight that battle. What we know about Canada thistle in particular is that we are learning from research that that cool season guild is one of the most important things that we need to fill. So cool season grasses, cool season forbs, that is a guild that historically been missing from our prairie reconstructions and because it is missing we have worse Canada thistle problems. The other thing about Canada thistle is mowing makes it

madder and sometimes spraying makes it madder. The best thing that you can do, and again this is from that 2017 paper from Pauline Drovney and Diane Larson, one of the things that they found is that patience can really pay off. As a reconstruction matured in their study, so 10 years after planting, Canada thistle cover declined in all sites even without herbicide application. To me, what I advise managers to do when they have a Canada thistle problem is wait. Be patient. That's not to say that if you get a new noxious weed or a new invasive and it's only in one tiny part of your prairie you shouldn't try to fight it, you definitely should. If it is patchy go ahead and try to take care of it. But I have seen plantings, for example, where it's solid Canada thistle in those first two years and it just drops out, provided you followed the golden rule that you built your seed mix with diversity. Lean into that resilience of nature, I can't say it enough. Nature is going to do amazing things for you. OK I am going to give you another quote. Four golden rules from Megan. So the best analogy I have ever heard is from Chris Helzer, he works at the Nature Conservancy, think about all of your weeds as holes in a screen door. Our job as managers is to tighten the mesh on that screen door so we allow the natives to thrive in the majority. If our goal is to eradicate completely we are going to fail. That shouldn't be our goal. There should be some baseline of tolerance to have weeds in the system. Again there's some things I would be more concerned about than others. But a lot of times if you've given your prairie those tools for success, it's going to do just fine. You just have to remember two critical things, time and patience, it pays off. Do you guys have other things you want to add to this one?

Gina: I really want to talk about climate change, just for a second. I know I we covered this in the last episode. There's been some new research coming out, again these long term studies, showing that if you plant in a really wet year, that can in the short term make invasives more problematic. So if this is something you are really concerned about and you are planting, of course we don't know if a year is going to be wet or not, but overall Minnesota is getting wetter and the springs are getting wetter. Weeds grow really well when they have a lot of water. If this is something you are really concerned about and you know you planted in a wet year, you know maybe some of these tools that Megan is talking about like mowing early on is something you want to consider a little more if that early part of the successional process is really important to you. But again, Megan is totally right you need that diversity. You need all the guilds filled and it is going to take time for those native species to establish well enough to really outcompete the invasives.

Megan: You also want balance in your seed mix and I didn't say that either. I'm usually shooting for some kind of ratio of somewhere between 40 to 45 percent grass and, whatever the backwards math is here, 55 to 60 percent wildflowers. If you go much higher than that, and you don't have good diversity in your grasses, like if you go to 80 percent forbs or something or 90 percent forbs, you really have a lot weedier sites. Especially if you are talking about doing large acres because grasses are the foundation of your prairie. They are meant to be dominant in your prairie and they are part of what set that baseline structure. They are the skeleton of the prairie if you will. Just like you

think about the skeleton of your body, if you don't have a skeleton ((laughter)) you're basically going to be a pile of skin right? So it's really important that we have grasses in the prairie to lift it up. I've also noticed, and this is just practitioner observation, that when I don't have grasses in the site, where I just do like forb only even in just a small plot around my house, the forbs are flimsier. So they don't, there's not as much competition for them so they don't grow as big and strong.

Ian: Yes!

Megan: Where when you have the grasses there, as their skeleton, they don't flop. Ian do you want to add to that?

Ian: Oh it's such a nightmare in my own home garden planting all these different native forbs, they get so big and they just can support themselves and I just end up with this big floppy mass. I have to do a lot of trimming. I have to support them. I end up using wire to help hold them together so that they don't just flop on top of each other and shade other plants out that are underneath them. So it is, it's like when you plant a lot of these other diverse plants or maybe more dry adapted, I'm going out on a limb here, when they get into these more gardeny wet fertile zones they just don't know what to do, they just go nuts.

Megan: ((laughter)) Well cause there's a piece missing right, so you got to make sure you have balance and diversity. If you want to learn more about this, because this is a huge topic, you can throw back to season one episode seven what you do now matters later. That's our establishment phase management. Or season two episode six bringing diversity back baby, where we talk all about interseeding and things you can do. There's also two really good blog posts from the prairie ecologist "Saving pollinators one thistle at a time" and "Remembering why we are fighting invasive plants". And then Gina this one was yours from Diane Larson et al., "Improving ecological restoration to curb biotic invasion" and we'll put those up on the web. Next question.

Ian: Alright so this one is about moving into our next section and focusing on prescribed burning and refugia. So Paul, does it matter what timing is used for prescribed burns to not annihilate the larval stage? Are there other management techniques that would be helpful to pollinators?

Paul: Yeah, so when I think about the timing actually, I think about that on a couple of scales and a couple of different approaches. The question really focused on timing the burn. But I think part of the answer is thinking about the duration and timing of the impact. So are we thinking about the impact of one burn, or are we thinking about the long term impacts of multiple burns in the same area over time. I think we have to think about that as part of the answer, or one of the things I'm thinking about. There's a couple big parts of that. One of them has to do with our, oh we will have a problem with the term pollinators. We talked about this last week, just the huge diversity of taxa that fit under the title pollinator. Are we focused on a single species or a small group? Or are we thinking about them in general? We certainly have a whole lot of life histories and

lifecycle needs, so trying to find one answer to fit all pollinator needs, I think that's going to be tough to do. So one of the things I like to think about, I think it is important to consider, is that any time we do a management action like burning we are going to have some winners and we're going to have some losers. And I think that that can be tough for us sometimes. The good news is that we are really thinking about the long term benefit. We want to maintain diversity. We want to maintain vigor. So the actions we are taking now are designed to produce positive benefits over the long term, so that's good. But we do have some short term impacts too. So, again that question kind of comes back to are we thinking short term or are we thinking more longer term. I guess I will think about that in a couple different ways too.

Ian: One way I was thinking about it Paul is with bees you have above ground and below ground nesters. Like I was saying on the last episode burning can probably help the below ground nesters but is probably detrimental to above ground nesters. Like you said there's no silver bullet to any management for pollinators.

Paul: So one of the ways I think about it, and I am going to jump a little bit ahead to different management techniques, I think that's part of how we avoid that. Again, it's thinking, I am going to use Megan's favorite word the D word diversity.

Megan: Woohoo!

Paul: You know there's the old joke you go to the doctor and say, it hurts when I bend my elbow. Doctor says, don't well bend your elbow. Well, we can't just say we are not just going to burn. So let's think about, again timing is what the person who sent us this question asked. Maybe not just one timing but diversify the timing. You may have some winners when we do it early, but hopefully we'll have a different set of winners when we do it later. So this year maybe we do spring burn, maybe next time on a different piece, maybe a summer burn on a different piece. We're balancing out those impacts. So we go into that second part of the question about different management actions. I want to step back even a little bit further. So if we are going to do that burn, what's the ecological outcome? What is your objective in doing that burn? I would ask myself, do we have to burn or is there another management action we can do to hit some of those benefits? So maybe we don't have to think about just burning. Let's diversify our management actions, let's diversify our timing. You know if we do the same thing every time we are going to drive our system in a certain direction.

Megan: My mom says that's the definition of insanity. When you do the same thing over and over again and you expect a different result.

Paul: You would know insanity Megan right? ((laughter))

Megan: Touché! I was going to ask you, are you holding onto some lingering resentment where the doctor told you not to bend your own elbow? We need to dig into that in a different podcast.

Paul: Yeah let's save that for a different one.

Megan: Psychotherapy time with Paul.

Paul: I don't think we want to go there. ((laughter)) You don't want to see behind the curtain.

Megan: OK sorry, continue.

Ian: The Wizard of Oz over here.

Paul: So there's an interesting study, actually this was focusing on looking at the impacts of fire regimes on legumes in long leaf pine forests. And there's a really great sentence in the abstract, "we propose varying the components of fire regimes rather than selecting a particular regime is likely to be important to conserve biodiversity in this and other fire dependent communities." And I really think, again, that's kind of where I go with that question. There isn't probably one timing, but if we diversify the timing we use over time I think that's powerful. Then we think about diversifying the management actions we use. That probably again supports and minimally impacts the broadest range of the components, the pollinator components, and all other components of our system. So you really want to think about diversifying your management actions. The other question becomes is there a specific species you are looking at. In which case we can probably think a little bit about the lifecycle of that species, it's life histories and what it needs and if we have an issue we can tailor it for that species. And then the other little piece would be if we have some species that's maybe a threatened or endangered species then there is a specific set of actions that we can or we can't, or how we work with that species conservation plan to make sure we are not impacting these species any more than we have to.

Ian: You know Paul there is a really interesting example that I think kind of feeds into this idea that we need to vary our management. It's with the Dakota Skipper. We worry about killing caterpillars with burns and things like that, and how much refugia we leave. But also Dakota Skippers benefit from burns because it helps foster more bloom of a lot of their nectar plants. So it's this kind of, they need burns even though burns could kill them. So it's like a matter of finding that sweet spot in the landscape and within the site of burning and refugia that I think is really, what is that sweet spot is an interesting question and how we get there you know.

Megan: Jess Peterson talks about the tightrope we have to walk for management because the very thing that keeps a species persisting is the very thing that can wipe them out. So how do you balance your fire regime so that you keep them alive?

Paul: Yeah I have a lot of respect for our managers who really have to fight that battle. That's what they do every day. Trying to walk that tightrope. That's a tough balance to meet. I think that's probably species dependent. I think that the skipper's a great example and there's probably a number of other ones that exist in small areas so how do we manage to do that? How do we maintain refugia when we've got a species with such a limited distribution or exists in small pockets? And so Megan asked me a

question recently about how do you define refugia. What counts are refugia? I think that skipper examples a great one because there is a fairly narrow, I assume and Ian hopefully you'll help me out with this, I assume there's a fairly narrow habitat requirement for that species. It's probably one of the reasons it's limited distribution now. So if we want to maintain refugia for that species it means we have to protect some of the good stuff. So we can't pick a brome field next to it and call it refugia for a species that requires diverse prairie. So when we're creating that refugia we have to be really honest with ourselves about what we can and what we can't do. And it goes back to our burn objectives. If you have an objective, if there's something you need to achieve, some ecological outcome you need to achieve with that burn, and how do you decide what that is? Or, how do you balance that with the need to protect other things? And that's also going to be very site specific. You know if we go back to the previous question we've got this field that's over dominated by grass, in a situation like that maybe we're gonna say well we're gonna temporarily accept a little more impact on our pollinators than we would otherwise, but because we are hoping for the long term value. So in that case we might choose a timing that we might otherwise not, a scale that we might otherwise not, you know there's a reason you are burring I assume, and I certainly hope so. What is it gonna take to meet that objective?

Megan: You are cuing Ian right up for the next question about refugia so that you guys can dig a little deeper into what we talked about the other day, what does it really mean when you say refugia. Yeah definitely counting the brome field next door would not be refugia for Dakota Skipper and it wouldn't be refugia for a lot of other pollinators that are in that prairie. There's a like vs. like kind of thing that's needed.

Ian: So let's, I'll read the question here. So the last question in our podcast today is, how much refugia is needed when doing a prescribed burn? There's a second part to the question that is, what are the key recommendations for making Oak Savannas more beneficial for pollinators. So maybe we'll tackle those two pieces. You were talking a lot about refugia Paul, do you have any specific guidelines for how much or what counts as refugia?

Paul: Well there's a couple of, it's, there are a couple of examples I'll point to. One I found comes from the Xerces Society and they recommended breaking units up into three to five pieces and only burning one of those pieces every year. So we're leaving the majority of the unit unmanaged. And Megan I believe you said once that the department has guidelines that they offer up. So I am gonna go back to the idea of your burn objectives. What is it you need to accomplish? What's the state of that particular parcel you are looking at? Again if it's rapidly converting to a woody dominated site or a brome field, to get where you need to be you may have to be more aggressive. So I would say my best answer is leave as much as you can leave but still meet your burn objectives.

Ian: And I think I'm hearing a couple different things kind of emerge from this too Paul. One is that you might be using fire as a tool for achieving a goal. Then there is this

potentially other type of burn that you are doing to maintain the natural ecological process which may just be like a matter of I am just going to do this because it is natural to my ecosystem. I am not specifically trying to control anything. Is that accurate that there's kind of two different themes in burning?

Paul: Yeah there is. I'm really glad you brought that up. I think fire is kind of unique in that sense. We recognize the need for that process and the multiple impacts that it has but we also tend to use fire to achieve specific objectives. Yeah figuring out how to meet those objectives on a site where we have a particular need vs. just allowing it to fill a role, again that's part of those challenges that our managers face on a daily basis. But you know those are the things you need to keep in mind if we want to maintain our diversity and we want to address particular needs that we need to have too.

Megan: Can I talk about the wheel of fire quickly.

Ian: Yeah.

Paul: Once you've brought it up how can we not hear about the wheel of fire?

Megan: The wheel of fire muahahaha. OK sorry it a Finding Nemo throwback. This is something we brought up in Season 8 the hills are ablaze, and the wheel of fire is this idea that if you are not using fire as a tool to meet some sort of objective like trying to deal with woodies or some type of invasion, but if you're just using burning as part of the natural process because we all know that prairies need disturbance to survive and thrive, the best way that you can be unbiased is if you randomize how frequently and when you're going to burn. So I have this idea, please someone build me this. I want a wheel the size of the Price is Right wheel. I want it to be huge. I want it to make noise. And when you spin it, it's gonna have a big outer circle just like the Price is Right wheel and it's gonna have an inner circle. That outer circle is gonna tell you what season you are going to burn in and that inner circle is going to give you the next time that you're going to burn. So it might be like 1 year, 3 year, 5 year 10 year, 15 year, 20 year, 25 year, OK sorry too far, too many. So you spin the wheel and then when you stop I want the wheel to make a sound that's like "fire" and it will tell you what to do. ((laughter)) Obviously Mike Worland, my normal podcast co-host, told me that you could easily just do a random numbers chart. Mike, I know that you are listening to this, how boring. Let's get a wheel of fire and make this happen. Because you have to find a way to take your own bias out of it. Because otherwise you are going to want to do what's easiest or you are going to do what is familiar to. So you might do spring burning not because it's the best thing ecologically, but because that is when you have staff and resources and also because that's what you are used to doing. So we need to find some mechanism that's going to break us out of that prescribed pattern that isn't necessarily an ecological pattern. So my attempt at this is to have a wheel of fire so we can truly randomize how frequently we're burning and when we're burning.

Paul: So I do want to pause for a serious note in that with all due respect to our fire practitioners, safety has to fit into that. It is an important part of the planning process.

Megan: I agree with you.

Paul: We have to give them complete credit for that it is their own safety, it's the public safety. So within all of those other considerations we need to make sure we're keeping safety in mind. That is probably gonna impact a lot of those other decisions. I mean we can't just be random at the risk of our property, ourselves, lives, anything like that. So just it's something I think it is important to remember. We really strive that diversity, and I think that we need to continue to strive to get better, be more diverse, as long as we can do it safely.

Megan: Fair point, fair point. It kind of brought down the excitement of my wheel of fire, but fair point. Nina you were gonna say something.

Nina: Yeah, I appreciate this conversation and the perspectives. In our previous podcast we talked a little bit about climate change and what we can do to make our prairies more resilient and adaptable towards future changing conditions. We said genetic diversity is great, species diversity is great, and now we are hearing management diversity is great. We want to give refugia in both time and space for our insect friends. You know one way we can do that is switch up the regime and that would help those populations to adapt to those changing conditions. Because if a fire is on the landscape in the spring, or the same time every year, it's gonna effect the phenology of the vegetation at that time of year. So you know, maybe not give opportunity for those other traits to develop in a population. So when we start thinking about climate change and how that's gonna impact a lot of our other decision making processes, you know even as we think about management we can think about what climate is going to be doing to change the water, you know the conditions on our landscape, then how those might interact with the fire or the management that we are choosing to do there. So I think it's worth considering how were managing and using those tools moving forward. Yeah, diversity is fabulous even at all scales. So thanks all.

Megan: Hashtag fabulous. OK really quick because we are running out of time and I want to make sure we get to this part, chat a little bit Ian about Oak Savannas and how we can make those more beneficial to pollinators. Again I know that's a big question because there are different pollinators with different needs, but go for it. Two minutes man, you can do this.

Ian: Alright yeah, OK, so Oak Savannas let's go. They are an ecotone between forests and prairies. That means they are a unique habitat and that they share characteristics with both of those types of habitats. So burning is an important part of Oak Savannas just like we were talking about. And we need to think about that too. But another element of Oak Savannas is that they have a canopy cover unlike prairies. So managing that canopy cover is a part of helping that understory diversity thrive. A lot of times Oak Savannas will have some element of non-fire adapted trees come in and they may not be removed by fire, especially if they are older trees. Some elements of thinning the canopy to allow only those fire adapted trees will allow more light and will

allow more forbs to come out. I think that, along with all the prairie management, making sure that we are managing the canopy too is an important part of Oak Savanna restoration. Back in Michigan when we were studying Oak Savanna restoration, we found that by thinning the canopy and restoring burning we got higher abundance and diversity. This was work done by Mitch Lettow in Oak Savanna restorations. This idea of opening up the canopy and making sure we are restoring these disturbance regimes really helps bring pollinators back too. It's all going back to that theme of let's get more diversity. More sunlight means more diversity typically kind of beating back the shade allows for those different kinds of niches like shade plants and sunlight plants to kind of get more in balance. That's my stich.

Megan: I'm really proud of you, you did that really quickly. I can't even. We're at the end. I can't even believe it. This one just went pew and were done. I can't even believe how fast it went. I learned, I always learn from all of you. I just want to say thank you for all of you taking the time to record today so we can answer these good land manager questions. I know that in some cases there good questions, but they are so big it's hard to answer them in such a short time block so we definitely encourage you to keep learning, keep looking at the resources on the website. Listen to past episodes. Reach out to other groups. Ask questions. Part of learning is being curious. We can't learn if we're not willing to try something new and if were not willing to listen to each other, so that's why I love this team that's here today and our land manager takeover of the Prairie Pod. That's what we do, that's what we are all about. We want to listen and learn from you and we hope that there will be a time soon when we're back on the prairie with you because that is truly, sometimes you need to be in the field. That's where the real work happens. That's where the really learning happens just organically. Do you guys have any final thoughts?

Paul: I would like to say thanks Megan. When we realized we weren't gonna be able to do a field day this year we were searching for an answer, Megan volunteered or proposed using the Prairie Podcast as an alternative. I'm so far pretty happy with how it worked out. And I am certainly happy we had the opportunity to the group of us to sit down together. I think it was Ian's idea to do the land manager takeover. I am glad we were able to pull those things together to get some information out. So I'd like to thank Megan and the DNR for hosting us.

Megan: And Mike who stepped aside in his hosting spot so we could have some unique guests today. Mike Worland my fellow co-host who you heard at the beginning of this episode. Thanks Paul that means a lot. I'm happy that we could do it. I'm happy the podcast exists. A lot of our listeners may not know this, but Jess and I started the podcast as a virtual field day. That was our original idea. We were kind of thinking collectively about how we could share prairie knowledge amongst all of the great people who are in the prairie partnership making good decisions and trying new things. We realized that even if we had three field days a year and we had 60 people attend, we did that math for the duration of our career, we won't tell you how much longer we have, we

don't want to date ourselves here but, we realized that we weren't gonna have the impact we wanted to have or share knowledge with as many folks as we wanted to. So the podcast was created as a virtual field day so it's kind of nice to come back to that and answer all of your great questions that you submitted. Nina, Ian, Gina, any final words of wisdom?

Ian: I think we should encourage everyone to keep thinking of questions and send us more questions for the future so we can do this again.

Megan: Oh yeah that's a good point we definitely should do this again.

Nina: Ian it sounds like you're totally hooked on this now.

Gina: Podcasts for everyone.

All: ((laughter))

Megan: Let's podcast all the time. I don't need to write a thesis, what's that?

Ian: A what?

Megan: I'm busy podcasting Dan Cariveau.

All: ((laughter))

Ian: I was told I wasn't allowed to be interested in birds till I was done with my thesis.

All: ((laughter))

Ian: These are words from my advisor.

Megan: It's typical when you're an ecologist because you're interested in all the things. Well thanks so much for listening today. Don't get too sad even though this is our final episode, really really, because there's lots of Prairie Pod episodes to revisit and re-listen to on our website. Please go rate us and review us on Itunes or wherever you get podcasts. It helps us bring in more prairie peeps like you and we can spread the knowledge. We hope that you still have many more days on the prairie. Don't forget to get out there. Discover the prairie, its majestic, and wondrous, and beautiful. And it's a frontier we still don't know so many things about so get out there discover. Look for the little things that you didn't see before. Send us pictures of what you found. We are headed into my favorite season. The Blustem's getting purple, the Indian Grass is getting golden, and the Prairie Dropseed still smells like buttered popcorn. So get out there and discover the prairie on one of your fabulous public lands. You are a landowner and you deserve to explore. This episode was produced by the Minnesota Department of Natural Resources southern region under the Minnesota Prairie Conservation Partnership. It was edited by Dan Ruiter and engineered by Jed Becher. High five prairie peeps.

Gina: High five.

Nina: Woot woot.

Paul: High five.

((sounds of birds chirping and wind blowing))

Nina: Yeah it's gentian season coming up soon. Get out there.

Megan: I love it.