Prairie Pod Transcript

Season 4, Episode 31: The how not the cow (Restoration Series: Grazing Grasslands)

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Guest: Kent Solberg (Sustainable Farming Assoc.) Amber Knutson (DNR)

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

Transcript:

((sounds of birds chirping and wind blowing))

Megan: Hey welcome back to the Prairie Pod. Happy prairie Tuesday. Mike, how are you today?

Mike: Pretty good, pretty good, fair to middlin', you know, how are you?

Megan: (Laughing.) You must have been chatting to Jeanine Vorland recently, you know, fair to middlin'.

Mike: I did.

Megan: I love Jeanine.

Mike: Me too. Yeah, it's a beautiful day and it's a beautiful, it's just I haven't had, had enough coffee yet but I'm trying.

Megan: (Laughing.) But I'm trying. We're really excited today because we are going to hopefully move you with our discussion, - -

Mike: Yeah.

Megan: - - emphasis on the moo because we are going to be talking about grazing grasslands. We hinted at it last week and we're still continuing. We told you the grazing party wasn't over. The grazing goodness continues today and we have some very special guests with us and so just to kinda set the stage before we introduce them, of course, just like we mentioned last week, grazing, fire, and climate are the three main disturbances on the prairie and so we just want to talk through how on earth do we

manage that in a system where we've lost 98% of our native prairie in Minnesota. That is a staggering loss, and so trying to figure out how we're going to recreate the system so it's functional and resilient and everything's working, man, that is going to be a challenge. And so I'm super excited to introduce our guest today and we're going to talk all about how we get started and uncover hopefully some mysteries. We're going to start with our favorite phrase from Kent Solberg, it's the how, not the cow, folks. So Kent, do you want to go ahead and introduce yourself?

Kent: Good morning, everyone. Kent Solberg. I am the senior technical advisor for the Sustainable Farming Association of Minnesota. My focus is on soil health, grazing management, and livestock. I've been a farmer for well over 20 years but also have a strong background in natural resource management.

Megan: And you're a former DNR employee. I mean, don't hide. Like let people know.

Kent: Yeah, yeah. Some of the old timers will recognize my name and they've probably seen me in print here and there. So yeah, I was about nine and a half years with Section of Wildlife.

Megan: Nice. And speaking of the Section of Wildlife, we have another very special guest here with us today from the Section of Wildlife, Amber. Do you want to introduce yourself?

Amber: Sure can. I'm Amber Knutson. I work out of the Marshall office in Southwest Minnesota. I am an assistant area wildlife manager and I help manage the habitat on three counties, Lincoln, Lyon, and Yellow Medicine, just all out here chilling in the west.

Megan: I love it. You're just chilling in the west.

Amber: Chilling in the west.

Megan: And you're very lucky because as we move west across the prairie landscape in Minnesota, we start to get more contiguous, $5 word of the day, tracks, so we get tracks that are more connected and so we start to get some bigger prairie in Minnesota, and so Amber, you're very lucky because when we have bigger in the case of prairie, bigger is better because the more prairie you have, the more resilient it can be because it's got more pieces, hopefully. At least that's the goal, right?

Amber: Yeah.

Megan: Have more pieces. So we're going to start with a quote from Fred Provenza. So Kent has never stopped teaching in helping us all learn new things and so he, when I was first interested in trying to learn more about grazing because I will confess, I am an ecologist, I know a lot about prairie, and I'm ashamed to say I don't know a lot about grazing. I am still learning. There's a lot that I need to learn. And kind of like, go ahead, Mike. Oh, you said me too. Sorry.

Mike: Yes.

Megan: You're still learning. We're all still learning. If we're not still learning, we're dead. So here is a quote from Fred Provenza, who is a grazing guru, if you will, but also just a really smart fella who spent a lot of time studying our interaction with animals and

talking about nutritional wisdom and other things, and so when I was interested in learning more, Kent was like you need to read this book, Nourishment by Fred Provenza, and so one of the quotes in there is every act of eating is an act of creating.

Mike: When I have a bowl of ice cream, I'm creating?

Megan: You are creating, Mike. You are creating. You are creating something new out of that ice cream.

Amber: But that ice cream came from cows.

Megan: Bring on the milk yay.

Mike: Justification then. Not what I need, trust me.

Megan: You don't need more ice cream, is that what you're saying? Everybody needs more ice cream, Mike. Don't be silly.

Mike: And as Wendell Berry said, eating is an agricultural act.

Megan: Love it. So we're just going to jump right in with the how, not the cow. This is how we're going to start everything. And just be thinking about that. I know as we were saying, every act of eating is an act of creating. Folks are probably thinking like oh, because then it comes out later on the other side. And yes, that's part of it, but it also goes into the earth and then becomes something new and part of this whole ecological system. So let's talk a little bit about adaptive management grazing because we already talked about the history of disturbance in a prairie. Or Mike, do you want to cover history of disturbance in a prairie?

Mike: Sure, a little bit. Yeah, so we've got the three main things that are for that the three main forces that shape prairie. We have fire, climate, and grazing. And of course, two of those we have large amounts of control over and grazing is one that we especially can control. Fire is the other one but this is why I'm excited to be covering this today because like this is one of the major tools that managers have for shaping prairie.

Megan: Let me add one caveat to what you said. When we say we have control over it, what we mean is that we can actively place fire on the landscape and we can get animals onto the landscape, but I would argue that there's also an elephant that we don't control. I mean, we're not walking with those cows every day saying eat this, now eat this, now you eat this now. And same with fire. As fire moves through a prairie with different structures like we talked about last time, it has different impacts and different effects. Like it's not, we don't want the whole thing to be black. So I think even though we can put things in place and we certainly have control over adding those disturbances into the landscape, we don't have complete control. I think it's fallacy to believe we ever have complete control.

Mike: That's a good point. I mean, like even if we do have control, your point is very valid that we often, or perhaps even usually don't really have a solid understanding of what the result's going to be.

Megan: Right, and that's where we need to adapt. Do you see how I did that? This leads right into our next section.

Mike: Well done.

Megan: I'm really proud of myself. Kent, take it away. Talk to us a little bit about adaptive management grazing. It's a mouthful, pun intended, and so I just want to know a little bit more about it.

Kent: It is, and I want to launch off what you and Mike have just been talking about, about these things we quote unquote "control" and you're both right. We only control things to a certain degree but in grazing, we control the timing, in other words, when we have those animals on a particular spot. We control the frequency of the grazing of the event, and that's really determination of the recovery period or the length of rest that's out there. We also control the duration or the time animals spend on a specific spot, and then we control the intensity or what we like to say, stock density of that grazing event. And all of those things are crucial to management. And like you said, it's the how, now the cow. We want to manage that disturbance. We need to use it to meet our goals, and we're still learning a lot of things. And we have to do this all within the context of that site, just like when we write a burn plan. I used to write a lot of burn plans, used to do a lot of running around with a drip torch, and how we apply that thing and when we apply that thing is important, but some of that is driven by context. Just for example in fire, one of the concerns is always smoke management, where's that smoke going to go? Is it going to go over a hospital? Is it going to go across I-94? We need to be cognizant of that and that's going to limit what we can do. It's similar for grazing, okay? We have context we have to deal with when we put those animals there, so we don't control everything but we can control a lot of things. And where we can control a lot of these things and apply animals to that particular ruminant animals, to that particular situation, we can get some pretty amazing results. You know, bad management gives us bad results. We've all seen examples of bad management and it gives grazing a bad rap, and we do everything we can to mediate that, to mitigate that, to ensure that those things don't happen, and I think that's an important thing to keep in mind. So what we like to talk about is adaptive grazing. A lot of people might be familiar with rotational grazing or set stock grazing or twice-over deferred grazing, there's this endless list, mob grazing, there's this endless list of grazing systems. All of those become part of adaptive grazing. Again, we're controlling the timing, frequency, duration, and intensity, and how we do that is based on observation, observation of the manager. And so we need to go out and spend some time as Dave Pratt, who's former owner of Ranch Management Consultants likes to say, boots on the ground, eyes looking down. And as managers, that's what we need to be doing. And unfortunately, sometimes especially in an agency like the DNR, we're spread thin, and that's a difficult thing to get around to all of our units. But we can do this thing and we can train other people to do this thing, and the beauty is if we can work with skilled livestock managers to do this stuff, they can serve to some degree as your boots on the ground and eyes down, looking down. So it's adaptive, it's based on observation. A lot of this comes from a lot of work, early work was done with Allan Savory from Holistic Resource Management. And all he did was copy some stuff out of the military where they teach people to observe, to orient themselves, to come up with a plan of action, and then reassess, and go back and do it

again. There's terms for that depending on where you're at, the history of that, but it's the same sort of thing. We observe, we plan or design, we implement, and then we go back and observe, and we do this with other things in our management. So it fits very well with that and it requires some other skills, understanding the infrastructure piece and how to manage that as well as understanding livestock behavior and what it's called stockmanship skills or animal handling skills. That's all part of it but these are all learnable skills - -

Megan: I'm going to pause you right there for a quick second, make sure people know. Some of our listeners might not know what you mean by infrastructure. So you're talking about fencing, you're talking about water.

Kent: Fence and water and animal supplements such as mineral systems. So and when we know and have the skills and know what the skills are and the options are, particularly like within infrastructure, there's a lot of little things we can do. So we can do some macro things and we can do some micro things. Micro things are what we call herd impact or herd effect, and herd effect is very short-term ultra-high stock density, we can do that within a different paddock. Great example is you got some snowberry out there on a hillside and it's more than you want to see out there, you want to do some impact. We drag a portable mineral feeder in there. Anything within 15 to 30 feet of that mineral feeder, if we've got enough animals out there is going to get stomped on as those animals come in and beat up, and then we move it on to the next site. We can do things with water tanks, we can do what's called a paddock within a paddock, where animals are only placed in a subunit, a very small subunit of that paddock, maybe only for 20 to 40 minutes. Generally no more than three hours and then they're allowed to have something else. But when we get into ultra-high stock density, that's really when the beauty of this or the magic, if you will, starts to happen. We can start prioritizing and picking off areas and start facilitating change out there. Now, I talked a lot about the frequency or the recovery period on when these events occur. That's critical too. We need to have adequate recovery time for those plants to really respond. And so when we combine high stock density with adequate recovery periods, we start stimulating latency banks in the soil and poof, we start seeing in a lot of places we start seeing recovery of native species and increase in plant diversity. It's pretty amazing system and like we said, like Mike said, we can't control climate or the weather. We have some degree of management on now grazing. Historically, that was done through movements of large herds as we know of elk and bison and even some places antelope and then deer and other critters coming along behind that. We don't have that luxury anymore. We've got to work within the context again of the world we live in. And so we try and mimic that as much as possible but those animals would come through at varying densities throughout the year and we do want to adjust all these things, the density, the duration, the frequency, and the timing again, as we go about our management. We don't want to do it the same all the time. And one of the issues we came, as we were trying to learn how to do this in the last 40 or 50 years, we got sort of fixed on fixed systems, on prescribe systems, on recipes, and it's gotten us into trouble, and we're trying to move beyond that. Part of that was we didn't have the tools, the infrastructure like we have now with semipermanent and portable electric fencing, and even knowledge on how to do portable water systems, even for people having all the skillsets

in their toolbox if you will, to go out and apply this stuff. So when we know what's available, when we're observant, when we understand what we need to do, we can be very flexible, very adaptive in this stuff, and it's pretty incredible what we can do.

Megan: Kent, I agree with everything you're saying right now about how we need to adapt because we talk a lot, Mike I think has even said this before, that when we do the same thing over and over and over again with our management, we sort of expect a different result, and as my mom would say, that's the definition of insanity when you do the same thing over and over and over again and you expect something different going to happen. And I think like you said, we get into these patterns because of resource issues, and when I say resource issues, I don't mean natural resource issues, I mean having staff, time, money, like to be able to pull off all of this. And so but one thing that struck me as you were talking is that, well two things I want to bring back to the forefront. You know, you're talking right at the beginning about bad, you know, management and good management, and I think one thing, and I know what you meant by that, but one thing I want to make sure is clear is that as you say, we say the how, now the cow because it's not as simple as saying fire is good, grazing is good, they all are parts of a prairie system that have a reaction and a response, and if you burn the same unit every single year over and over and over again, you are going to negatively impact the same groups of plants, the same groups of wildlife, all of those things, and so it's about building that disturbance in so that you get this is Mike's favorite word, heterogeneity so that you get, - -

Kent: Yes, yes.

Megan - - there you go, heterogeneity across your site. But the second thing I wanted to bring forward as we talk about recipes, this is the question I get asked all the time. Just tell me how to do it. I planted a prairie, just tell me what I need to do next, tell me when I need you. We're people, we like recipes, - -

Kent: Yep, we do.

Megan: - - and what we try to tell folks is that we can give you a framework to work within but you might be making a lemon cake and I'm making a delicious chocolate cake. We both need flour, butter, sugar, a leavening agent, we need those things, but the extras.

Mike: Why do all of your analogies involve desserts, Megan?

Megan: You know, I don't think you should be bothered by that, Mr. Ice Cream Man, just saying.

Mike: That's a good point.

Megan: Just going to say why do all of your analogies involved desserts. Takes one to know one. (laughter) Anyway, as I was so wisdomnessly saying, it's not a word, I think what I try to tell folks is you need those structures like you need the pieces and components of baking in order to have success, but you're going to add lemon obviously in your lemon cake and that's going to make a very different cake than my chocolate cake when I add delicious chocolate to it. Maybe I'll put some raspberries in

there. Who knows? But it's like those, we need that framework and that structure and so I guess what I want to hear a little bit more about because it's very hard to be adaptive because we want to point to that worked over there and I want to duplicate it over here because that is working. We want that ease, we want that recipe, and so I guess I want to get into just a little bit more detail before we switch over to Amber and some of her experiences about that framework. And you talked a little bit about it but I want to hear more.

Kent: It's a set of principles. Yeah, you're right. We want the recipe, we want the prescription because it's easy, because we like routine, we schedule our days on a calendar, we want to schedule when the cows are there based on our calendar, but the prairies with the soil, with the plants, with the interaction with the animals are complex biological systems, and we can't do the same thing all the time. An analogy that I've heard and I like is it's like our own body. It's a complex biological system, and if you think about an elite athlete, let's say they do the 100m freestyle or whatever, they don't just go do the 100m freestyle every day. They may run one day, they may be on the rowing machine another day, they may be in the weight room, they may do other swimming strokes, they're going to do other things because it's going to create stress and disturbance to that body but the rest period is important too, but that's how they move forward ahead. We see the same thing in grazing systems and in these prairie. We need that disturbance, they're complex biological systems, we have to stretch them, we have to push them a little bit, but then they need that recovery period also and we can't do it the same all the time. And so and the complexity I think is part of that is also most of us are trained in reductionist science. Reduce the variability so we can have statistical validity. It doesn't work so great in ecological systems, you know, and in the real world. And so this is where the observation comes in and we need multiple points to observe. And I just want to build this in here because it ties into the complexity. We can't just go out and do one thing, we need to be looking at vegetation, we need to be looking at wildlife response, we need to be looking at lepidoptera response, we need to be looking at what's happening below ground in the soil. Are we getting aggregation? Are we getting good infiltration? Are we getting nutrient cycling? All of these things and we can do lab analysis but we need to be out there counting, monitoring, looking, smelling, and even smelling, touching, feeling, and sometimes even tasting sometimes to know if we're making progress, all of those things are important.

Mike: If you're talking about tasting, Kent, I'm onboard.

Kent: The ice cream plants.

Mike: Probably depends on what we're talking about tasting, I guess.

Kent: Yes.

Mike: But I love what you're saying because this is probably revealing my bias too but it really highlights the importance of monitoring and - -

Kent: Yes.

Mike: - - and we can't do this adaptive management without monitoring, really can we?

Kent: Yeah. We cannot. And it's just very critical. We're coming up with some tools for monitoring that are not as I'll say analytical as some of our other tools. They're both important but sometimes again, context. We only have so much time in the day. We only have so much time to do things and we've got the Ambers out there with umpteen dozen scattered management units across the countryside, mileage restrictions, and hiring freezes and all that stuff, it gets a little complicated. But as we're training more people to do this, we get more eyes and ears out there listening, looking, touching, feeling, smelling who understand this and can help provide feedback on this stuff. So that's a big part of my job and my role is to help educate folks and stuff so we can do more of this. But back to being adaptive, again, it's not prescriptive, we can't be prescriptive, we're going to just get in a ton of trouble. We've got to set some sideboards and those sideboards are principles, and these principles we're finding are pretty universal. We need to keep that soil covered, we don't want to graze it down to the nubbins because we'll have problems with that soil heating up. That's going to cause higher levels of evaporation. That's going to have a negative impact on soil microbiology, which is subaquatic organisms, compounding and cascading effects here. As we know in ecology, all these things are interlinked and interrelated. We want to stimulate plant diversity. We can do that through the animals. We know that stock density is very important, so we want to adjust that we've got some cutoffs, for example. We know that we really don't start seeing positive impacts on vegetation and on soil biology until we get to around 40,000 to 50,000 animal pounds per acre, and when we put that, when we put that in perspective of your standard continuous stocking rate, continuous graze situation that you might see out there, our stock densities are only running about 500 animal pounds per acre, so that's a huge, huge difference. And if we really want to facilitate impact out there, we need to start looking at 150, 250, half a million, and when we can do it and where we can do it even taking the opportunity to do a million animal pounds per acre. And people are just like blows people away. But again, we're not going to do this every place, every day all the time.

Mike: Right, right.

Kent: We don't want to and we can't, we just can't, the animals can't, we can't, we just can't. But when we understand the principles and how we can stock density and that we can facilitate that through herd effect through some of these other things I spoke about earlier, now we can prioritize sites as we're moving across a management unit, if you will, and start knocking those off. And if we're keeping good records and where we were and when, and good grief, everybody's got a computer in their pocket now, right?

Mike: Right.

Kent: There's no reason we can't document and there's a number of apps you can get for this, you can't document that on July 10th, we were in this paddock but we put the mineral feeder in this willow patch and there was some boxelder encroaching over here and we did a paddock within a paddock around that quarter-acre boxelder patch for about 35 minutes that morning while I was off setting up other things for those animals for the day. There's ways to build efficiency in there, there's way to document this stuff, there's just coming back and monitoring, just some of these things we just come back and look at need did we have impact, and it's like yeah, we don't need qualitative data

to see that they stripped all the leaves off a bunch of boxelder. Either they did or they didn't. And if we do that and understand the biology, for example, of woodies, we know we want to do that later in the summer when most of the energy reserves are up, those plants are trying to put energy reserves back down in their root systems. We remove the photosynthetic capability of that plant, we're going to have a negative impact on it, bing, bang, boom, now we're starting to make progress. So again, these principles of ecology, the principles of grazing, understanding tools in the toolbox. Once you start knowing that, that kind of defines your sideboards and you can start not only facilitate or compiling a plan, but then you can make active on-the-ground decisions. We're not going to get everything done all the time, we never do. Look at our burn list every spring. Things happen. Wind speed is wrong, the humidity is wrong, wind direction is wrong, same thing with grazing. We don't get it all done but let's have this list put together of what we want to do and what we want to prioritize within the context of these principles as we move across the landscape, a skilled manager is going to make the most of those opportunities as they come along this time. Next time we're going to change things up. That's why we're adaptive. We're going to do it a different way again next pass through.

Mike: Should we hear an example of an on-the-ground application of the things that Kent's talking about. Ask Amber about Hole in the Mountain?

Megan: We should and I think if I could wrap up that piece, what I heard is we need to allow for change and variability and adaptation, which is something that is so hard for us to do, so.

Kent: You'll work in that old Holstein cow in the barn. She likes to be fed and milked the same way the same time.

Mike: And we can't forget to devote significant resources to monitoring.

Megan: Yes, Mike. Good plugs, Mike. This is good but it's true. We have to know what we're doing and what impact we're having to know kind of how we're going to change. So if I had a recipe that I would give people based on what I heard you say, it would be graze, rest, recover, change. Graze, rest, recover, change. But I mean, it's basically not in necessarily that order but you need all of those components as you're adapting. Amber, you are doing some of this work and I know that you're in the middle of an adaptive management grazing, but you're also in a patch burn grazing system, and so I want to talk to you a little bit about Hole in the Mountain, some of the things that you're seeing there. We had a really nice summer visit last year with Kent in the field where he was giving us the Sermon on the Mount as I like to say and he was telling us diversity is just as important in this prairie as it is in the gut of these animals. They are going to be healthier if they're eating lots of diverse things, and you are a trailblazer - -

Amber: I'm trying.

Megan: - - and you're just doing lots of cool things. So tell us about it.

Amber: Well, we started with patch burn graze across the whole unit at Hole in the Mountain on the west side of the road, the main part of the unit, and it fell apart last year because of Covid. We didn't get the fire in like we needed to, so we had to switch and

do this adaptive management, little keywords there today. So I tried with rotational grazing across this one paddock that we're supposed to burn in and again, it fell apart. We had issues with water, we did what we could, and that's where the adaptive comes in. We do what we can and we try to focus what we can do out there in a right time, I guess, the timing of it is everything and just we got to have a good producer too, so he was willing to make those switches at the last second and get the hose on the ground to do some management, I guess.

Megan: Partnerships. What were your goals when you were out there? Obviously, like you're in a unique situation at Hole in the Mountain where the producer is right next door, so our ability to be adaptive is enhanced by that relationship and that partnership that you built out there and it takes that relationship to really make this all work out on the prairie but why did you start saying to yourself, I want to get cows out there and this is what you want to do? I think you started with a set of goals.

Amber: We did. Go across the site and you see it was just covered a wonderful invasive cool season grass as we see everywhere on our native prairies out here. So we're trying to reduce those, we're not going to ever get rid of them, but we want to manage for them, and yeah, promote the plant diversity that comes with the management and the way to do this with the fire wasn't always going to work out here because we have some variable different degrees of troubles, I guess. I don't know what to say but.

Megan: You have a big highway--

Mike: Good context, good context.

Megan: - - you have a big highway that you don't want to put smoke across. Yeah.

Amber: So yes, that, that causes some issues when we're trying to fires, so grazing was our next thing. Patch burn graze, I didn't want to run all kinds of fence across and divide it up because it's supposed to be a wildlife management area, it's supposed to be for wildlife, it's supposed to be for the sportsmen out there, so fence climbing is not ideal for that type of situation. So fire driving the cattle movements was the ultimate goal in that type of detail but as CO hit, we're having to readjust and now we're going more towards adaptive management, which I think is going to play out better out there. It's going to give us more flexibility to do what we need to do on the ground for the diversity for the plants, to wildlife, and for the neighboring producer. It's going to be a benefit for everybody.

Mike: Yeah. So Amber, yeah, Amber, tell us a little bit more about what patch burn grazing and how it works, please.

Amber: I found patch burn grazing modeled by Chris Helzer down in Nebraska. He's famous all across here for the prairie ecologist, but it's just interesting on the big scale, he's got they burn patches of land and then that new growth that comes up after the fire, the cows are drawn to that to eat it down. Well when we burn later May, early June, it hits that smooth brome, so when it starts coming back up again after that fire, those cows are right on it, so that gives us that additional management focus to hit that smooth brome, those invasive species that we don't want out there. Just another layer of control, so. When we burned out there, the cows found that site, they were on it, and

as it grew up a little bit taller, they chewed it down, and then they'd move off to a different area. And then as it started growing again, they were coming back to that site, so it was just like their own little rotation without having people on the ground to do it for them.

Mike: So are you saying when you burn, you get like a smooth brome response then? It actually flourishes after you burn? Is that what I'm hearing?

Megan: It's the flesh of new green growth just yeah, and that's true for all plants but it's just that they're a cool season plant and so the timing of the burn is both to impact it when it's growing really well and active and then when it come back because it's dominating that where the cows are out there, it's sort of taking over the prairie in a way, then as we get that flush, you're basically hitting it twice. So you're hitting it with fire when it's very vulnerable and then you're hitting it with cattle when it's still vulnerable growing back. Amber, is that fair to?

Amber: Yeah.

Kent: That flush of vegetative growth is highly, highly palatable to the cattle. It's just like ice cream, Mike.

Mike: There you go. Full circle back to ice cream. So patch burn grazing, the burning basically makes ice cream for the cows. I got it.

Amber: It does, yes. Just like the cows make ice cream for us once we get them off of there.

Mike: Again, full circle, there you go.

Megan: Full circle. Every act of eating is an act of creating. We're right back at the beginning of this podcast. Okay, I don't know why there's singing but.

Mike: No need to sing, yeah.

Megan: So Amber, tell us a little bit more about like so the recipe a little bit. And I know we already said earlier there's not a recipe. But there's a framework like the flour, sugar, eggs. So tell us about the framework that you're using with patch burn grazing and how you're adapting within that framework.

Amber: So first of all, looking at the site, I split it up into four patch burn paddocks, so we had a little bit of structure there, like that's our sideboards, this is what we're going to burn, we have the rotation going around the unit with those four paddocks each year burning one of them, and that's what draws the cows in, so we're looking at there all kinds of smooth brome and reed canary grass and Kentucky bluegrass and stuff that we really don't want to see out there, so that's where we put our focus on managing and those cows are drawn to that because of the nice green growth and then they move off the site for a little bit because they have freedom through the whole 400-500 acres that that site is. And then as it comes up again, the ice cream, they're drawn back to it. And then as the season moves across, we just kind of manage to see what they're doing and if it looks like they're hitting one spot too much, whether on the patch or off, we kind of have the a little bit of flexibility, the adaptive measures to like put little fences around

there or something to keep them off there or if it comes into drought conditions, we can pull them off there and the producers got to move them to someplace else, so we're just watching what the vegetative response is. We always want cover out there, we want the habitat for the wildlife because that's what we're here for is to provide quality habitat for wildlife, just a couple of things we're looking at when we're roaming around the prairie.

Megan: Really, really nice way to, you just wrapped it all up with a cherry on top. I'm just continuing with our ice cream analogy. (Laughing) So gosh. Mike, you wanted to talk mechanics a little bit. Help us, you know, ask us some questions. Ask Kent some questions and Amber.

Mike: About mechanics? What are mechanics?

Amber: My husband's one.

Megan: This is derailing us--

Amber: Sorry. (Laughter)

Megan: You guys are killing me. Mike, about the like how you know when to move or when not to move and with being adaptive, like what are some of those markers and signals.

Mike: I'm sorry. The word mechanics threw me off.

Megan: Yes, I understood. You were like I have a mechanic who works on my car. He fixes it and makes it real pretty, like that was your face.

Mike: Okay, yeah. So the question I have in my head, the parameters that you look at to decide when to graze, when to pull the cows off, the grazing intensity, you know, the number of head of cattle, those things, can you talk more about what those parameters are, what you're looking at when you make those kinds of decisions?

Kent: Sure. A lot of that, Mike, depends on your goals for the particular site and what resource concerns are we trying to address there. You know, these are WMAs, so wildlife habitat is a big thing, but we may need to do something more, like we want to suppress brome, we want to suppress Kentucky bluegrass on that site, so if we do know in grazing that if we take more than 50% of the aboveground biomass of a plant, we're going to have a negative impact on the roots. So if our target is to suppress brome or Kentucky bluegrass, we want to hit that hard in order to do that and we also the timing of that's important too because they're a cool season grass and then we can create opportunities for warm seasons to come up after that. So that's one thing. We also know that the bulk of the nutrition for the cattle is in the upper third of the plant, so this becomes a balancing act, okay? We want animal performance as well as meeting resource objectives on that site. And by adjusting livestock density and the time of the year and the frequency and all that stuff on that site, we have some degree of control on that. And so trampling is another big piece as long as the recovery period is also. So like for recovery period, if we're doing high stock density on a site, we're talking quarter million or so animal pounds, 150,000 animal pounds, we want to follow that with a minimum of an 80-day recovery period. We're finding we need 80 to 90-day recovery period on those sites in order to allow that latency bank to express itself. We also want

a lot of trample when those animals are on that, so we're only going to probably take maybe no more than a third of what's out there vegetatively but we want to stop the rest of it down through high stock density in order to do that and then give this the extended recovery period, and that's creating conditions again for that latency bank to really start exhibit itself out there. So are we working on plant diversity? Are we just working on suppressing brome? To some degree, we need to take in animal performance but we can also adjust that by frequent moves. All of those things play into that. So if we know what our recovery length needs to be, we know what our stock density should be, and then we've got to go and observe. Okay again, we can't make this just prescriptive, we have to go out and observe. Is it doing what we want it to do? So if we estimate how much forage is out there for the cattle and we put it together and get our stock density where we think we want it to be, we need to go do it but short of going on clipping every blade of vegetation out there and weighing it, we really are just taking our best guess. And so we put it out there we need to go out and we need to make some observations. In other words, and we need to ask the question did we accomplish what we wanted to do? Then we need to go back in a couple months or the next spring and go did it accomplish what we want it to do? Did we suppress that willow that's encroaching? Did we knock back that thistle patch? Did we knock back that snowberry patch? All of those things. Are we seeing more diversity out there? And oftentimes that can be just a drive-by windshield view if we see an explosion in, for example, big bluestem, Indiangrass, and switchgrass out there, it's like oh, cool, you know. We did something positive here that may not be as quantitative as we like it from a research standpoint, but from a management standpoint, we're seeing some things and then we're going to adjust for the next time around.

Mike: What you're saying to me now brings up one question in my head. So yeah, I can see how grazing really you kind of have nothing to lose if you have a serious brome or Kentucky bluegrass problem, for example, serious invasives problem. How do we feel about higher quality remnant prairie? Is there a place for grazing as a management tool to prevent an invasives problem when we're dealing with a higher quality remnant prairie?

Kent: So what maintains grassland? As we were talking about earlier, it's disturbance. Systems designed to, they need to disturbance in order to maintain their health and vitality, it's just the way they're put together. So and the disturbances we've already talked about. Climate, fire, and large ruminants. And so yes, absolutely we have to do that. The frequency is debatable. Again, we don't want to be prescriptive or in a recipe. We talk about averages but averages are just that. Very rarely in the natural world, the things fall on the mean. Remember the bell shaped curve here, okay? And so we don't always want to come back to a spot let's say every three years. We may want to go two years back to back and rest a year and then come back for a year and then rest four years or whatever. We want to mix this up but it has to be based on again this observation, using this feedback loop. We're intelligent people, we've got ecological backgrounds, ecological training, we want to use that and go did this accomplish what we want it to do. And when we do that, we can start looking at how we can do a better job. The beauty of something like grazing is nature is a very forgiving system. It's self-regulating, self-healing, self-moderating. And so when it's given a chance to recover, it

has the ability to do that and when we recognize that, again, we can use rest is just as much a tool as the drip torch or the poly wire.

Mike: There ya go.

Kent: It's a huge tool. And so we could have an oopsie out there. Let's say we move cows in a paddock and then some thunderstorm blows up and drops six inches of rain when there's very, your summer popup thunderstorm thing drops five, six inches of rain in this site and they just, the cattle just tear it up. You shouldn't lose your job or your mind over that. You just you need to build in recovery and go from there and oftentimes, as we're working with grazers, as long as we're adaptive and adapt to this stuff and understand we need to get them off, we need to give it a rest and recovery period, there's people who come back and go wow, that's the best thing that could have happened to that site. And so we get a little nervous about some of these marginal areas sometimes, and yet if we're adaptive, we can adjust, I mean, think, the buffalo and the elk didn't know they weren't supposed to go some places, but they did. They waded into streams on a hot day, maybe they spent the day hanging out there but then they were gone and moved on, and we should be doing that with remnant livestock if we're about management. And so again, nature itself, self-healing, self-regulating, it can respond to this stuff. It's a lot like when we scratch the back of our hand and get a scab on there, what does our mother always tell us? Don't pick that thing, when we were little, because we don't want it to be chronic. It's an acute disturbance but nature has the ability, the inherent ability to heal given time. And it's when we get into chronic things, when we get into routine things doing the same thing all the time, that can be chronic in itself. And when we keep doing it the same way all the time, it doesn't have a chance to recover. So understanding those basic ecological principles, understanding some general things about when we're going to have a negative impact on the root system, where the most nutrition is for the plant, understand we need to adjust for our goal. If our goal is to maintain a pretty decent native prairie site, absolutely for sure we don't want to be taking more than 50% of the aboveground biomass. But if we're trying to smack that Kentucky bluegrass or brome, we better be targeting 70% to 90% consumption aboveground, and we don't need to hurt the animals in the process in doing that. There's ways to do this. It's just putting all the tools together. Again, what are we trying to do out there ecologically? Okay? Sometimes in wildlife, we get a little hung up on oh, we need this certain height density or the babblings are going to flip out and not going to show up there this year. Well historically it wasn't like that every day all the time, and we get really sensitive to this because only 2% or less of this prairie remnant is left and I totally get that. But at the same time, understand it's still a complex biological system designed and needs disturbance. It's how, when, where, all those pieces that we need to be cognizant of. And I want to jump a little bit into these sensitive sites, particularly what, again, I touched on a little. Elk and bison didn't know they were supposed to go there but we know they did. We know they did at different times for whatever reasons. But again, it was an acute versus a chronic disturbance, not that we want to intentionally dump them in a wet fen because the cows, they're not going to want to wade in something they're going to sink up to their bellies. The reason we see cattle going to that oftentimes because they got nothing else to eat, they've got to go there. Well, that's a management issue. We need to adjust for that. And we can use

them on the edges of some of these sites. Managers have successfully used cattle and wetlands to help set back things like phragmites, cattail, and so on, and they've had great success with that in doing those things. But again, acute versus chronic, acute versus chronic. Keeping those animals on the move. Long recovery periods. Determining what your goals are for that site before you even put those animals there. And I would encourage us to think more ecologically. Are we stimulating soil biology? Are we stimulating plant diversity? Are we thinking about nutrient cycling and the water cycle in this process? Not just habitat for pheasants or sharp-tailed grouse or not that that's not important, don't get me wrong, that's not what I'm saying here. But when we think about ecological processes, all those other things.

Mike: Thinking about a functioning prairie, yeah.

Kent: Functioning ecosystem, a functioning prairie is more than just the megafauna out there or the insects out there.

Megan: Absolutely, and we could, I mean, we could nerd out about this all day long because this is just what you're speaking to is that they're complex systems, we know that they've been reduced, we know that change has to be a part of it, change is hard for us to allow things to happen both because we're afraid of making a mistake because we want these things to persist, and because the context of where we live right now, 2% is not 100%. Having 2% of something left means that now these natural systems, we're trying to recreate natural disturbance within them but in a very prescribed way because we don't just have bison roaming anywhere anymore. Nature was doing this on its own and now we've created a system where we've got to ensure that those pieces are in there. And so that's really tough, and so.

Kent: And humans were directing that, though too, indigenous peoples were a big part of that, and fire was a part of that, but, I mean, I don't know that we've got a good handle on all of those interactions from say 500 to 1000 years ago, and I don't, I don't - - -

Megan: No, we don't. We're trying to recreate - -

Kent: - - we can't, we don't - -

Megan: - - a system.

Kent: We don't - -

Megan: What do I say, Mike, all the time? We're building a Lego without all the pieces and the - -

Kent: Without all the pieces.

Megan: and a partial instruction manual--

Kent: We, we can only guess. There's not a written record, there's not documentation there, and so that's a, that's a huge challenge. But what we're finding with research and case studies and time and time again, it's adaptiveness is huge, even if it looks like an oopsie, as long as we're moving things, adapting, adjusting, providing recovery, we can do some very, very powerful things out there. I think the biggest thing is fear and the

fears of the unknown. So often we're trained as resource managers not as livestock managers, and livestock managers are not trained as resource managers, and yet I think there's a lot we can learn together and do together, this can be, and we've seen it over and over and over again adaptive grazing if done well can be a win for the livestock person and it can be a win for the resource. We just see that over and over and over again. What we lack, I see more and more is just because we lack the skillsets and this fear to change, that is the human mind is the biggest obstacle to all of this. It's not that we don't have infrastructure out there. It's not that we don't have the skillsets. We can learn and develop skillsets. It's not that we don't have a grass base. It's not that there isn't livestock right next door to this unit. It's the mind and thinking through within the context of all the tools and the context of the site, what's going to be a good fit for that site.

Amber: I was just going to say, bringing it back to Hole in the Mountain, I know I say a lot about the cool season invasive grass is what the brome and the Kentucky blue, but we do have high quality prairie out there. Anybody that's been out there, Megan, she's been out there, she's seen it, so we're also managing for that. We still want the diversity and hopefully by managing the brome and the Kentucky blue, the cool season invasives that we can start seeing more of the natives come through too. And where the cows do that, we're learning, so.

Megan: Yeah, you are absolutely right. There is definitely high quality prairie at Hole in the Mountain. It's a system and there's lots of pieces to that system but we got to try to figure out how to manage the whole. This is a perfect time to move us to the next part of our podcast.

(Music)

LET'S SCIENCE, TO THE LITERATURE!

SCIENCE!

Megan: This is the part of the podcast where we recommend a book, a blog, or a paper, and I could just talk to you guys all day about this because it's so complex and there's so many things to learn, and obviously we're just scratching the surface here like a little cow hoof or a bison hoof in the crowd, we're not, we're not going to get all the way through it. So Amber, we're going to start with you. Tell us just a little bit about your pick and why you recommended it.

Amber: I have been following The Art of Range Podcast from the University of Washington. It's mostly western related but definitely range science type of deal, kind of what we're doing out here. We want to promote better range management, the soil health like Kent has talked about, improving diversity across the landscape with plants, and bringing more animals in with wildlife and livestock. So it kind of goes hand in hand with everything just nice little key picks here and there, scroll down, find something that we want to listen to where we can apply it here in Minnesota. It's been great to just learn from I guess.

Megan: I love it. Kent, what's your pick?

Kent: Yeah. I'm going to pick a recent paper by Tegan Kreider from just last year here called Managing Grazing to Restore Soil Health: Ecosystem Function and Ecosystem Services. And it's just a great summary about adaptive grazing and what it can do like the title says, for ecosystem function, soil health, and ecosystem services. It's a nice little compact summary and Richard Teague's been involved with this for a lot of years and has done some great research on it. Yes, it's in Texas but the principles remain the same wherever we go.

Megan: And we can learn from other people. I mean, it doesn't, our lives and the things that we learn shouldn't just be isolated to one place. That's how we get smaller in our thinking, not bigger in our thinking. I know I mentioned this book. I have a pick for the day, I didn't even let Mike pick one but I picked one. It's the Nourishment book by Fred Provenza and I just think I got the sense when I started reading it and it is one of those books that is very much like A Sand County Almanac, whereas you just start reading it, the way that he's writing, yes it's a science book, right? It's a book about these principles that we've been talking about, but it's a lyrical book that is written in a very accessible way where you want to read it with some cookies and a cup of tea and it's that kind of book. And so I just want to quote for you one of these and hopefully it'll draw you in and help you get this book because I think it's a really good one to read. So this is Fred talking here. During our moments on earth, we dine with change, we dance with uncertainty, and we fade into mystery. Perhaps, what we view as loss isn't loss at all but being ever creating new forms, functions, and behaviors from works to universes, and everything in between.

Mike: That's deep.

Amber: That's deep.

Megan: It's deep and beautiful. It's like reading out a Leopold. You're going to learn a lot just by observation and so and obviously through science, which is observation. So okay.

Mike: I like it. Hey Megan.

Megan: Hey Mike.

Mike: Will you please take a hike?

Megan: I will take a hike and we are going to hike with Kent and Amber and so just like we always do, we are going to recommend some of your public lands. Yes, you are a landowner. You can go visit all of these places and so Kent, we'll start with you, what's your pick and why?

Kent: Well, you had asked earlier about what my favorite is and unfortunately, it's not in Minnesota but it's not far away, it's the Prairie, the Prairie Coteau Region of Northeast South Dakota. I spent two years there a long time ago and just fell in love with the area, but not far away from that is one of my favorite picks in Minnesota, and that's Lac qui Parle WMA.

Megan: And you said it right. Why is Lac qui Parle your favorite?

Kent: Well, I spent 10 months working there when I was the Section and just kind of really got to enjoy it. I like its vastness, the horizons, the vistas, the diversity, yeah, and the shoutout to my friend Walt who's the manager there these days, keep up the good work, and try and stop in and visit someday.

Megan: Love it.

Mike: That says a lot that it's still your favorite despite working on it for a while. Sometimes the opposite effect happens you know, for some people, so. That says a lot.

Megan: Amber.

Amber: Yes.

Megan: What's your pick?

Amber: Legacy WMA down there in Lincoln County. It's just a little postage stamp on the horizon but it's got a little bit of everything. It's got prairie and wetlands and a few trees out there, so we can see any sort of wildlife you can imagine pretty much that calls Southwest Minnesota home. It's a beautiful little place to be.

Mike: Legacy WMA you said, right?

Amber: Legacy WMA.

Mike: Legacy. Nice. I'll check out. I don't think I've been there.

Megan: I've been there. It's one of my favorites. I love it so much and Amber is doing great work, you and Troy both, and Wendy. It takes a village, like it's a whole village of people working on this and so and we're all benefit from each other and our knowledges and experiences. Gosh, I don't want to end but we've got. We're out of time. So next - -

Mike: I learned a lot.

Megan: Oh, you have learned a lot, Mike. That I have no doubt.

Mike: Cows and ice cream have more in common than the fact that cows produce ice cream, I guess.

Megan: I'm so proud of you.

Mike: Lots of other parallels.

Megan: I'm so proud that that's the thing that you learned today. They start talking about ice cream and I didn't listen to anything else. Cows like to eat stuff that tastes like ice cream, yum, yum, yum, I like to eat that ice cream, comes from a cow. Wonderful. Oh I love it, Mike. All right, next week on Prairie Tuesday, we're going to be chatting with Veronica Jaralambides, our marketing spent with Parks and Trails. Were also going to be talking with local doctor, Dr. Ann Vogel, where they're going to share with us prairie's importance as a mental health refuge. This is something that was certainly true last year and it remains true right now. Our brains are deeply connected to nature while things change and certainly the prairie changes, and people change. Our brains really haven't

changed that much. We still get lots of benefits by that connection to nature. We are not separate.

Mike: I'm still a caveman.

Megan: You're not separate from nature, Mike. That's the point. So it's going to be great. As Dr. Ann Vogel says, this is the best kind of medicine kind of medicine because you don't even need to look on a label for side effects. The only one that we know of is something called a random case of sedge fever where you get really excited every time you see a sedge and you just have to identify it. Oh, the fever. It's here.

Mike: It's a serious disease, yeah.

Amber: Well it's serious, serious, well it's serious.

Megan: Yes, it's a "Carex" [scientific name for sedge] disease. As always, you can find all of the resources and links that we talked about today on our website at mndnr.gov/prairiepod. This episode was produced by the Minnesota Department of Natural Resources Southern Region under the Minnesota Prairie Conservation Partnership. It was edited by the magnificent Dan Ruiter and engineered by the fabulous Jed Becher. What should we say to sign off, like moove on, everyone, or what should we? (Laughter)

Mike: Doesn't have to be a pun, okay?

Megan: Bye guys.

Mike: Bye-bye.

Amber: See you later.

Kent: See ya.

((sounds of birds chirping and wind blowing))