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## Season 1, Episode 12

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**John McMaine:** Thanks for joining us on Streamlines, your source for water knowledge. I’m your host, John McMaine with South Dakota State University Extension. This is Episode 12.

**[transition music plays]**

**John McMaine:** Again, I am John McMaine.

**Anthony Bly:** And I’m Anthony Bly.

**John McMaine:** And if you missed last week’s episode, we introduced constructed wetlands, told some great stories, and brought in Jeff Strock to give his take on the topic. So, we left off with a challenging questions: how do we get farmers to adopt these practices? And I think this question is not just solely related to constructed wetlands, it’s related to anything, right?

**Anthony Bly:** Oh yeah.

**John McMaine:** Because we can do all the science and research we want. But it doesn’t matter if things don’t change.

**Anthony Bly:** Yeah, if, if they’re not adopted, it’s almost worthless.

**John McMaine:** Right. So, we will kick off this episode with some of Jeff’s answers about this question of how do we get farmers to adopt these practices.

**Jeff Strock:** For an agricultural producer to want to be able to take land out of production, even if its marginal land, you’ve got to provide an opportunity beyond the aesthetic, you know, biodiversity benefits they’re going to get. From an economic standpoint, if we knew the answers to these things really simply, we wouldn’t have these conversations. But how do you put a value on the frogs and the toads and all of the, you know, the biodiversity. What, what is the number value? I can go out to the store and I can buy a gallon of water that costs me a dollar, right? Is the water that comes through the wetlands, is that also worth a dollar? Or is that worth 50 cents or is it worth two dollars? I, I don’t know. But it has a value, right? And so, at the end of the day, farmers are in business to make money. So, what I was trying to advocate for a little bit was to say okay, if we don’t call these areas that farmers might install as ‘constructed wetlands’ and we design them in such a way that sort of the upland area, around the wetland area, would be able to be actively managed by the growers. They might be more interested in adopting these practices. You know, if you could fence out constructed wetland area and graze the upland areas around it, it probably would work. But what I was talking about was we have lots of people who farm road ditches. They go out and they cut the grass, hay in road ditches. And then they sell it. It’s part of their income. So, if, if you’re going to allow farmers to develop these constructed wetlands and then also allow them to harvest the grass in the uplands around those areas and sell it, there might be some incentive for them to do that because maybe they’re able to still make some money. The other part of it would be, and this is part of the reason why we planted the mixes of vegetation that we did in our constructed wetland areas in the uplands, because we wanted combinations of grasses and forbs. The grasses and forbs that we spent money on to plant our site were insanely expensive. It costs us like $3,000 for all of the seeds for our 10 acres, okay. So, my whole thought was what if you had some innovative farmers who got together like a little co-op who had a bunch of these sites and then were able to harvest the seeds from these forbs and theses grasses off of their upland areas around their wetlands and then sell it. Now, of course you know, the seed dealers aren’t going to be happy because, you know, there will be more seeds and so the cost will come down. But you’d be able to seed more acres for more economic purposes. So, I’m a soil scientist, not a banker or an economist. So, you know, my brain is kind of small in terms of thinking about these things. But the whole point was that if you want farmers to adopt these things, you got to give them some incentives to be able to earn money off of what they’re doing and be able to manage actively is an opportunity to do that. Now, I know that groups like EcoSystem Exchange and all kinds of other groups that have talked about, you know, carbon trading, water trading, and nutrient trading, and these markets. And there’s probably still a place for that, but you know, for reasons that I don’t either know or understand, you know, those, those markets and those trading opportunities, just really haven’t flourished. But maybe, you know, there’ll be some tipping point in the future where that type of thing will flourish. And then, you know, it might again provide some incentive for farmers to say, “You know what, hey, I got this marginally or really, really poorly farmed area that I could put into a constructed wetland and now I’m going to get paid some nutrient credits, some, some water credits, carbon credits for what I’m doing here.

**John McMaine:** So, I want to start with the markets question, or the…

**Anthony Bly:** Yeah.

**John McMaine:** Market driven question.

**Anthony Bly**: Right.

**John McMaine:** What, what do you think about that concept? And we talked about it before on some other podcast episodes, but what do you think about this idea of valuing the water quality benefit, the carbon benefit, from these systems and then trading them?

**Anthony Bly:** I think that’s a great idea. I think it’s got a goal there because that’s what our society does, is it puts values on things.

**John McMaine:** Sure.

**Anthony Bly:** And so, you just can’t think about aesthetics or just the altruistic good that comes from cleaning up the water. I mean, I think there has to be some values and some trading going on.

**John McMaine:** Sure.

**Anthony Bly:** The exchange part.

**John McMaine:** Yeah.

**Anthony Bly:** Exchange is so big.

**John McMaine:** I agree. Why hasn’t it happened?

**Anthony Bly:** Oh, I, I, I just think it’s difficult. It’s out of the norm.

**John McMaine:** Okay.

**Anthony Bly:** Okay. For starters. But I, I, I think it has to become a norm, you know. We’re trying to change paradigms all the time, but you know, I think, there’s a bigger awareness now.

**John McMaine:** So, so part of it is just awareness. Awareness of the issues or awareness of the potential for market-based solutions? Or both?

**Anthony Bly:** There’s awareness for the issues, so I think that helps open the door for markets.

**John McMaine:** Sure.

**Anthony Bly:** Because where someone can see a profit, they’ll try to step in and make that profit.

**John McMaine:** Sure. Do you think farmers would trust the market system?

**Anthony Bly:** That’s a, that’s a totally another question because I hear farmers talk about markets and things like that all the time.

**John McMaine:** Right.

**Anthony Bly:** And that, that, that’s a good point.

**John McMaine:** And that’s.

**Anthony Bly:** A good point.

**John McMaine:** I mean, in, to be fair, my, you know, main sources of information are conversations with the farmers that I work which, you meet one farmer, you’ve met one farmer, right, I mean.

**Anthony Bly:** Correct.

**John McMaine:** It’s not a monoculture of farmers, I mean everyone has their own opinion, as they should. And then also, Twitter. Which you know, can maybe be the extreme views pretty easily amplified and so, I don’t know if that’s representative either, but…

**Anthony Bly:** Correct.

**John McMaine:** I do see a lot of skepticism about markets, and I don’t know, I’m not a social scientist but I’m not sure what the, not to say that everywhere should jump on board immediately, but it’s hard to really distinguish what the opposition is or kind of what the hesitancy is. I think a lot of it is trust in data, is one thing. And this is more for infield practices. But how do you reward what people have been doing for thirty years? Or how do, you know, reward things that people are changing but not also reward people that have been doing the quote-on-quote “right thing” for the last thirty years.

**Anthony Bly:** There’s a lot more questions than answers. And it’s exciting right now. Very exciting right now.

**John McMaine:** Yeah.

**Anthony Bly:** The carbon and you know, Jeff mentioned the ecosystems services. Other things as well because why not pay a producer or landowner to clean up water if someone else can’t do that, they can buy those credits or whatever they call them.

**John McMaine:** Right.

**Anthony Bly:** And, and, and we can trade our, our good and our bad.

**John McMaine:** Right. Right.

**Anthony Bly:** You know, through the economy.

**John McMaine:** Yeah. And so, in South Dakota, we do have a couple of wetland mitigation banks and this is, I’d say, the closest we’ve come in this area at least, to like a market based solution. But, if someone wants to drain a wetland, for farming purposes or for development purposes, then you can purchase mitigation credits basically. Where someone has restored a wetland somewhere within the same area, it has to be local. Or at least within the same watershed. And I wouldn’t say it has seen a huge amount of use.

**Anthony Bly:** Yes, I would agree with that.

**John McMaine:** But I, people have definitely utilized that to make both ends work. I mean, so the…

**Anthony Bly:** Correct.

**John McMaine:** Both the person that, that’s established a wetland, as well as the one that, you know purchased the credit.

**Anthony Bly:** Yeah.

**John McMaine:** So, one of the things that you talk about a lot and Jeff brought up, is about marginal lands.

**Anthony Bly:** Yeah.

**John McMaine:** How do you view marginal land? Especially I mean corn prices, at least as we’re speaking, are probably the highest they’ve been for what?

**Anthony Bly:** 10-12 years.

**John McMaine:** 10, 12 years. So, at what point does that marginal land, you know, change back to economically viable land? And how do we make that argument, that land that is truly marginal should, should not be used. Like it shouldn’t just be considered about profit. Because corn could get so high that growing corn in your, in the space between the driveway and the house could be profitable.

**Anthony Bly:** Absolutely. Well, you know, if, if we can develop a system where we’re trading nutrients in the environment, in the value of those nutrients become just as profitable as corn or other commodities, I’m not saying to replace those commodities, because those will still be important. But that can help both systems.

**John McMaine:** Sure. Sure.

**Anthony Bly:** You know, it has, you know, that’s competition.

**John McMaine:** Yeah.

**Anthony Bly:** You know like, beans compete with corn.

**John McMaine:** Sure.

**Anthony Bly:** And, and, you know, and planting intentions and prices affect all that. But if we add another commodity in there, farmers are looking for their commodities.

**John McMaine:** Sure.

**Anthony Bly:** They think that they need to plant them.

**John McMaine:** Sure.

**Anthony Bly:** But those commodities could be cleaning up water. It could be in definitely carbon now.

**John McMaine:** Yeah.

**Anthony Bly:** And, and so I think I think, an awareness of the capability of what the farm has to offer, profit streams.

**John McMaine:** Yeah.

**Anthony Bly:** Potential or enterprises or whatever you want to call them. I think that’s, that’s really important.

**John McMaine:** So yeah, there, I guess, there is potential. And it’s up to the social scientist at this point and the, and the economist to say, “How do we make these systems work?” Probably a lot of the physical science, well there’s a lot of questions there too, but you know, we know generally how a constructed wetland would perform.

**Anthony Bly:** Yeah, we’ve had to adjust our commodity prices up in the marginal end. In our, our precision profitability analysis.

**John McMaine:** Sure.

**Anthony Bly:** That moves that line. That moves that line in the field.

**John McMaine:** Right.

**Anthony Bly:** The non-profitable acres are shrinking.

**John McMaine:** Right.

**Anthony Bly:** And then prices will go down. And then they’ll grow again.

**John McMaine:** Yeah.

**Anthony Bly:** So, the, the trick is knowing where that line, where that mean average, that average value, in the field. I’m talking in the field.

**John McMaine:** Yeah.

**Anthony Bly:** You know, where that’s at. That’s, that’s really the trick of it all.

**John McMaine:** And again, somehow giving value to, I mean marginal lands, yeah, they’re marginal for farming. But they may be optimal for some other ecosystem services.

**Anthony Bly:** Absolutely. One thing, one thing that I’ve done a little bit of, is looked at on farms soil organic matter levels. And our marginal lands, I think, are a really good opportunity for carbon farming.

**John McMaine:** So that would be the best place for that.

**Anthony Bly:** Right. Exactly. And, and so marginal wetlands could be a great opportunity for nutrients, you know, changing water quality and.

**John McMaine:** Right.

**Anthony Bly:** Capturing nutrients and, and things like that too. So that’s that ecosystem services.

**John McMaine:** Right.

**Anthony Bly:** I mean that’s an exciting thing! I just, I just wish it could, could get a big jump start.

**John McMaine:** Yeah. And there’s lots of people working on it so I guess that’s the positive thing. And, not to belabor the point, but I guess there is challenges too about people potentially gaming the system, right? Because if you can, if you can demonstrate that you have removed say, 100 pounds of nitrogen per acre, I don’t know that’s a crazy high number. But some amount of nitrogen per acre. But then you have less incentive to kind of do infield management to reduce the amount of nitrogen you apply.

**Anthony Bly:** Correct.

**John McMaine:** So, there’s a lot of moving parts.

**Anthony Bly:** Right.

**John McMaine:** But I’m hopeful, seems like you’re hopeful.

**Anthony Bly:** I’m hopeful, yeah. I’m hopeful. And, and I want to visit why there’s a stigma regarding the word wetland.

**John McMaine:** Let’s do it.

**Anthony Bly:** Well, you’ve ever been stuck?

**John McMaine:** More times than I should admit probably.

**Anthony Bly:** Stuck with a big tractor or a big combine?

**John McMaine:** That I have not been stuck with a combine, mainly because I don’t farm. But tractors yes. Trucks, many, many times.

**Anthony Bly:** Yeah, it’s, you know, life changing. You’ve got several thousand dollars sitting there, essentially worthless. You know, it’s just stuck.

**John McMaine:** Yeah.

**Anthony Bly:** And, and you’ve got to get it out without wrecking that piece of equipment.

**John McMaine:** Yeah.

**Anthony Bly:** And you know, that, that’s a big deal. And so, I think that’s in the back of a mind of a lot, a lot of producers you know. Or here I am, planting this field that’s 98% of it is ready, I have to swerve around this, this area that’s wet.

**John McMaine:** And I mean, I know that you know drainage is contentious. I mean I’d say that’s the most opposite in views I’ve heard since I’ve been in South Dakota. I mean, people are either for drainage or very much against drainage. And so, I think that folks that maybe are against drainage, see, see wetlands and then that’s, that’s a loaded term then related to drainage, and of course, from an USDA funding perspective, you can’t, I mean from a swamp buster you can’t drain wetlands that are classified. But then there’s a lot of disagreement. One person sees a wetland or sees pieces of ground as wetland, and the other person does not. It’s a very contentious issue.

**Anthony Bly:** And the water movement, and who’s water is it. And, and dumping. Are you dumping water on your neighbor?

**John McMaine:** Right. Yeah. Yeah.

**Anthony Bly:** And I’ve heard all those things. Yeah.

**John McMaine:** So that, that to me, I mean, it kind of gets back to, yeah. There’s a lot of, hot tempers around wetlands and drainage.

**Anthony Bly:** There is! It gets, it gets pretty heated sometimes.

**John McMaine:** So, one more thing, would be the utility of that land. How much do you think that can make the, I guess, economic argument? So, if you can hay an upland part, and you have a wet meadow say instead of a constructed wetland quote-on-quote. I mean haying is not the most profitable thing to do in the world, but does that add to the economic incentive of it all? Or is that kind of marginally beneficial and not enough to.

**Anthony Bly:** It’s not that exciting.

**John McMaine:** Yeah. Oh hayfield!

**Anthony Bly:** You know, and I’m certainly, in, in, in, you know, if you’re a livestock producer and you’re doing that practice anyway.

**John McMaine:** Right.

**Anthony Bly:** Then, you just do that.

**John McMaine:** Yeah.

**Anthony Bly:** And then, and then it has a higher value.

**John McMaine:** Sure.

**Anthony Bly:** You know, we see, we see, the development of larger, larger farms and, and those farms don’t have that capability to do that because they don’t want it.

**John McMaine:** Sure.

**Anthony Bly:** So, it just depends.

**John McMaine:** Yeah.

**Anthony Bly:** It really depends.

**John McMaine:** Yeah. But it wouldn’t, it wouldn’t be everybody that would find much value in that. What about the seed harvesting?

**Anthony Bly:** That’s kind of a stretch.

**John McMaine:** Okay.

**Anthony Bly:** You know, I’ve thought about that in the past. There’s a certain set of technology that you kind of have to be aware of.

**John McMaine:** Sure.

**Anthony Bly:** You have to know these plants. When is that seed viable? And how do you take it? How do you gather it?

**John McMaine:** Yeah.

**Anthony Bly:** How do you separate it? Clean it?

**John McMaine:** Yeah.

**Anthony Bly:** What form it needs to be in for the wholesaler to want to even try to buy it from you.

**John McMaine:** Yeah.

**Anthony Bly:** Germination testing.

**John McMaine:** Pretty big learning curve.

**Anthony Bly:** There, there, there is a learning curve there. It’s not like going out and, and producing. If you’re a corn and soybean farmer, now you want to plant a cereal grain like oats, there’s enough of a learning curve there.

**John McMaine:** Sure.

**Anthony Bly:** But to go to a really specialty forb or other grass, is even more.

**John McMaine:** Yeah, it makes sense. So, let’s transition to kind of some of the future ways Jeff envisioned being able to use constructed wetlands and/or kind of how they fit in the watershed.

**Anthony Bly:** Sounds good to me.

**Jeff Strock:** In our wetland systems, we do use controlled structures at the outlets of our wetlands. And in our systems because we have a pair. One we just allow to free flow water out and then the other one, we actually have increased the outlet elevation by about a foot, so we are trying to retain a little more water there. A little longer to see if we can get better treatment. So, you know, in terms of innovation, there are opportunities for using technology like controlled structures. Earlier on, you and I, you know, probably before the recording was turned on, you and I were talking about a project you’ve got going on, that is related you know, measuring soil moisture in a water shed.

**John McMaine:** And I’ll just jump in quick here, so this is the Willow Creek watershed project that Jeff mentioned here.

**Anthony Bly:** Good.

**John McMaine:** And we’re looking at soil moisture. And I think soil moisture is a big driver for kind of resilience because you want the right amount. You either have too much or too little. So, we’re looking at how different agriculture systems perform for managing that soil moisture risk. Anyways, we’ve got, we’ve got, twenty-four fields in the Willow Creek watershed, just northwest of Sioux Falls. But, back to Jeff.

**Jeff Strock:** And you’re talking like a big watershed. We’ve been trying to work on doing the same type of thing in our small watershed at the research center. And we’ve been very specific in terms of trying to consider the different types of cropping systems and the different types of natural drained, well-drained, and un you know, poorly drained soils in these areas. And then looking at these cropping systems. And we’re trying to produce sort of a database of soil moistures associated with these cropping systems. And we’re planning on doing this over years. Because we want to be able to use that information, even though its only on one site at this point. But we want to use that information to be able to develop models and sort of couple that with machine learning, artificial intelligence. To be able to manage our water systems, right. So, we’re specifically doing this with our drainage ditch research in mind. So, you know, if we’re able to monitor soil moisture for example in our fields, in cropping systems, and we’re able to measure with a bubbler or a pressure transducer, some of our drain tile. And we know that we’re using some weather forecast and can we use the knowledge from these technologies, from the soil moisture, from the weather forecasting, from the tile, in terms of just hydrology. Can we use that to manage the outlets of our drainage ditches? Or could we use that to manage the outlets of our wetlands? So, if, if we were looking at some really, really wet conditions coming and we have water backed up in our wetlands that we’ve been storing temporarily or in our ditch system for example, and we knew that the forecast in the next three days says holy cow, you’re going to get two or three inches of rain. We can use technology to basically release some of that water through those control structures. Create a draw down in our constructed wetlands and then, before that rainfall event happens, raise that elevation outlet again and then we got additional storage capacity. So, we can potentially have a little bit more management, active management, on the flow mitigation going into and out of those systems. And so, obviously in our little watershed we are not going to affect flooding downstream when doing it at one site. But you could see where potentially if we were able to actively manage systems that, you know, we might be able to have a positive impact on flood control and that kind of stuff, too.

**John McMaine:** So, yeah. We’ve talked about before what Jeff mentioned here about automation and kind of smart systems.

**Anthony Bly:** Yeah.

**John McMaine:** And he identified water quantity, you know flooding, flood mitigation, potentially. But I think it could apply for lots of different things.

**Anthony Bly:** Oh, I got a smile on my face. It’s really exciting.

**John McMaine:** And I mean, I can even see it for, if we identify cycles that are more effective within a constructed wetland or a bioreactor, I’ll throw that in there. So, if you have wetting and drying cycles, and you’re able to more effectively treat nitrate or some pollutant that you want to remove. Well then you can automate that system with a control structure, an automated control structure to specifically target that pollutant.

**Anthony Bly:** Correct.

**John McMaine:** And then what he’s talking about is kind of building this database of soils and cropping systems to basically know exactly what to expect for flow in a watershed based on inputs, precipitation inputs. And now you can model very specifically what’s going to be coming into the constructed wetlands and again, if you need extra capacity, you, you draw it down beforehand and then you, you know, raise your outlet back up and now you’re holding more back.

**Anthony Bly:** You can take more water.

**John McMaine:** Yeah. And so then, if you scale that up, this could be all across a watershed. And you could design this to, you know, if you need to cut off an inch or two inches off the top of a storm, you can manage all your systems that way.

**Anthony Bly:** Sure.

**John McMaine:** There, if they’re all connected.

**Anthony Bly:** That’s what I was thinking.

**John McMaine:** There you go! That’s, that was the smile on your face. Then, I mean, now you’ve got the opportunity to really make a big difference potentially. Enough to a certain point.

**Anthony Bly:** Yeah, obviously those 18-inch rainfalls are going to be over the top. But, but I mean you could make an impact.

**John McMaine:** And in that case, just have the ark in your backyard.

**Anthony Bly:** Right.

**John McMaine:** And you know, jump in and you’re set.

**Anthony Bly:** Yeah.

**John McMaine:** Yeah. So, this topic has come up a lot about kind of smart systems brining in lots of different variables and automating the system. But I’m so excited about it. I think it has a lot of potential for impact along the road.

**Anthony Bly:** Yeah, I agree.

One thing I have heard about or seen, is wet meadow concept. So, it’s not, you know, a traditional constructed wetland, but you’re able to control the outlet elevation so you can store water, get water quality benefit, but you allow the water elevation to be such that you can actually grow, grow a meadow there.

**Anthony Bly:** Sure.

**John McMaine:** So, it’s a wet meadow. You’re getting water quality, water quantity benefits, but then it’s basically a hayfield. And so, you can draw the water down, harvest it, and just keep the cycle going. And that gets another benefit of getting nutrients out of the system.

**Anthony Bly:** Correct.

**John McMaine:** So, any plant uptake well you, you can take that vegetation out of the system. So, again with all these practices, constructed wetlands, I think there’s a lot of functionality and utility and flexibility and it’s about thinking what fits best for the situation.

**Anthony Bly:** Yeah, and I think producers aren’t in tune with thinking or seeing these things.

**John McMaine:** Sure.

**Anthony Bly:** And I think if more of them were exposed to some of these thoughts and ideas, they would say, “You can do that?” You know?

**John McMaine:** Yeah.

**Anthony Bly:** I, I really do.

**John McMaine:** Yeah.

**Anthony Bly:** I really feel that way.

**John McMaine:** That’s good to hear.

**Anthony Bly:** And, and, you know, half of the land, you know, being owned by absentee landowners is kind of a problem as well. But I think of, I think a lot of these landowners want to do the right thing for the environment.

**John McMaine:** Right.

**Anthony Bly:** They just don’t know how.

**John McMaine:** Sure.

**Anthony Bly:** So, I’m hopeful for, for the opportunities there. I think, I think there’s a lot of opportunities there.

**John McMaine:** Cool.

**Anthony Bly:** So, awareness.

**John McMaine:** Sure.

**Anthony Bly:** Because you gave me an idea with the wet meadow.

**John McMaine:** Hey, awesome!

**Anthony Bly:** Hadn’t even, hadn’t even thought of it.

**John McMaine:** Awesome, fantastic!

**Anthony Bly:** Hadn’t even occurred, occurred to me!

**John McMaine:** Man, love that we’re doing this then! We got one farmer on board.

**Anthony Bly:** Yeah, I mean, I like to learn you know, learn something in everything I do. Got to learn something.

**John McMaine:** And it’s cool to whenever you talk about a concept and then someone just takes it and runs with it. And I think almost every farmer has that ability and interest and so I agree like, exposure to the problem number 1.

**Anthony Bly:** Right.

**John McMaine:** And then exposure to solution systems. I’m not going to say, you know, a prescription, but people are innovative, they’ll take it and run with it and figure out a solution that works for them.

**Anthony Bly:** They will. Absolutely.

**John McMaine:** So, the final question I asked Jeff was kind of what is the future, what do you see about the future, you know, if he’s going to envision the future of constructed wetlands, what does he see. And so, this is what he had to say.

**Jeff Strock:** Things that we researchers do, sometimes pushes our stakeholders a little bit, their comfort level right. Part of it is the fear of the unknown, part of it is about anxiety and changing what we’ve done for the last number of years in terms of how we farm or whatever. But I think when we think about the future, you know, some of it is probably going to relate to policy things, right. Things that you and I can inform policy, but we don’t control policy. And so, there can be federal policies, state policies, that could potentially be put in place, and I don’t even want to think about what those could be. But policy could potentially dictate more implementation of conservation practices that might be required, might be mandatory, rather than voluntary. So, the work that we do, John, that you, the research you’re doing, the research I’m doing, and our colleagues in Indiana, Ohio, Iowa, Wisconsin, Illinois, you know, we’re trying to look forward a little bit of course and I, I think that there, well I don’t think, I believe, that there’s going to be a place. Clearly Iowa has shown that there’s a place for constructed wetlands on their landscape. And their work has evolved so you know, it evolved from constructing large wetlands at the outlets of drainages to constructing many more smaller ones in the, in the upper reaches and in the headlands of some of these drainages.

So, you know, I think we’re going to able to learn from some of that, but, but at the end of the day, it’s going to come down to something that one of our state agencies talked to me about and that’s about the numbers of ecosystem services that these conservation practices that we’re trying to implement for water quality protection from agriculture. The number of ecosystem services that these things provide, you know, what this is going to end up meaning is, is that state agencies are probably, ad this might end up being federal as well, they’re going to support with much more enthusiasm and maybe it’ll translate into dollar support for implementing practices. But these agencies, state and federal, are going to support practices that have, that offer more ecosystem series than less ecosystem services, right? And I guess a constructed wetland is going to provide a lot of ecosystem services.

**Anthony Bly:** That was interesting.

**John McMaine:** Yeah. And I think this is a good place to pause in this clip because again, like constructed wetlands and, and maybe we’ll just talk broadly in a second. But constructed wetlands do have the benefit of having such a diversity of ecosystems services, such potential to treat, you know, a wide range of pollutants, water quantity benefits. You know, storage and detention. Habitat, pollinators, yeah, water quality and water quantity. And so that perspective is interesting that it’s not just thinking about single, single-use or single benefit practices, and we still need those, they’re still apart of the toolbox, but thinking about maybe multi-benefit and what multiple benefits we can get out of practices.

**Anthony Bly:** Correct.

**John McMaine:** I want to swing back to this point that he brought up at the beginning of the clip and you mentioned this earlier about problems and solutions. Do you think that a lot of, I guess, challenges with implementations is just the, the paradigm, like shifting the paradigm, fear of maybe the unknown or fear of shifting the paradigm? How much do you think that holds people back?

**Anthony Bly:** Oh, I think quite a bit, because you don’t want too much change.

**John McMaine:** Yeah.

**Anthony Bly:** Because there’s that fear of “Can I adapt?”

**John McMaine:** Sure.

**Anthony Bly:** You know, “Will I be forced out of something because I can’t adapt?”

**John McMaine:** So, here’s a question about mindset and paradigm. I see a lot of land that is used. Like South Dakota, you drive up I-29 and probably 90% is cropped.

**Anthony Bly:** Correct.

**John McMaine:** And I’m not saying that’s a good thing or a bad thing. It’s just the landscape.

**Anthony Bly:** Correct.

**John McMaine:** And so, as a farmer, if you see land on your farm that’s not being cropped, and this kind of goes back to the marginal acres question, you know, you look at that first glance. Is that like “Ugh” if it, you know, doesn’t have a crop growing? Even if it is a poor crop? Basically, are you, in some way, feeling like you’re admitting defeat if you convert that land into something else?

**Anthony Bly:** Farmer’s farm.

**John McMaine:** Yeah.

**Anthony Bly:** And, and right now, the farming paradigm is growing a crop. Planting something. Using the ground to produce something.

**John McMaine:** Yeah.

**Anthony Bly:** So, there’s two fronts you know. The landowners need education on all these things and then the producers as well. And I believe rented land and owned land is kind of treated differently in a sense, sometimes.

**John McMaine:** I believe that.

**Anthony Bly:** Because I’ve heard, “Well I would do that on my land, but I wouldn’t do that on the owned land.” Because there’s another level of exchange going on.

**John McMaine:** Sure. Paradigms are hard to shift.

**Anthony Bly:** Oh, they’re hard to shift. They take, they take a generation or more.

**John McMaine:** Yeah.

**Anthony Bly:** To get a producer to change his paradigm, their paradigm.

**John McMaine:** Or her paradigm.

**Anthony Bly:** Or her paradigm. Is worth more than twenty or thirty dollars an acre or five dollars an acre.

**John McMaine:** That’s an excellent point.

**Anthony Bly:** Okay.

**John McMaine:** Yeah.

**Anthony Bly:** Because they are changing their paradigm, how they do things.

**John McMaine:** Right.

**Anthony Bly:** So, the value of the carbon right now are what carbon markets are willing to pay is too low.

**John McMaine:** And at the same time, we can’t rely on “pay me and I’ll do it” to shift the paradigm, because that doesn’t actually change their mindset necessarily.

**Anthony Bly:** No, no, it’s “I’ll do it as long as you pay me.”

**John McMaine:** Yeah.

**Anthony Bly:** And then I’ll probably revert back**.**

**John McMaine:** Yeah, you got to change what you want. Not necessarily what you end up at.

**Anthony Bly:** Correct.

**John McMaine:** So, if we think about taking land out of production, that currently doesn’t pay anything unless it’s in CRP and so for that to be permanent, the ecosystem services either have to be incentivized in some way or the producer has to see the value. Like it has to add value to their life.

**Anthony Bly:** Correct.Or if we put a value on these ecosystem services so that an industry or someone who can’t clean up their act, put it that way, can offset their problem.

**John McMaine:** Sure.

**Anthony Bly:** And are willing to pay a producer to offset their problem.

**John McMaine:** Sure.

**Anthony Bly:** But the net gain in society and the environment has to be positive. It can’t be going backwards.

**John McMaine:** Yeah.

**Anthony Bly:** Yeah. That was deep thoughts.

**John McMaine:** That was. Man. Alright, let’s go back and we’ll let Jeff finish up his answer there about kind of the future about constructed wetlands and beyond.

**Jeff Strock:** There’s a lot of potential benefits. There are drawbacks. And you know, I don’t know if, if we talked about this in the last interview we did John, but one of the things that everybody who’s listening really needs to understand is that there are tradeoffs in everything that we do. There are tradeoffs in every single practice that we try to implement were research. You know, constructed wetlands, you know, will take land out of production. People who’ve advocated over the years for two stage ditches, take land out of production. Cover crops, there’s expense, there’s challenges with getting cover crops established in our northern part of the, the region. So, there are advantages, disadvantages, and tradeoffs with everything that we’re going to do.

So, none of it is even going to be absolutely perfect. But, you know, again, coming back, state, federal agencies are probably going to be looking more and more at putting funding towards things that have more ecosystem services than less ecosystem services. You know, one of the things that we’ve thought about, you know, we have not gotten a lot of traction with our bioreactors or at least our modular bioreactors in Minnesota. We’ve shown that they’re very effective but one of the things we were criticized about was is, well it only provides one ecosystem service and that’s improvement in water quality. So, I’ve kind of tongue and cheeked it and said well what if we grew wild rice on top of it, right. Farmer could put a bunch of bioreactors out there, harvest the wild rice, and sell it or eat it. What if you planted a bunch of species that were tolerate of wet conditions and you were able to harvest the seeds off. I’m not saying that we are trying these things at Lamberton necessarily, but if someone poses a problem to you, we need to put our little thinking caps on and figure out, okay how do we get around that? How do we take what we are doing and meet the needs of not the growers, the stakeholders, but also these biodiversity things and other ecosystem services things? I, I, I just think it’s an exciting time and if we don’t live in a box, I think we can solve problems and come up with viable solutions that maybe not everybody is going to be happy with and maybe no one is going to be happy with. But everybody will be equally happy and unhappy with what they’re doing, right? So, it’ll be a balance and, and that, that’ll satisfy people.

**John McMaine:** And so, I do agree in we’ve talked about it already in this episode of, you know, give people ideas, give people concepts, make people aware and then let them run.

**Anthony Bly:** Exactly! We want that instead of a world of regulation.

**John McMaine:** So that’ll wrap up our Part 2 of constructed wetlands as you’ve heard and as I’ve said, constructed wetlands are near and dear to my heart.

**Anthony Bly:** I like the constructed wetlands, I really do.

**John McMaine:** So, are you going to put some in on your farm?

**Anthony Bly:** I’d like to dig a hole; I’ve been thinking about it.

**John McMaine:** All right. Give me a call when you want.

**Anthony Bly:** Okay.

**John McMaine:** When you want a design.

**Anthony Bly:** I should show you the spot.

**John McMaine:** I’ll come on over. It was great to talk to Jeff and get his perspective. There’s a lot of potential. If you have any questions about constructed wetlands, be sure to check out Part 1, where we get into more of the mechanisms of removal and performance. And as we’ve said, there’s more questions than there are answers. These are challenging problems. Water quality, water quantity, carbon ecosystem services. But we have a nice toolbox. And like we said, every solution, it has a flaw but let that be the starting point for innovation.

**[transition music plays]**

**John McMaine:** Thanks for joining us today on Streamlines. We sure had a lot of fun today, hope you did too! If you want to learn more about anything you heard today, head on over to the SDSU Extension website. But for now, I’m John McMaine.

**Anthony Bly:** I’m Anthony Bly.

**John McMaine:** And we’ll catch you next time.