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A Technical Report for the Farms & Rivers for the Future Project

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Executive Summary

This report facilitates conservation work in the Meduxnekeag Watershed by summarizing interview data to communicate:

- Values guiding farmers' adoption of conservation practices and the perceived benefits they feel they receive from those practices
- Barriers to riparian buffers in terms of how they are discussed, defined, and understood
- Tensions or pressures farmers feel between improving their operations for conservation and their economic obligations
- Collaboration and co-development of projects, problems, and solutions as an important process for successful projects moving forward

Report Rationale

The goal of this technical report is to provide a summative research update and final report for the Farms and Rivers for the Future Water Resources Research Institute (WRRI) project. The purpose of this report is to provide a concise, but detailed, account of the information that came out of project interviews with farmers, how that information connects to many of the central questions and interests of the project, and how partners might think about making use of the information in future work.

While the information gained from conducting interviews exceeds what is presented here, these themes represent the most central points of those interviews and the example quotations help to ground those themes in farmers' perspectives, values, and language.

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Discussion of project methodology

The overarching framework we adopt for this project takes a sustainability science-based approach and focuses on using rhetorical research methods. A rhetorical approach to research entails four key commitments for our project. First, a rhetorical approach to research works to develop a more thorough understanding of our audience to connect the perceptions, needs, and values of farmers with conservation-based decision making within the watershed. Our research design sees the perspectives and values of farmers as an important factor to take into consideration early on in designing projects and best management practices that farmers will perceive as valuable and worthwhile.

A second commitment of rhetorical research entails paying attention to how these perspectives and values emerge or take shape within the mundane, everyday lived experiences of our audience (McGreavy et al., 2018; Rai & Druschke, 2018). Whether or not farmers find proposed best practices or projects compelling, or persuasive, will depend in part on whether those practices can connect to the everyday experiences and meaning making of farmers. Such a rhetorical perspective highlights the need to pay attention to the role of rhythms and materiality in farming practices as they relate to how farmers make sense of their work, find value in it, and make decisions.

Third, rhetorical research focuses on attending to the way communication acts as process by which communities—and their boundaries—are formed and maintained. Our methodology works to identify and locate key statements or phrases as they circulate through, and help shape, the Southern Aroostook farming community (Druschke, 2013). Once identified, rhetorically oriented research sees these communal beliefs and statements as boundary objects or sites of tension that invite collaboration and persuasion as a form of intervention in the interest of conservation (Druschke, 2018; Rai & Druschke, 2018). In our project, farmers expressed a responsibility to care for the soil as well as financial/economic pressures or values that may be in tension with that responsibility. Such a site can be an opening to collaborate with farmers to develop projects capable of acknowledging and working with those competing values.

Finally, this approach is committed to identifying opportunities to expand collaboration in environmental decision making. Our design communicates findings with partners in ways that facilitate their capacity to use existing community relationships, knowledge, and resources to craft collaboratively defined project to address conservation needs and goals (Blythe et al., 2008). It also provides opportunities to forge new collaborations and partnerships through involving farmers in the co-development of problems and solutions in the watershed. Such an approach will help future projects to find intersections between conservation, farmer values, and cultivating productive relationships (Clark et al., 2016; McGreavy et al., 2018).

We were able to practice these rhetorical commitments throughout the project by conducting interviews ($n=17$) that worked to uncover and discuss some of the mundane or everyday values and rhythms that guide farming. From those interviews we scheduled field visits ($n=5$) with farmers that put those rhetorical methodologies into practice by asking farmers to show us many of the things we discussed. This helps contextualize conversations in interviews by providing researchers with firsthand experience moving through farming operations. For example, instead of just discussing the excitement and value farmers attach to soil health practices, researchers were able to walk with farmers through the mundane, everyday processes associated with that work, share their energy with us in-person, and explain the steps they take to promote the health of their soil and take care of their farm.

Riparian Buffers

Summary: The way that farmers understand and talk about riparian buffer strips can be separated into three key points: that there is a sense of uncertainty in the function of buffers and/or why they are needed; that there is a variability in how buffers are defined or understood; and finally that riparian buffers are themselves a boundary object in that they weren't often discussed on their own but were more likely to be considered in terms of other practices farmers are using such as soil health-based approaches.

"Generally we just do it because you need to. Now I don't know, I have heard talk in the past of having great big deals where - like on this side there's little brooks. In fact, some of them dry up in the summer even there. Like one field is only three acres, but there's one of them little brooks on each end. Well some of that talk I heard you wouldn't even be able to touch the ground."

"The reason that I probably can't answer that question in a check-the-box form, so to speak, is because I took 80 acres of my own land and about that many acres of rented land, and I turned it all into sod. As far as buffer zones or strips to keep runoff, the whole thing is that. The whole farm is that, with the exception of taking ten-acre plots from time to time, or 20 acres, and turning the sod over in the fall, minimal tillage, and putting it back into sod in the Spring just to get a new [inaudible]. The whole farm is a strip, if that makes sense to you."

"So, the technical description of a riparian buffer, I'm probably not familiar with, my own opinion of riparian buffers--yeah. That's why I'm strip cropping is so that I have tilled soil, then I have an area that is gonna prevent runoff and hold and maintain my soil, then I have another piece that's plowed, then I have another piece that's not, ya know on and on and on all the way down through. Riparian buffers, are you saying simply only in waterways or are you saying all over the whole farm?"

"I don't know of any place in Aroostook county where anyone's farming right up to a water body. I mean is there a mile-long buffer--no--but I think realistically, again, my take would be the issue is the 55,000 acres of exposed soil up above."

Valuing Soil

Summary: Conversations about valuing one's soil, taking care of it, and working to promote soil health appeared in all 17 interviews. Both organic and conventional farmers expressed a commitment to taking care of or building their soil. This focus on soil emerged in terms of two key ideas: keeping farms as efficient/fertile as possible, and seeing farming as both a responsibility to care for soil and a process for that care. It seems that a main way farmers are considering the watershed is through soil.

"Absolutely, yeah. We were put on this earth to take care of it and part of taking care of it is using it but using it to use it not use it to abuse it. So...I mean farming is taking care of the land if you're doing it right. If you're not farming to take care of it correctly...there's only 2 ways to go with soil: you're either building it, you're either helping it, or you're hurting it--there's no middle ground at all."

"So, again going back to what we were talking about, I want to build my soil. I want to keep everything that I have here, I want to keep it here. So, I don't want it washing down the brook. I don't want it going down into the Meduxnekeag watershed. Am I necessarily thinking, at that point in time, am I necessarily thinking about the Meduxnekeag watershed, not necessarily. At that point in time, I'm just thinking about keeping my soil here."

"Yes. Yeah. So a ground that's been worked hard and the organic matter is depleted in it, we've got some clay in our soil, a fair amount, actually; and so it's clods, it's lumps, and it just doesn't work up well. Whereas if you give the ground some time, you get a root structure that grows within that, and you get some microbes and whatnot, and it's very beneficial. We see big yield responses on rested ground, on the table stock side of things. We see significant quality benefits."

"Well I mean we need to be stewards of the land so that what's surrounding that river is in good condition. And you know like phosphorus, we've decreased phosphorus use, I mean we don't need more phosphorus in the water and algal blooms and that sort of thing. I mean, we've got to be taking care of our land properly for the river to remain healthy."

Summary: Climate change is a salient topic for many of farmers we spoke with. Many discussed a focus on planning for climate change in order to keep their operations as productive as possible. Several farmers discussed the need to work adaptations into operations over several seasons or years. Additionally, there are different ways that farmers are approaching adapting their operations. Finally, it's also worth noting that some farmers are uncertain whether climate change is the cause of recent erratic weather.

"I guess the weather's been very unpredictable in the short period of time. I mean like the drought that happened this year, it was unlike anything my grandfather had seen in 82 years. If you can blame that on climate change or what it is, I don't really know...I don't know. I know we have dry spells and wet spells. I guess I haven't - I mean we still farm pretty much by the calendar so I guess I haven't felt like I need to change that yet."

"The change in our climate, blatantly obvious. Our weather is more extreme than it has been...what May of last year, we got a foot of snow here. You know? It's just unheard of. The year I built my house. Let's see, that was 2012. We had, I don't know whether it was nine or ten inches of rain in the one storm. I mean, it's just unbelievable...there's no amount of rotation that's going to help with that. You know? But, you know, it's the extremes. This year was the driest year we've ever seen. We dug the smallest crop on some of our farms that we've ever dug. And that's what gets under my skin, is that. And we've invested heavily into irrigation on our own, aside from NRCS. And it just, that's what gets under my skin, is that something's gotta give here. This is the extremes of the weather. You know, you can't afford to lose a whole crop."

"I know a large grower who's not gonna grow barley next year because, again, with some of those rainstorms...where they have an intensive green manure program, they saw differences in their soil movement. So, they're gonna, I mean that's gonna be a humongous shift of barley acres, well over a couple thousand, but all due to, again, observations."

Community

Summary: Community came up across interviews in several important ways. One of the most prevalent was that the Southern Aroostook farming community is tight-knit and rely on each other for support instead of being competitive like up-country. Despite this, farmers also defined important boundaries between operations within Southern Aroostook. Additionally, many participants discussed the value of consultants in their capacity to aggregate information and connect folks across operations.

"[A vendor or consultant] may be walking on my farm. He may be walking on my neighbor's farm. He could be one of the guys [that's] here every Monday – every Monday, all year long. Doesn't matter whether there's crop in the ground or not. And so, he's also on Thursdays in Presque Isle. So he sees the things going on, and sees what maybe is working in other areas, and may say, 'Hey, you ought to call so-and-so. They've got an idea.'"

"Not up country you're not gonna find that if you were doing this in Presque Isle or Caribou; but, oh my gosh yeah...we all share [equipment]; because, that's what works best. And so we all see each other's potatoes and, ya know, no we don't--we're unique in that we're not competitive. Like, I want to see my neighbors succeed where you don't see that everywhere. Ya know, if my neighbor's failing, that's not a good sign for me. Ya know, I don't want to see my neighbor fail so I can try to buy their farm; I want them to succeed and be part of the industry as well. I mean we share the hard times too because we go through some really tough times, sometimes, too. And, you know, we share those with each other and look for advice...and that's what we have to do, we have to work together because we can all learn from each other; we all have strengths and weaknesses."

"There's a lot more tillage involved in breaking down the carbons in the soil [in organic]. That's the stuff that everybody thinks organic is better for the earth. But, I think there needs to be a hybrid somewhere. There's aspects about both conventional and organic ag that have their place. Our tillage practices are by far less than that of an organic farm. Our production is just unbelievably beyond what theirs is. So, there's aspects to both sides that are valid. But, commercial ag gets a black eye because we use chemicals and synthetic fertilizers."

Farming as Rhythmic

Summary: A prevalent theme across several interviews is that farming is rhythmic in many ways. Specifically, several participants expressed a sense of pride in operating their own business, being a decision maker, or being part of an exclusive group. Rhythms were also discussed in two other important ways: that the dynamism of farm work makes it enjoyable because you don't get bored; and there is an energy and enjoyment in being able to play a necessary role in the larger process of growing crops or livestock.

"I have always loved...a couple things about it. There's a freedom about running your own business that you feel. It's labor-intensive, but there's a sense of pride there to continue running your own business, and I've been in other industries...but I'm not one to sit still. I have to be active and I've always – I like working with the seasons, having every season be a change of pace, and it's always something different. It's not the same day-to-day routine, I guess."

"Yeah, play a role is a part of it. To be the whatever that, I don't want to say makes [crops grow] because obviously god almighty is who makes it happen, but. To have the enjoyment of watching it happen, to be the one that, hey there's hard days of farming don't get me wrong, there's days that I don't wanna go out and mow hay. But, ya know, you mow hay, you take the hay put it in the barn, take that feed it to the cows, take that manure put it back out on the field, get a second cutting, ya know all those things. Yeah, I just, it wouldn't happen if I wasn't doing it so I guess being the one to do it is what, yeah it excites me I guess."

"But it's just the smell of the ground and the equipment, the soil, the not being – there's always something new. We never get really sick and tired of doing anything in farming, because the jobs just don't last. It's different than, say, a cattle farm. But, like I said, we ship potatoes. We ship for most of the winter. And we're done shipping now. We're going to go work in the shop for a few months. And then we'll start cutting seed. And then you get on the ground and it's just about the time you get sick of doing something, a new job comes along. So, that's what keeps you going, I guess."

Summary: Farming as a way of life and as generationally important is another prevalent theme. Many participants discuss farming in terms of it being a fulfilling culture or way of life instead of just a job or career. Participants also express a commitment to improving their farm and their soil so that they can pass it on the next owner better than they received it whether that meant their children taking over or not. This generational perspective is also helpful for highlighting the value of inherited experience or know-how in farming.

"experience in agriculture is, like I said, valuable. I find myself--and I'll be 50 this Summer, and I've been on the farm since I was 5 years old...of course my foreman is younger than I am and my son, he's 24. So, ya know they'll bring things into the office and they'll start saying 'we can do this, we can do that' and I say 'we can't do that cause this' I'm the guy with the experience now, ya know what I mean? Like it used to be my dad but he's pretty much retired so now it's me...like I said that experience is just invaluable, it really is."

"I mean there's a mindset behind it, there's a work ethic behind it...I can take my kids with me to work every single day. In fact, one of my kids usually goes to work with me every day...at age 14, I know that my daughter can go to the barn all by herself and do everything she needs to do to milk cows, feed cows, take care of washing up, she can do all of it at age 14...the whole thing is a culture thing. So, yeah when I say I can't think of a better place to raise my kids, I can't. They're safe, they're learning what work really means, they're learning how to provide for themselves."

"I believe that...farmers in general, we have an obligation to leave the ground better than we get it for our future. I want it here for my kids because without farms you don't feed anybody, so you need it. Yeah. I would say if you're not...a farmer that's trying then you're not going to make it. There's always going to be challenges, but you've got to try to leave the ground better than you got it in my eyes. I mean, that's the way I was raised. My grandfather – you always look to the future in anything you do. I wouldn't expect anything different from any farmers really."

Summary: Another central theme is the idea that innovation and adaptability are key parts of farming. Farmers discuss innovation and adaptation as both energizing rhythms or part of what makes farming fun but also necessary for farmers who want to be successful. This can be seen in farmer's willingness to try things differently or take a risk so long as that risk makes sense. Farmers also express that projects and programs that aren't open to that commitment to flexibility are more difficult to work with.

"[My Grandfather's] always been a guy to try something new and to experiment. And I think every good farmer kind of has that in them that they want to change things, see how they turn out."

"I was like 'wow.' There's just so much going on in the farm operation, if you can be part of that thought-stir, it's a really fun place to be . Ya know, provoking thought with these guys--I mean they're thinking about everything"

"I mean you need to find ways or look at ways of maybe doing things a little differently once in a while and try to improve. Maybe it will work out, and maybe it won't. That's what I always find exciting is – like when I went to no till...I was just going through that whole process of doing some research and finding out what I needed to work, to put on my planter to change it so I can use the same planter. I just put on some no till equipment. In talking to different farmers that was really a challenging and worthwhile experience. And every year, I like to be able to try something a little bit different just to see how it works. See if it will improve our operations."

"I mean there's equipment, there's chemistries, there's technologies, ya know. I think too often people think of farmers as, ya know, on this tractor with no cab just haphazardly spraying a bunch of pesticides that don't need to be sprayed. I mean we use stuff now that's molecules per acre...I mean, we don't want to spray! It's in our best interest, we're a business, to not spend money on that if it's not warranted. But, you know, there's so much technology now...we take a soil sample every 2.5 acres...mapped out on software. And so then I can build zones in that field so that like every 500', if it needs a little potash here and not the next 5 acres, then I build that prescription to do that and then the applicator just uploads that file [and the tractor] goes across the field"

Thinking about the Watershed

Summary: Whether farmers consider the watershed in their operations is another important theme. In many ways, the watershed is not on farmers' minds when farming or it is secondary to decisions based on land/soil. However, many farmers see best practices used across their operations as protective of the watershed whether they're thinking about it or not. There also seems to be some interest in larger conversations about how farmers can approach the river in a way that works both for them and the community.

"I wouldn't say the river's on my mind all the time. What I would say is I – and I'm not gonna say I necessarily treat the ground next to the river better or different than I do the rest of the ground. But I do try to make my practices the best that I can, even the stuff that's on a side hill, that's – I mean, eventually, it's gonna wash somewhere. I try to do my best on all my ground that I – that I can reasonably do."

"Oh yeah, we need to be a part of [conversations about the watershed], yes. It needs to be a total community project if you will. You have to find that balance. You can't--right now the state of Maine doesn't have a lot of regulations that have a lot of teeth in them to stop people from pumping out of places they shouldn't be. You know, you're walking a fine line there as far as whose water is it? There needs to be more work done on that."

"I would think so. I would think that's the way it should be. There's, it's like I said about conventional and organic ag, that everybody has their place. And instead of giving somebody a black eye, then let's work together. You know? And so in realistic outlook, I would think that there's going to continue to be agriculture in our communities, and that there's going to continue to be modern practices, and that there's going to continue to be a focus on maybe the Band's outlook is to try to preserve, that we can work together instead of trying to limit access. Like I said, my great-grandfather irrigated out of these streams. We irrigate with a more conserved approach. There's low-flow rules, and things that we abide by"

Pressures Farmers Navigate

Summary: The multiple pressures that farmers face is also a common theme. Many farmers mention wanting to improve some of their practices but feel that economic barriers prohibit them. There is also an important temporal consideration in how farmers weigh short-term costs against potential long-term benefits. Many also discuss the fact that maximizing efficiency in their operation is key. Additionally, several farmers mention finding it difficult to engage conservation-oriented projects that add to their workload.

"I mean it's nice when they put in some funding for farmers to do this work because it's above and beyond their normal day. I mean we've got a full enough day as it is. We don't need to be harped on about being environmental stewards and adding work. But, inevitably, we are in that position to make those best, you know, the best possible improvements that we can. So we try to but we're pretty straight out."

"Land is a tight commodity. And so we work excessively hard trying to increase our rotation. It's definitely worth the investment. It's just it's a short commodity. And again, with some of the rented property, you never know. We try to purchase as much land as we can, but not everybody wants to sell...There's been some increased pressure on land, and we slipped on that for a few years...there's been a couple of farmers that have gotten done, and we've been fortunate enough to pick up almost the entirety of their ground. And so that's got us back into that, just to try to give our ground a break, give it a chance. Obviously, the soil structure has a lot better chance of handling the moisture. You know?"

"If you're gonna go from a 2-year rotation to a 3-year rotation, you gotta have very deep pockets if you're just gonna say 'I'm doing it right now' because not only do you lose 1/3rd of your revenue stream the very first year, you don't get the benefit of getting it back the very first time that you plant behind 2 years rotation. Yeah, it may be better, but it's not gonna be good enough to replace that...maybe when you're planting your 3rd crop in 10 years you go 'now I got something' but 10 years is a long time to wait if you haven't got enough revenue stream. It's a long time to wait and a lot of people don't make the trip."

Fumigation

Summary: Fumigation is also a regular theme that emerged. Discussion about fumigation was fraught with several farmers mentioning that they would like to avoid it if they could or don't prefer it but are being pressured to maximize their yields. It seems fumigation conflicts with the soil health values and responsibilities many farmers feel. Some mention biofumigants as an alternative but others aren't convinced they work. Many mention preferring increasing rotation or soil health to maximize efficiency.

"I think it's going to catch them. I think it's going to - long-term I think it's going to devalue their soil. You know, I think they'll have more misshapes, they'll have more - now maybe I'm wrong, but let's see.
[Laughs] Yeah. I don't - maybe it works great, you know, but I don't want to - I don't want to do it. I don't want to kill soil life, you know, myself."

"So [the processors are] pushing for us to do a better job and grow more potatoes, not more acres of potatoes but more potatoes on an acre and they don't think that we're changing things and [think that] we're not doing it fast enough. So...in order to stay in business, we have to grow more potatoes per acre. Well, so that's a benefit and the people are trying to rotate better and do that sort of thing. But...the other thing that they're pushing is that there's another way to do that and that's through fumigation. Well, I don't know how much stuff we talked about--the love of the land and the soil and all that and all of those things--and then you get into this serious conflicting thing about whether that is the right thing to do or not. They do it everywhere else. Is that good for the ground? So it's a real struggle."

"there's a battle to be fought [on fumigation] and I do, I think there's opportunity for the district type entities to, and not come out and say 'fumigation's bad, don't do it' but say 'hey, this is better' you know...If I come out and start making fun of Michael, we're not gonna get along...[there's] massive opportunity because every grower out there understands and has realized soil health. You know it's easy to talk about, it's not a new concept, but what's the next level? What fits in your management system...hey if that means not spending \$600 an acre and smoking all the biology out of my soil, a lot of them would love to."

Summary: All 17 interviews mention improved rotation, irrigation, or both. Some farmers discuss these practices in conflict with each other while others see the value of incorporating both of them into operations. The shortage of land is a key obstacle for improving rotation as farmers feel they can't afford to reduce the acres of potatoes they grow for processing. Additionally, several farmers express an interest in improved water infrastructure to support expanded irrigation as a means of adapting to a drier climate.

"I do think [Climate change is] gonna be a challenge and that's something that, we can overcome it but there needs to be, you know you need to have access to water whether it's building ponds or regulation speaking, allowing people to build, maybe making that process a little easier."

"Yes, there's no question [farmers are planning for climate change], and the driver of that's water management. Irrigation, things like that. We've had a dry past couple years; we had, 3 years previous were all records and then we've had some very dry ones and not so pretty. So, there's definite attention to that and, again...climate change is a part of everyone's operations. Does it mean I can stop using diesel fuel, no; but, I think after last year especially, climate change is something that became very prevalent."

"Well, we're usually on a rotation program and potatoes is our main source of income. But you can't plant potatoes every year so we usually go with oats - I go with potatoes, oats and then potatoes. And I don't have enough ground to do a three-year rotation but I've got probably 60 or 80 acres or 100 that I try to go potatoes, oats, clover and then back to potatoes. If we had enough ground, that's the way I would go because this past year was so dry and any of the ground that I had that was on a three-year rotation was a better crop. Yeah, it was a better crop."

"Well, the better rotation. We can have, ideally we'd have access to a lot more land and we'd plant a potato crop every 4 years; but, there's not enough land to do that. And so, in the year it's not potatoes we plant a cover-crop mix of ryegrass, clover, and turnip and then we just plow that back into the soil."

12 | Transparency & Dialogue

Summary: This final theme highlights a desire farmers have for transparency and dialogue. One farmer expressed an interest in transparent communication about what comes from this WRRI project insofar as they don't want their words to be used in ways they didn't intend. Others express a desire to be more involved in conversations and dialogue around problems and how they should be addressed. Finally there is also an interest in making NRCS/SASWCD project and programs more apparent and accessible.

"Well, I would like them to be very transparent on what projects stem from [the WRRI] and what thoughts they're having for the future. Then again, that it gets used in the context that it is intended. That make sense? Don't want your words to turn around and bite you in the ass."

"Well, hopefully we can get some more dialogue here with the community here and the...general public and just try and have everybody being on the same page working for the same common goal. Ya know, finding balance between sustainability, profitability...profitability is not different than sustainability as far as production agriculture goes; it's just gotta be part of it. Ya know, it's not a separate entity."

"I just feel like [programs need] to work for us as farmers as these programs need to be talked about openly...'Hey, ___, this is an issue. What do you think we can do about it?' Let's talk about that first. How do we address it and whatnot? That's what I see would be a whole lot more beneficial...you know, I like the dialogue, being able to have this input and say what I think and be able to think this through."

"the best way to put these practices into place is to have someone make people aware of what the practices are. That has always been a flaw of the NRCS. If you go in and sign up for something, you need to know what your going in there to sign up for. If the language isn't exactly right, you may not qualify for something...because you just didn't say it right....like when I said I needed a barn to put over my manure, well they don't build barns....but they build covered, heavy use areas. Well I don't know that. So...NRCS or whatever program it happens to be, needs to be more open with sharing information because there are scads of programs that I have missed out on or would have signed up for if I just would've known."

Connecting themes with project questions & goals

Project focus on riparian buffers

Key interests associated with this focus

- Why aren't farmers more interested in installing riparian buffers when there is cost-share available?
- What are the barriers farmers face in installing more buffers?
- How are farmers understanding or defining riparian buffers?

Many farmers expressed uncertainty in how riparian buffers ought to be defined or understood and conception of them seemed flexible across interviews which seemed to contribute to the uncertainty around them. There did not seem to be a common theme across interviews for how farmers understand: what a sufficient buffer is; what the purpose of buffers are; why there is further need for them; or even how to define a buffer strip (participants mentioned grass strips along waterways, trees along waterways, or strip cropping and grass strips in fields). Additionally, such uncertainty seems to lend itself to concerns in how buffers might become a site for regulation. This is because there isn't a clear understanding of how big they would need to be and what impact that would have on farming operations. Finally, most farmers do not seem to be thinking intentionally about buffers unless asked about them. Many of the conversations about buffers turn to how they do or don't fit in with other best management practices that are more salient for farmers such as soil-health or reducing erosion.

Project focus on practices farmers currently use

Key interests associated with this focus

- What practices are farmers already using and why? What is it about those practices that energizes farmers to adopt them or continue them?
- In what ways do farmers consider themselves stewards or environmentally-oriented?
- What practices are farmers sticking with that the NRCS/District have had a hand in getting started?

Discussions of soil health also emerged as important for better understanding what practices farmers are currently using and why. Virtually every farmer expressed some sort of commitment to soil health, regardless of the type of operation across interviews. Several farmers connected a responsibility to care for or build soil to what it means to be a good farmer. Many of them seem to feel energized by working to care for soil through farming in addition to taking joy in being able to be more directly involved in caring for their farm through the different processes and rhythms offered by soil health practices. Additionally, commitments to soil health seem to be successful because they operate at an intersection of environmental values and responsible farming while also helping make operations more efficient. Programs farmers mention that they think are worthwhile were: the hay/mulch program, increasing rotations, and trying different cover crops or green manure programs. Aside from soil health, many farmers are also interested in increasing irrigation and adapting their operations/practices for climate change though this was not universal.

Connecting themes with project questions & goals

Project focus on farming community

Key interests associated with this focus

- How is the farming community in Aroostook county understood or discussed? Are there different farming communities?
- Do those communities influence or inform decisions farmers make or practices they adopt?
- Who are farmers working with?

A common theme across interviews is that the farming community is small in Northern Maine in general but that the Southern Aroostook community is uniquely tight-knit because they are less competitive and want or even need each other to succeed. While the farming community is close, many farmers mention not feeling connected to other communities outside of farming or that those communities no longer have a good idea of what farming actually involves. Despite the closeness in the farming community, there are also noticeable borders and boundaries within the Southern Aroostook farming community. Specifically, farmers discuss different parts of the community in terms of: type of operation (e.g. organic or conventional); what types of practices different farmers use (e.g. green manures, rotation, or irrigation); their volume of production; and whether or not others are responsible farmers. Finally, when asked who else farmers work with, many mention third-party resources such as vendors and/or agronomists who they felt were valuable because they work across a large area and several operations which is helpful for aggregating information.

Project focus on consideration of watershed

Key interests associated with this focus

- Are farmers aware of the boundaries of the Meduxnekeag watershed on their property?
- How, if at all, are those boundaries accounted for in farming decisions and practices?
- Is there a way to make watershed boundaries more salient or visible for farmers?

Consideration of the watershed and its boundaries vary across interviews. Many farmers don't seem to be considering the watershed on its own but rather consider it through their soil. Several farmers share that they don't treat land based on its proximity to water but try to implement practices they feel are worthwhile for soil health across their whole farm. Other farmers do not seem to consider the watershed in a central way because it is not directly connected to their operation as a resource. Still, throughout interviews many farmers express a desire to have a larger, community level discussion about how to best manage the watershed for multiple parts of the community. One farmer expressed an interest in clearer regulation on how farmers can responsibly irrigate out of the river and its tributaries. Though, another farmer expressed some concern at the idea of there being too much regulation once it starts. Oftentimes these conversations established the watershed as a community boundary object that no single organization owned but that multiple parts of the community value or use so plans for it need to be representative of that.

Connecting themes with project questions & goals

Project focus on farmers' pressures and barriers

Key interests associated with this focus

- How are barriers such as contracts, size of equipment, and financial burdens playing a role in farming decisions?
- What other barriers and pressures are farmers navigating that our partnership ought to be aware of?

There are several important pressures and barriers farmers face that emerged throughout interviews. Farmers discussed: tensions between financial considerations and conservation; difficulty finding time, energy, or money to put into conservation practices; pressures farmers face from contractors; and constraints on land availability. Many farmers are aware that several of their practices could be more conservation-oriented but do not feel that they are able to put those practices in place because of the economic trade-offs associated with them. An extremely common one farmers mention is being able to increase their rotation. It is also an increasing challenge to find labor which means that as operations grow, a smaller number of farmers are increasingly responsible for larger farms. Connected to this, several farmers feel a lack of capacity for implementing conservation-oriented practices or sometimes even participating in NRCS programs because of limits on their time or availability. In some of these cases, if there is funding available to help offset costs or hire out work, farmers seem more likely to participate. Farmers also expressed that they are receiving pressure from contractors to produce more potatoes per acre and that contractors are pushing farmers toward both longer rotations but also towards fumigation. Farmers also share that farming amidst these competing pressures is stressful. One farmer likened growing potatoes to putting all your money into a jar and burying it in your yard, hoping that when you dig it up there's more money in the jar all while being worried that something will happen to it. A final pressure that farmers mention is that there are constraints they face with land availability. Many would like to increase their rotation but do not have the land to do it. Several conversations during interviews and field visits mentioned that practices that take a long time to benefit from, such as an increased rotation, are difficult to see as worth installing on land that is rented because of the uncertainty of continuing to farm that land. Several farmers shared experiences where they lost access to acres and had to sacrifice practices to make up for that.

Considerations for future work

Designating specific sites for buffers

Future projects could specify areas of the watershed that would benefit from riparian buffers and approach individual landowners about establishing buffers. This specificity would be useful for addressing the lack of clarity in how farmers currently understand buffers and their purpose. It would also provide opportunities to collaborate with farmers to fit buffers into their operations in ways that make sense and can be useful for connecting buffers with practices and values that are already guiding farmers' decisions

Support for soil health & increased rotation

Designing projects that are focused on soil health and irrigation would allow farmers to connect with the interests many farmers express in improving their practices/operations but not being able to afford it while also directing funding at projects farmers feel are worthwhile. Such projects could help alleviate pressures farmers feel from processors to increase efficiency/yield. These projects would also offer opportunities to segue soil health discussions and commitments into projects interested in water quality.

Collaboration & co-development in projects

Working to more collaboratively develop projects can begin to address farmers' interests in being involved in defining problems and solutions. This collaborative approach could also create capacity for community-level conversations about watershed management. More farmer input would also improve NRCS/District projects so that they're more representative of farmer concerns such: projects being realistic or useful for their operations, project practices being adaptable, and the overall cost of projects.

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