Social Science Evaluation Report

Beargrass Creek Watershed Approach Project
Wabash County, IN

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The Natural Resources Social Science Lab studies how human interactions with the environment impact natural resources. Our research, teaching, and engagement activities focus on how to best motivate farmers, stakeholders, and citizens of all kinds to participate in more environmentally friendly behaviors and practices. For more information, please go to https://www.purdue.edu/fnr/prokopy

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Key Findings

The Natural Resource Social Science (NRSS) Lab at Purdue University conducted surveys and interviews in 2014 to collect baseline social science data for the Beargrass Creek Watershed Approach Project. After the implementation of the project, the NRSS Lab conducted a final round of surveys and interviews in 2016 to measure any changes in conservation practice adoption in the watershed and to evaluate producer and agency staff experiences with the project. The following are key findings from the 2016 surveys and interviews.

- Most agricultural producers in the Beargrass Creek watershed still use grassed waterways. Cover crop usage is about the same as it was in 2014. Interviews show some producers are unwilling to continue using the practice based on negative experiences, while others remain optimistic and determined to successfully maintain cover crops as part of their operations. Adoption of other conservation practices, such as denitrifying bioreactors, saturated buffers, controlled drainage, two stage ditches, and stream channel restoration remains low, but awareness of these practices has increased over the course of the project.

- Key factors that encourage the initial adoption and continuing usage of cover crops include: availability of cost-share opportunities and a desire to reduce on-farm erosion and improve soil health.

- Key factors that discourage ongoing usage of cover crops include: decreased or unsightly yields and negative experiences with managing cover crops.

- Benefits of the Beargrass Creek Watershed Approach Project: water quality monitoring and data, opportunities to learn about and try new conservation practices, enhanced local relationships, and collaboration with Manchester University and outside institutions and agencies.

- Challenges of the Beargrass Creek Watershed Approach Project: successful management of cover crops, implementing promoted conservation practices, recruitment of producers, and communication across project partners.

- Evaluations of success: Overall, producer and agency staff interviewees were satisfied with the level of education and awareness-raising accomplished during project. Both groups would have liked to see more conservation practices implemented. Producer interviewees wanted the project to continue for a few more years so more practices could be implemented and more water quality data could be collected.

Project Background

Targeted conservation, placing the "right practices" in the "right places," is thought to have the greatest impact on reducing nutrient loads from agricultural lands, while efficiently allocating funds to implement such practices. Efficient and effective conservation strategies are essential to meet ambitious water quality goals, such as the Mississippi River/Gulf of Mexico Watershed Nutrient (Hypoxia) Task Force's call for a 45% reduction in nutrient loading. As part of a Conservation Innovation Grant from the Natural Resource Conservation Service (NRCS), Wabash County Soil and Water Conservation District (SWCD), Manchester University, and Environmental Defense Fund (EDF) joined together in 2014 to create the Beargrass Creek Watershed Approach Project. The watershed approach is defined as, "a systemic and strategic approach to reducing nutrient losses from agricultural landscapes" (Social Science Findings Report for the Beargrass Creek Watershed, 2014). Beargrass Creek is a sub-watershed of the Middle Eel River, located in northcentral Indiana's Wabash County.

A major goal of the three-year project was to demonstrate how a locally-led, partnership approach can encourage voluntary adoption of conservation practices to meet water quality goals. Additional project partners, scientists at Manchester University and researchers at USDA Agricultural Research Service, were brought on board to show the impact of conservation practices on water quality and to show opportunities for conservation practices using remote sensing technology, respectively. Purdue University's Natural Resources Social Science (NRSS) Lab conducted surveys and interviews with agricultural producers and agency staff to collect baseline data for the development of the project. Agricultural producers' perceptions of water quality in the area, opinions of targeted conservation, and usage of conservation practices were assessed and presented in a report. As the Conservation Innovation Grant drew to a close in 2016, the NRSS Lab conducted a second round of surveys and interviews to evaluate the project from the perspective of producers and agency staff.

The following report contains information from surveys and interviews with producers and agency staff. Four agency staff members and 13 producers from 10 different agricultural operations in the Beargrass Creek watershed were interviewed regarding their experiences with the project. Participating producers and agency staff were interviewed in August 2016 by an NRSS Lab research associate. Interviewees were selected by SWCD staff. Interviewees varied in their levels of engagement with the project. Interviews typically lasted about 45 minutes and took place at producers' homes, shops, or the SWCD office.

Survey data were collected by mail during the summer of 2016. Survey content was identical to the surveys mailed in 2014, except that some items were replaced with questions specifically designed to evaluate the Beargrass Creek Watershed Approach Project. A modified list of respondents created by SWCD in 2014 was used for distribution of the surveys. Respondents were contacted up to four times (advance letter, 1st mailing of paper survey, reminder postcard, drop off and pick up of 2nd paper survey with a reminder postcard). This methodology achieved a 47% response rate (n=40). Over half of the respondents (n=28) completed the survey in both 2014 and 2016. Identical surveys were also distributed to producers in Flowers Creek watershed, a control area where no targeted outreach occurred. A full description of analytical methods of both survey and interview data is found in Appendix A.

Information provided in interviews and surveys provides insight into how conservation practices and attitudes have changed over the course of the project and how participants evaluate the success of the project. The following report details current usage of conservation practices with a focus on cover

crops, positive and negative experiences with the Beargrass Creek Watershed Approach Project, and participant suggestions for improvement.

Current use of agricultural conservation practices

All operations accounted for in the interviews had **grassed waterways** and **filter/buffers strips**. These practices, along with **nutrient management plans** and some form of **conservation tillage** remain the most common practices in the watershed. Survey data show that usage of grassed waterways remains extensive, with a majority of producers reporting that the practice covers 76-100% of their waterways (see attached Appendix B for the full data report from the 2016 survey). Of the respondents who completed the survey in both 2014 and 2016 (see attached Appendix C for comparison report), coverage of conservation tillage remained relatively consistent with conservation tillage on corn acres increasing slightly from 37% to 40% and soybean acres decreasing from 61% to 52%.

Usage of conservation tillage on corn and soybean acres might fluctuate based on an operation's use of cover crops. Interviews with producers revealed that cost-share contracts for cover crops required producers to not till their cover crop acres. Therefore, if an operation adjusted their cover crop acres, they might also adjust their acres in conservation tillage. Based on data from producers who completed surveys in 2014 and 2016, **usage and coverage of cover crops** on corn and soybean acres remained about the same. However, interviews indicate that future usage of cover crops might be inhibited by negative experiences over the last three years.

Difficulties with cover crops

While survey data show that **cost remains prohibitive** to the adoption and continued usage of cover crops, interviews with producers highlighted more specific challenges. Almost all interviewees cited recent **wet springs** as a major challenge with managing cover crops. Wet ground made it difficult for producers to kill their cover crops in the spring before planting their cash crops. Aside from weather conditions, producers generally experienced difficulty with the **timing of killing/spraying** the cover crops. Issues with timing and lack of personally-owned spraying **equipment** resulted in excess growth of cover crops, which created problems during the planting of corn and soybeans. In terms of planting the cover crops, some producers were dissatisfied with the **spotty stands** produced by **aerial seeding**. Inconsistent stands, lack of growth, and **decreased yields** were common negative experiences with cover crops. Seed type, application method, and other restrictions associated with **cost-share contracts** proved frustrating for some interviewees. Interviewees also noted that **current market prices** made for tight operating margins, causing them to feel hesitant about continuing a practice that negatively impacted their bottom line. Some interviewees expressed concern about their peers **discontinuing cover crop usage** after having these negative experiences. A few producers said they were unsure whether or not they would continue to use the practice. Recent **lack of positive results** in the watershed appears to be the main deterrent to future adoption and maintenance of cover crops in the area. The following quotes from producer interviews highlight the challenges producers face when using cover crops.

Aerial Seeding

"He doesn't get it covered. And I understand why. Along the edges and stuff he doesn't want to get it into the neighbor." –Producer

"We're spotty. We're streaky. It seemed like one year it would be awesome and the next year it was terrible. It's really hard to get a perfect stand." –Producer

Cost-Share Restrictions

"I guess part of my frustration is that we don't get along while no-tilling corn, and they tie with EQIP's program. You have to do three years of crops, of no-tilling - two years of corn. And so that kind of throws that bag out of the water for me, because we just don't get along while no-tilling corn in our heavy, wet, clay soils." –Producer

Decreased Yields

"I saw some pretty lousy looking corn fields. Maybe it will come out alright, but the proof in the pudding will be in the field monitor this fall. Saw some pretty poor stands of corn." –Producer

"Before I'm sold on the cover crop I need to see more successes than failures, because I'm seeing more failures than successes out there. They stick out like a sore thumb." –Producer

Discontinued Use

"We won't stick with them unless we have to…Because of the management issues. That's why. It looks good on paper, but if it's a wet spring - like this spring was very wet - and you can't get in to get that cover crop burnt down, it's going be detrimental to your bottom line…No, if I can't make money, I won't be in business. I have to stay in business." –Producer

Lack of Equipment

"With my off-farm job, I just simply don't have much time to do much spraying. So, we don't have a sprayer. And that can make a little bit of a challenge as far as getting a timely application of the chemical on when it needs to be on." –Producer

"We had a commercial applicator was supposed to come in. I called him to come spray it, to burn it down when it was just about knee height. And they messed around for four days, didn't get out here, and then we got a three-inch rain. And the rye…Took off and got eight, nine feet tall. And so what do you with it at that point?" –Producer

Market Prices

"With corn at $3.30 as opposed to $4.50, there's not that much incentive for us to be out messing around. We're trying to hold it together, not learn new things right now." –Producer

"Especially with $3.25 corn. That's below the cost of production. So I'm not going to farm for free. I'm just not-- it's too hard of work. And it's too much of a risk." –Producer

Wet Weather

"We have seen a lot of failures, and concerned about financial end of it, because there's-- especially this spring, there was a lot of people trying to plant corn and had some disasters. They haven't harvested yet, but they're just pulling their hair out because the ground wouldn't dry out." –Producer

Benefits of cover crops and motivations to continue

Interviewees said they were motivated to start using cover crops because they believed it was the **right thing to do** and that cover crops would help improve the **soil health** on their farms as well as improve the **water quality** of the watershed. Some interviewees mentioned that the **cost-share opportunities** made available to them through the project helped motivate them to try cover crops. Interviewees commonly referred to their usage of cover crops as "*a learning experience*."

Despite the challenges involved with using cover crops, some interviewees said they plan to continue learning and figuring out the best way for cover crops to fit within their operation in terms of seed, application, acreage, timing, and other management factors. A few interviewees, though dissatisfied with their cover crop experiences, decided not to give up entirely on the practice, but instead to take some time off from doing cover crops or to do the practice only every other year. Additional solutions to management issues included waiting for cost-share contracts to end to employ **alternative seeding methods,** such as adapting a highboy to seed into standing corn or lightly incorporating cover crop seed with a vertical tillage tool. Most interviewees were interested in continuing the learning experience with cover crops because, despite recent challenges, interviewees believe in the soil health benefits of the practice. Benefits and positive statements from producers about cover crops are found in the following quotes.

Cost-Share Opportunities

"If it wasn't for the EQIP, I don't know if I would've [done cover crops] *because…to pay the $30 an acre to start…I don't know if I would've…definitely the cost-sharing helps out, to get your foot in the door, and try something that you probably wouldn't have tried."* –Producer

"I think they make the difference of you trying something or not, quite frankly. It becomes a factor of, 'If I can get some cost-share, sure, I'm going to try it.' If it were on your own that you are going to have to experiment, then it becomes a real tighter decision of whether I can economically experiment…So, yes, absolutely. Those cost-share programs are huge." –Producer

Learning Curve

"The only way to learn sometimes is mistakes and you hope you learn from your mistakes and improve the next year so that's why the mistake we made this year was our mistake, my mistake, but hopefully we can learn from that and do a better job next year…The whole cover crop and no-till practices was just, for our farm anyway, was just totally new experience and totally new learning curve and totally different management situation on how you apply your fertilizer, the planting method as far as [equipment]*, it's nothing that can't be overcame, but it's just a totally different management practice than what we were used to."* –Producer

Seeding

"If and when the Beargrass Project itself is no longer and farmers [still] *want to continue, then maybe we can put the fertilizer on in the fall and use a vertical tillage tool to lightly go over it and incorporate it into the soil to keep the fertilizer from moving. And then we could probably, because we're not meeting anybody's rules at that point, do it your own way."* –Producer

Stewardship

"I think it's the right thing to do in terms of conservation. I think it makes sense to build organic matter to take care of the soil, and I think we want to always have the concept that we're going to basically, improve the quality of the soil itself. So that the future generations that we're leaving something better than maybe we had." –Producer

Taking a Break

"We're trying to make sure we're back on a square playing field before we just keep charging ahead and things get out of control." –Producer

Factors which encourage adoption of other practices

Overall, whether interviewees discussed cover crops or any other conservation practice, **financial factors** greatly affect a producer's decision to adopt. Other factors include **maintaining yields** and **seeing improvements in soil health**, both of which are closely linked to a producer's financial well-being. One producer summarized his thoughts on why he and his peers continue using certain conservation practices: *"A, because the yields are still there… B, it's economically feasible. And C, because* [we] *actually see improvement in the soil tilth…So I think it's combination of factors."* Additional quotes from producers show how adoption of conservation practices is closely linked to economics.

Nutrient Management

"You know what, bottom line is cash. Dollars. So why in the world am I going to throw that on the farm and watch it go down the river?" –Producer

Conservation Tillage

"It's economically more feasible that I don't have to work the ground and everything. I can just plant, is what I'm saying. So that's an economic decision." –Producer

Factors which discourage adoption of other practices

Perceived **lack of cost-share opportunities** and the perception that existing opportunities involve **restrictive requirements** (e.g., an operation must use no-till for a certain number of years) are two main deterrents for producers interested in adopting conservation practices such as denitrifying bioreactors, two stage ditches, and controlled drainage. Some producer interviewees were interested in these new practices, but said it was difficult for them to implement bioreactors, two stage ditches, and controlled drainage because of **high implementation costs**. Agency staff interviewees sympathized with producers and described the adoption of **edge-of-field conservation practices** as an economic challenge for producers. In addition to implementation expenses, agency staff interviewees explained adoption of these practices is difficult for producers because benefits of the practices are not directly related to operational productivity. Quotes below demonstrate the willingness of producer interviewees to adopt conservation practices and the barriers producers face in implementing larger, more expensive practices.

Bioreactors

"That's why bioreactors and all those things really seem silly, because that's not affecting their yield whatsoever. You know, that's just water quality. Which I'm not saying we shouldn't agree with. But again, to spend money on your land for something like a bioreactor…it's not improving their bottom line. So that's always a challenge as well." –Agency Staff

Two Stage Ditch

"We are 100% for it. In fact, I've tried to get [project partner] *to do our whole ditch…but they couldn't get funding for that…And it has to be done through the grant, because it's a very expensive project."* –Producer

Water Sediment Control Basins

"There's things like WASCOBs that I would love to do, but it seems like there's some restrictions with that type of thing too. I've talked to them several times about doing different projects like that, but it seems like when I want to go in and get in that program, they're trying to make you do the no-till thing for three years. That just restricts me from being able to do that project, because there's no cost-sharing on it, and I got to foot the whole thing myself." –Producer

Increased awareness of other practices

Although adoption of denitrifying bioreactors, saturated buffers, stream channel restoration, and two stage ditches remains low, awareness of these practices increased since 2014. Qualitatively, the quote below demonstrates how producer interviewees reported increased awareness of conservation practices. Quantitatively, the table below shows the number of total survey respondents in 2014 and 2016 who had never heard of these practices. Beargrass Creek responses are shown in comparison to responses from Flowers Creek, a control watershed. In 2014, respondents from the two watersheds were not significantly different in their awareness of denitrifying bioreactors, saturated buffers, stream channel restoration, and two stage ditches. Awareness of these four conservation practices increased in both watersheds over time, but a higher proportions of respondents in Beargrass had heard of the practices than respondents in Flowers. Awareness levels of denitrifying bioreactors and saturated buffers were significantly different between the two watersheds in 2016. These statistically significant differences speak to the impact of education and outreach efforts of the Beargrass Creek Watershed Approach Project. While awareness of these practices has increased in Beargrass and while there is interest among some interviewees to adopt these practices, adoption rates are likely to remain low given the high costs of implementation.

Awareness

"That's all new to me. I had not heard anything like that until I was in this Beargrass Creek watershed program." –Producer

	2014				2016			
	Beargrass		Flowers		Beargrass		Flowers	
Never heard of:	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Denitrifying Bioreactors	53	66	29	72	25	20*	22	55
Saturated Buffers	53	68	30	60	27	30*	20	70
Stream Channel Restoration	50	72	27	78	23	52	16	63
Two Stage Ditches	51	57	30	70	24	29	21	57

*significant at the $p < 0.01$ level using a χ^2 test.

Experiences with the Beargrass Creek Watershed Approach Project

During the interviews, producers were asked why they were motivated to join the project, what benefits they associated with their participation, what challenges they encountered, how they would evaluate the success of the project, and if they had any suggestions for improvements or pieces of advice they would give to other watersheds. Agency staff were asked similar questions.

Motivations to join

Most producer interviewees first learned about the project from local SWCD staff members. According to survey data, awareness of the project was high, with 30 out of the 40 total respondents having heard about the initiative. Most interviewees and 15 survey respondents attended at least one project meeting. Interviewees said they were motivated to participate in the project because it felt like it was *"the right thing to do"* in terms of conservation efforts to **reduce runoff** and **improve water quality** in the area. Interviewees were largely interested in learning about opportunities for how they could play a part in improving the watershed's water quality. Some producers were also motivated to participate in the voluntary program in hopes of **preventing future regulations** from state or federal government. Producer quotes below describe interviewees' motivations for participating in the Beargrass Creek Watershed Approach project.

Improving Water Quality

"The fact that I own land in that watershed…When it rains hard, it floods our lowlands and runs directly into an open ditch, which drains into the Beargrass Creek watershed. That's the whole reason I'm there, is to try and see what programs are available to help in that watershed with issues of runoff." –Producer

"Mainly [we participated] *for protection of the soil and water quality. We're all wanting better water quality and not wanting our nutrients to end up down in the Gulf of Mexico, you know."* –Producer

Preventing Regulation

"We just don't want to be forced, that's all…that's always been in the back of my mind ever since this whole thing started: When are they going to start policing us? And then it's going to be a problem. We're willing to work and that's the main reason we are working is because we figure if we're proactively work[ing]…then they're not going to come out and get after us." –Producer

Benefits of participation: producers

Interviews revealed that producers benefited from the project in multiple ways. Two main benefits occurred in every interview: 1. Producers often described their experience with the project as *"eye-opening"* in terms of **raising their awareness** about environmental problems associated with farming and learning about what conservation practices are available to reduce their environmental impacts; and 2. Producers frequently referenced **water quality monitoring** by Manchester University as a major benefit associated with the project. Project meetings provided producers with opportunities to not just learn about new practices from agencies and universities, but also to hear from their peers about **personal experiences** with conservation practices, such as cover crops. A few interviewees appreciated meetings where their peers shared experiences of cover crop successes, failures, and different

management strategies. Both round table discussions and more informal opportunities during project meetings were beneficial for interviewees to learn from their fellow producers.

Some interviewees mentioned additional social benefits, such as meeting and interacting with new people and collaborating with outside partners. The **collaborative nature** of the project gave some interviewees the sense that government agencies were willing to listen to the experiences of the producers and to learn about the difficulties associated with conservation practices, such as cover crops. Overall, interviews showed that producers believed the project was eye-opening for themselves and project partners. The following quotes from producer interviews show the benefits they gleaned from the project.

Collaboration

"We've been able to meet some people that we would not have been able to meet if it had not been for the Beargrass Project…we would have never had an opportunity to meet or talk with or present maybe our side of the table to them. And it's not just all one-sided where they've [agencies] *just been throwing the Beargrass stuff at us. We've been able to give some information back to those people which has helped, too, I think."* –Producer

"Everybody's pretty much open-minded. Nobody's saying, 'Well you've got stupid ideas.' You know, they listen to you. That's been pretty much been the attitude of everyone involved; the soil and water people, the university people, the farmers. So I think we've all tried to work together pretty well." –Producer

Meetings

"I think having other farmers come in that have done it, and share their experiences helps, too. Because, at our annual meeting, they've had different farmers from different areas come in and talk about that. I think people like to know, 'I'm not out here by my own on this island.' It's like, other guys have done this, and yeah, they've had headaches, and they've learned. But you can do it." –Producer

New Practices

"Probably the main thing for us would be that it's shown us that there are different ways to go about farming than what we were doing before instead of just conventional [till] *and all that, there's a different way…So it's kind of opened our eyes, you might say, a little bit"* –Producer

"Before the project started, there were some practices that we didn't know about…so we have learned some new practices to use." –Producer

Water Quality Monitoring

"It brings your attention to what's going on in the crick, in the whole watershed area. And going to the annual meeting, that's pretty eye opening; what they're finding when they're testing the waters. The things I thought they would find are not what they're finding. It's more – Nitrogen seems to be the biggie here." –Producer

Benefits of participation: agency staff

Interviews with agency staff revealed many of the same benefits provided by producers. Agency staff saw the project as a great opportunity to bring in **funding** to the watershed to **improve water quality**

and **soil health**, which were said to *"go hand-in-in."* Staff from NRCS and SWCD also viewed the watershed project as beneficial for producers interested in learning about and trying new practices, saying that the project "*sparked a lot of interest*" in conservation practices and programs among producers. Project meetings were seen as a benefit, allowing for the **sharing of information** among partner organizations, as well as between outside organizations and the local producers. The ability to share information and to connect with producers was seen as a benefit from the agency perspective, because local staff were able to **build trusting relationships** with participating producers. Benefits of the project are described by agency staff interviewees below.

Funding

"It was nice that the district was able to bring in some funds…we get very little from the county to do anything with our programs…So we definitely would not have been able to do a watershed project obviously without the funding that EDF allowed the district to have, that's for sure." –Agency Staff

Improving Water Quality through Best Practices

"Benefits would be improving water quality, soil health promotion, reducing soil loss. Those are some of the things we try to quantify. That's where Manchester University has been a big advocate on telling us – Are we making improvements? What best management practices are needed out here?"
–Agency Staff

Meetings

"The fact that these farmers sat in a group together to talk about it [conservation] *is huge."*
–Agency Staff

Opportunity to Try New Practices

"They're [producers] *very comfortable with the way they've been doing it, they know how to get it done that way and that's what they stay with. But with this project, it has allowed some producers…to try it on a small part of their farm. Which is the way you want them to do it. You don't want them to change everything overnight. Because there's a learning curve, there definitely is. So this was an opportunity for some of them to get their feet in the ground a little bit and try it a little bit at a time. And it gave others an opportunity that were willing to start something, to do something, it was a great opportunity for them to really get involved."* –Agency Staff

Trust

"They [producers] *put a lot of trust in what the group is saying, what NRCS is saying, what soil and water is saying…I mean they are basically making cropping decisions that affect what they do for a living on what* [the agencies are] *advising them to do."* –Agency Staff

Challenges with the project: producers

Other than extra paperwork and time, which interviewees acknowledged is *"like anything else, everything takes more time than what you expect it to,"* challenges associated with the project from the producers' perspectives focused on the **management of cover crops**. When asked about what was challenging about the project, interviewees frequently spoke of cover crops as the only challenge. For example, "*Other than just the actual physical management of the cover crop, no"* and *"Other than that* [cover crops]*, I don't think there's been any major challenges. Nobody's caused us any grief or headaches."* For most interviewees, the practice was synonymous with the project.

Project meetings were highly praised by interviewees, but some did offer minor critiques. Some interviewees thought the meetings were occasionally scheduled during inconvenient times, were too long, and contained too much information all at once.

Challenges with the project: agency staff

Agency staff experienced different challenges than the producers. Although interviewees mentioned producers were having difficulty with cover crops, project challenges for agency staff focused more on **communication**, **shifts in project personnel,** and **producer participation.** While building partnerships with multiple partners across different states, agencies, and areas of expertise was a perceived benefit of the project, agency staff acknowledged that effective communication between all groups was a struggle at times. There were also personnel changes within different partner groups that came as "*a huge blow in momentum,"* but those were challenges outside the control of local agency staff.

Within their control was the **recruitment of producers** for the project. Local NRCS and SWCD staff interviewees said one of their main challenges was the recruitment of some producers, noting that it has taken quite a bit of *"convincing them* [producers] *we are working with them, not really against them…that's come a long way in this project…It's been difficult, but it's been fun."* Interviewees believe that changing the mindset of the more resistant producers, motivating them to change their practices and manage their operations in a more conservation-minded way will be an *"ongoing"* challenge. Additionally, although interviewees understand the benefits of and advocate for the adoption of new conservation practices, they also sympathize with producers over their legitimate fears and risks associated with changing their operations. For producers who did implement conservation practices, such as cover crops, agency staff interviewees say the next challenge is helping producers maintain those practices: *"These EQIP applications are running out and you can't necessarily convince somebody to continue and so that obviously is a huge struggle."*

Other challenges agency staff interviewees experienced when recommending practices to producers were the differences in state **NRCS construction specifications** for conservation practices. Some project partners involved in making conservation practice recommendations hailed from states other than Indiana. Construction specifications for certain practices may have been within NRCS guidelines in these other states, but were unavailable for funding in Indiana. Such discrepancies led to some frustration among agency staff members and producers. One agency staff member said, "*there were a few curveballs as far as policy stuff goes…When I say policy, I mean NRCS policy."* Additional quotes from agency staff call attention to the challenges they faced throughout the project.

Communication

"Just keeping an open line of communication. The more partners becoming involved, it became more evident to us very quickly that we needed to keep these teleconferences going. A lot of the partners aren't located in Wabash, Miami County. So we had to make special efforts to get everyone together in the same room. Keep everybody up to speed. That was a challenge. But [local coordinator] *did a good job coordinating that. That's an issue. Communication and off-site staff. Out of state staff."*
–Agency Staff

Financial Risk to Producers

"It's not my family. And I understand that it sounds great, why wouldn't you just do all these things? Because at $3.00 corn there's not a lot of extra money to do a lot of things with. And so I've been farming and I've been making a living so why would I all of a sudden change my management practices and not make as high of a yield? That's always a challenge as well to us, that it's not our bank account." –Agency Staff

Mindsets and Participation

"I mean there are some farmers you are just not going to get…and you have to accept that, I think…the farmers that farm in Beargrass, some of them, it was going to be a hard sell from the get-go. So in a way you set yourself up to fail but there's probably not a perfect watershed or an easy watershed. There's always going to be farmers that farm it that are going to be tough to get." –Agency Staff

Evaluation of Project Outputs and Tools

Outputs of the watershed project included the production of an informational booklet titled *Strategies for Voluntarily Improving the Soil Health on your Farm* and LIDAR-based maps, on which conservation practices were overlaid. The purpose of the LIDAR map was to present producers with opportunities of the "right practices" in the "right places." Conservation practices promoted on the map and throughout the project were pictured and described in the informational booklet. Overall, interviews with agency staff and producers showed project outputs to be useful tools in encouraging education about different opportunities for conservation practices.

Booklet

Both agency staff and producer interviewees were pleased with the *Strategies for Voluntarily Improving the Soil Health on your Farm* booklet. Agency staff said they found the booklet useful because they could distribute it at project meetings and to producers who visited their offices. An agency staff interviewee described the booklet as a helpful ***"Cliffs Notes of each practice and what it does."*** Producer interviewees appreciated the booklet, saying they were able to reference it if they wanted to refresh their memory of a practice they recently learned about from a project meeting. If they were interested in a practice depicted in the booklet, producer interviewees said they would check with their local NRCS/SWCD office for more information.

LIDAR Map

Reviews of the LIDAR map were generally positive as well. Agency staff interviewees thought the map was a *"great tool for the NRCS to utilize"* and *"It's a huge ice breaker."* Agency staff interviewees said the map was a useful **catalyst for conversations** with producers about conservation practices. While useful for providing *"options"* for practices such as bioreactors, two stage ditches, and WASCOBs, agency staff noted that *"there needs to be a practicality, because you're not going to go out there and implement every practice that's available."* Agency staff recognized that the map was useful in an educational rather than a motivational sense, noting that cost and availability of cost-share funds were limiting factors for producers interested in the implementation of practices shown on the map. When using the map, agency staff interviewees said they reminded producers that they were not limited to only practices on the map and that *"waterways can go in any field, buffer strips…the biggies like no till,*

nutrient management, pest management, any type of manure management, those are big practices, cover crops, can apply anywhere."

All producer interviewees and 17 survey respondents had seen the map. Survey respondents all rated the map as *somewhat* to *very accurate*. Producer interviewees expressed similar confidence in the map's accuracy, but some went on to say they would need to **explore the physical characteristics** of their property before agreeing that the map showed the "right location" for a given practice. In terms of general location, many interviewees had difficulty finding their property on the map because there were no road numbers. Producer interviewees preferred versions of the map with key road numbers *"so you kind of knew where your property and everything was."*

No producer interviewees believed the map to be an invasion of privacy, saying that "*it's just basically public knowledge"* and "*pretty much anyone that knows how to use the computer can look* [this] *stuff up."* Of the survey respondents who took the survey in 2014 and 2016, attitudes remain fairly split between those who think targeted conservation efforts and tools such as the LIDAR map invade privacy. Interview data provide further insight into potential concerns over privacy. Some interviewees said the map as it is currently being used does not cause concern, however, they foresee **issues if in the future the map were to be used for regulatory purposes**. This type of attitude toward the LIDAR map is summarized in the following quote from a producer:

> *"I would think they'd need to approach it with going to the farmer and saying, 'We think this might fit. What do you think?' Because the farmer's going to have first-hand experience tilling the ground, and if he has any kind of a care for the land at all, he's going to want to take that into consideration. But for them to come out and say, 'Here's something we need to do. You're going to be forced to do it,' that's not going to be a pill that anybody's wanting to swallow very well."* –Producer

Definitions and Assessments of Project Success

Both producer and agency staff interviewees mainly defined project success as **improving water quality in the watershed through conservation practices**. However, almost all interviewees were uncertain about how successful the project has been in that sense, often stating that three years of water quality data is not sufficient to assess the project's success. Some interviewees believed **more time** is necessary to evaluate success because the impacts of conservation practices might be delayed. One producer stated that, *"Long term success may be literally five, ten years. Because it may take that long for some of these practices to really show its full effect."*

Beyond water quality, many producer and agency staff interviewees defined success of the project to be **increased awareness** about conservation practices and ability to implement practices. While both groups of interviewees had hoped to see more extensive implementation of conservation practices throughout the watershed, they placed great value on the fact that the project facilitated **educational opportunities** about new conservation practices and structures. However, some producers and agency staff believed success of the project would be determined only if producers **maintain usage of conservation practices**. One producer described success and ongoing maintenance of conservation practices: *"If it was a true, total success, everybody that was involved would probably stay involved and maybe increase their acreage. If some guys back out and say "well this didn't work for me," then maybe it wasn't a total success."*

Producer interviewees often credited **local NRCS and SWCD staff** as being dependable sources of information and providing reliable support throughout the project. The local project coordinator was frequently mentioned by name, as were project personnel who presented *"creative"* conservation practice ideas and who led the water quality monitoring efforts. Agency staff interviewees also valued the **relationships** they built with producers and the partnerships they formed between partner organizations.

Agency Support

"[Local project coordinator]*'s been fantastic.* [District coordinator]*'s been great. Actually, the whole office has been very solid from that standpoint…It's been a concerted effort, you can tell, of the whole office."* –Producer

Extensive Outreach

"It's an educational process. The farmers have to want to do it, but to want to do it, someone has to educate them. And I think our local office has done an excellent job on that." –Producer

"One-on-one meetings with producers, telephone calls, got them out to some demonstration plots and stuff like that. But it's still… the best part of it though is still talking to those producers, you know, meeting them on the street, at the grocery store, at the county fair, stuff like that." –Agency Staff

Improved Water Quality

"I think the main thing would be if, overall, if everybody that participated…actually made the water quality better, if we wound up with less nutrients in the water, less soil, sediments in the water because of the Beargrass Project, then I'd say it was an overall success." –Producer

"I think it starts with the water quality monitoring department in a university. That is the scientific based approach that you can't argue with." –Agency Staff

Increased Opportunity

"On an individual basis, each farmer might be able to say, 'Well it was a success to me because I learned a couple different methods of farming that maybe we wouldn't have tried without this on our own.'" –Producer

"What I hoped to see out of the project was an opportunity for education…And it very much did that. I mean, even if we didn't get as much…projects implemented as we wanted to, it still was an educational, an opportunity for knowledge. It's like, you gotta plant a seed and let it grow." –Agency Staff

Need More Practices

"We're pretty well-ready to have the rubber meet the road…There's a point where guys just need to say, "Okay, we're ready to start doing some of these things." –Producer

Uncertain Evaluation

"I don't think we've got enough information at this point." –Producer

"I don't really know how much we've really accomplished anyway." –Producer

Suggestions for improvements: producers

When asked what they would improve about the project, producer interviewees said they wanted the project to continue for a few more years. **Extending the project** into the future corresponds with producers' difficulty to define success within the project's short timeframe. One producer interviewee said he thinks "*we're just getting started really"* and "*was kind of surprised the other day, when* [local project coordinator] *said* [chuckles] *that this meeting was more or less getting ready for the end of it."* Overall, producer interviewees felt as though the project needed more time to implement conservation practices, collect more water quality data, and to improve conservation decision-making in the watershed. The following quotes demonstrate producer interviewees' desire to continue the project.

More Time

"I was hoping we [would] *go a couple more years"* –Producer

"I know it'll take a lot of funding and they probably won't be able to do it, but if they could extend it another 2 or 3 years and get more data collected, I think they could maybe make some better decisions, or our farmers would maybe have a better idea if it would work or not work… Some projects just take up a long time to collect enough data to try to make a decision from." –Producer

Suggestions for improvements: agency staff

Agency staff interviewees would have liked to see more practices implemented, but they struggled to pinpoint how exactly they could have improved rates of adoption throughout the project: *"Well it's tough to say because…we tried our hardest."* Overall, agency staff felt satisfied with what they accomplished, given the time, staff, and other resources they had: "*I look back at 2015 and the amount of work between the two counties. Beargrass, the lower Eel river, the middle Eel river. We had so many irons in the fire. We did the best we could with what we had. I feel like we went above and beyond."* Generally satisfied with their efforts, the main suggestion for improvement was more guidance from EDF, the funder of the project. Challenges with communication (pg. 9) led to local agency staff having unclear expectations regarding their role and deliverables: "*I don't know that we've fulfilled what they* [EDF] *thought we were supposed to do and I'm not really sure what that was."* More specific guidelines at the beginning and throughout the project would have been appreciated by local agency staff.

More Guidance

"I felt like if we did it again, like always, you'd have a little more idea, once you have that experience. I guess we were under the assumption that EDF had done this numerous times and had an idea." –Agency Staff

Lessons Learned and Advice from Participants

Producers

Despite the difficulties with cover crops, interviewees said they would encourage producers in other watersheds to **try cover crops** on a small scale and to get involved with a local initiative like the Beargrass Creek Watershed Approach Project. Interviewees advocated for initial and **continued participation**, education, and advised other producers in similar projects to *"keep an open mind."* Because financial considerations are highly influential in conservation decision-making, producers also

advised their peers to **seek out cost-share opportunities**. Producer pieces of advice about joining a conservation project are found in the quotes below.

Get Involved

"You get out there and figure out what program is there, and what funding there is for different applications… If there's funding available, make use of them and try them out." –Producer

"*Join a project, because if you don't, you're not going to learn anything at all. Whereas if you do join the project, at least you're going to learn a little bit."* –Producer

Agency Staff

During the interviews, agency staff advocated for keeping the scale of a watershed project small, so that interacting with and recruiting producers is achievable. Within that smaller watershed, agency staff called for social science investigations prior to the project so that project personnel would have a sense of "*who is in that watershed…what practices they are already doing…what practices they might be willing to do."* Based on that information, interviewees advised that their peers in other watersheds should first recruit conservation-minded producers. If these producers have already implemented conservation practices on their land, interviewees advocated for asking the producers to host a demonstration site for their neighbors in the watershed.

Agency staff realized that implementation of conservation practices is not and should not be the sole measure of success for a project. Rather, methods of recruiting and educating producers were especially important to interviewees. Agency staff interviewees strongly recommended that **forming personal contacts** with producers is essential and that agency staff are responsible for **quality engagement** and education regarding conservation practices. To do so, one agency staff member summarized, "*"Definitely make it personable…You gotta get face to face."*

As seen throughout the project, **water quality monitoring** is crucial for a successful project. When possible, agency staff highly recommended future projects should find partnerships and pathways to collecting water quality data. Advice from agency staff are found in the following quotes.

Beyond Implementation

"The most interesting part of this concept of this project is what I realized really early on: That it's not – with this particular project – it's just not about getting the practices on the ground, but it's a lot about how we got those practices on the ground." –Agency Staff

Recognize Responsibility and Possibilities

"The main thing is to realize your responsibilities…It's our responsibility to realize that sustainable agriculture is possible, and to try to make other producers realize what sustainable agriculture really is and what it needs to be." –Agency Staff

Water Quality Data

"Start with the water quality monitoring and build those partnerships…Find out who's doing water quality monitoring. And that's tough. That takes money. I keep coming back to Manchester because [of] *their strong partnership… get that scientific baseline set."* –Agency Staff

Recommendations

Beargrass Creek

Moving forward in the Beargrass Creek watershed, producers will require motivation and assistance in continuing and expanding conservation practices. Final interviews and surveys demonstrate that while there are conservation-minded producers in the watershed, producers are largely limited by financial factors. Survey data show that the number of producers who plan to apply cost-share funds to implement practices is similar to the number of producers who are not interested in applying for cost-share programs. Continued outreach for cost-share opportunities might encourage future adoption of conservation practices to improve water quality. More survey respondents agree/strongly agree (n=20) than disagree/strongly disagree (n=5) that producers play a key role in reducing nutrient loading by 45%. More producers also agree/strongly agree (n=12) than disagree/strongly disagree (n=3) that the 45% reduction goal is achievable. These data, along with interviewee interest in continuing the Beargrass project and the practice of cover crops, suggest there is momentum to motivate producers to continue and potentially increase their conservation efforts.

Future Projects

Based on our study, we recommend future projects should:

- Incorporate water quality data through rigorous sampling methods and analysis. Both agency staff and producer interviewees cited water quality data as a main benefit to the Beargrass Creek Watershed Approach Project. If future projects set a goal of reducing nutrient loading in waterways, baseline and continued assessment of water quality must occur to track improvements in water quality over time. Evaluation of a project's success should also not be limited to a few years' worth of water quality data.

- Continue assigning a local project coordinator within the watershed. Personal contact and face-to-face meetings were highly valued by all interviewees. The local project coordinator and other project partners who directly interacted with producers were often referenced as highly valuable assets and sources of information. Local staff should continue to be responsible for maintaining positive relationships with producers in the watershed. The local project coordinator should be provided with and have access to resources that will help them fulfill clear project goals.

- Keep project scale within manageable limits. Agency staff interviewees were in favor of focusing on relatively small watersheds so that outreach and education efforts would be effective. Producer and agency staff interviewees valued project meetings and in-person conversations, which are difficult to facilitate on a larger scale. If future projects were to be implemented in a relatively larger watershed, consider assigning multiple local coordinators in smaller geographic areas or sub-watersheds.

- Consider redefining requirements of cost-share contracts and provide options for implementation. Some producer interviewees were willing to adopt conservation practices, but felt restricted within cost-share contracts. For example, requirements of no-till on cover crop acres was perceived as a deterrent by some interviewees. Including a variety options and room for flexibility in the implementation and maintenance of conservation practices may increase producers' willingness to adopt and maintain practices.

- Consider extending timeframes of future projects. Interviews with producers showed interest in having more time to learn how to best incorporate conservation practices, specifically cover crops, into their operations. Three years may not be enough time for producers to effectively adopt and maintain new conservation practices.

- Social science investigations should occur during the early stages of the project so that local agency staff may gain more in-depth insights into producers' conservation attitudes, practices, and willingness to adopt new practices.

- Evaluation of future projects should not be limited to strictly quantifiable measures, such as water quality data and number of acres enrolled in a conservation practice. Qualitative assessment, such as interviews with participants, should also occur. Producer interviewees often evaluated the Beargrass Creek Watershed Approach Project as successful based on the educational opportunities and awareness-raising throughout the area.

Appendix A: Data Analysis Methods

Interviews

All interviews with producer and agency staff were scheduled through the local project coordinator. The local project coordinator contacted all interviewees in-person, over the phone, or via email to set times and locations for the interviews. One agency staff member and two producers who were interviewed in 2014 were not interviewed in 2016 due to retirement, health concerns, and scheduling conflicts. Other than these three individuals, all interviewees from 2014 participated in the 2016 interviews. All agency staff interviews were conducted on a one-on-one basis. Two producer interviews were conducted with multiple producers from the same operation. Agency staff and producer interviewees varied in their levels of engagement with the project.

The local project coordinator escorted the researcher from Purdue's NRSS Lab to the various locations, but did not stay for the duration of the interview to ensure confidentiality. All interviews were recorded with the permission of the interviewee. Undergraduate students and staff from an online transcription service transcribed all interviews.

After reading through all of the transcriptions, the NRSS researcher who conducted the interviews developed two coding frameworks: one for agency staff interviews and one for producer interviews. Another NRSS researcher assisted in the refinement of the coding frameworks. Transcriptions were coded in NVivo 11. Using the software, two coding comparisons were analyzed to ensure consistent coding between the two researchers. Coding comparison queries resulted in overall kappa scores above 0.7 for both sets of interviews. Based on the coding, key themes emerged from the interviews and illustrative quotes were organized within the report.

Surveys

Surveys returned through the mail were entered into Qualtrics by NRSS undergraduate students. The data were downloaded by the NRSS researcher, who followed lab protocols for quality checking and cleaning. Data entered by NRSS students were merged with data entered directly into Qualtrics by respondents who chose to complete the survey online into a single SPSS 23 file. Descriptive statistics

were analyzed to create the data report for the 2016 survey (attached Appendix B).

Respondents were assigned the same 4-digit ID number in 2014 and 2016. Based on these ID numbers, 28 respondents completed the survey in both years. Counts, rather than percentages, were used in the comparison data report (attached Appendix C) due to the low sample size. Means for variables across the two different years were generally very similar. Paired t-tests were conducted and no significant differences were found.

Surveys were also mailed to producers in the Flowers Creek watershed, located in northcentral Indiana's Miami County. Miami County is adjacent to Wabash County, where the Beargrass Creek watershed is located. Surveys distributed in the Flowers Creek watershed were identical to the surveys distributed in Beargrass except for questions specific to the Beargrass Creek Watershed Approach Project, which were excluded in the Flowers surveys. To compare differences in awareness of conservation practices between the two watershed, appropriate variables were recoded and chi-square tests for association were conducted in SPSS.

I. Methods

Mail Survey

86 Surveys distributed
1 Bad address
40 (47%) Completed (% not including bad addresses)

II. Water Quality: Water Impairments

1. Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
a. Sedimentation/silt (n=36)	5.3%	31.6%	31.6%	7.9%	18.4%	2.55 (n=29)
b. Nitrate/nitrogen (n=36)	16.7%	25.0%	27.8%	2.8%	27.8%	2.23 (n=26)
c. Phosphorus (n=36)	16.7%	25.0%	19.4%	5.6%	33.3%	2.21 (n=24)
d. Bacteria in the water (such as E. coli) (n=36)	19.4%	11.1%	8.3%	2.8%	58.3%	1.87 (n=15)

III. Water Quality: Sources of Water Pollution

2. The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

		Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
a.	Discharges from industry into streams and lakes (n=37)	29.7%	29.7%	13.5%	0.0%	27.0%	1.78 (n=27)
b.	Discharges from sewage treatment plants (n=37)	27.0%	21.6%	13.5%	13.5%	24.3%	2.18 (n=28)
c.	Soil erosion from farm fields (n=37)	10.8%	45.9%	24.3%	10.8%	8.1%	2.38 (n=34)
d.	Soil erosion from shorelines and/or streambanks (n=37)	19.4%	41.7%	19.4%	8.3%	11.1%	2.19 (n=32)
e.	Lawn fertilizers and/or pesticides (n=37)	24.3%	35.1%	16.2%	2.7%	21.6%	1.97 (n=29)
f.	Fertilizers or manure used for crop production (n=35)	20.0%	40.0%	22.9%	2.9%	14.3%	2.10 (n=30)
g.	Improperly maintained septic systems (n=37)	24.3%	27.0%	18.9%	5.4%	24.3%	2.07 (n=28)
h.	Manure from farm animals (n=37)	32.4%	35.1%	16.2%	0.0%	16.2%	1.81 (n=31)
i.	Littering/illegal dumping of trash (n=37)	21.6%	43.2%	16.2%	0.0%	18.9%	1.93 (n=30)
j.	Pesticides or herbicides used for crop production (n=37)	27.0%	40.5%	16.2%	2.7%	13.5%	1.94 (n=32)
k.	Animal feeding operations (n=37)	35.1%	27.0%	18.9%	2.7%	16.2%	1.87 (n=31)
l.	Urban storm water runoff (e.g. highways, rooftops, parking lots) (n=37)	27.0%	29.7%	13.5%	2.7%	27.0%	1.89 (n=27)
m.	Removal of streambank vegetation (n=36)	38.9%	33.3%	5.6%	2.8%	19.4%	1.66 (n=29)

IV. Management Practices

Cover Crops

3. Please select the option that best describes your experience with cover crops. (n=39)

15.4%	Not relevant
2.6%	Never heard of it and not willing to try it
0.0%	Never heard of it, but might be willing to try it
12.8%	Heard of it and not willing to try it
7.7%	Heard of it and might be willing to try it
2.6%	Used it in the past and not willing to try it again
17.9%	Used it in the past and might be willing to try it again
41.0%	Currently use it

4. On what percentage of your cropland do you use cover crops? (n=16)

37.5%	0-25%
18.8%	26-50%
12.5%	51-75%
25.0%	76-100%

5. How many of the corn and soybean acres that you manage in the Beargrass Creek watershed were in cover crops in 2015?

Corn (n=8)

12.5%	30%
25%	50%
62.5%	100%

Soybeans (n=10)

10.0%	15%
10.0%	20%
10.0%	42%
20.0%	50%
50.0%	100%

6. How much do the following factors limit your ability to implement cover crops?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=27)	63.0%	18.5%	11.1%	0.0%	7.4%	1.44 (n=25)
b. Time required (n=26)	26.9%	38.5%	23.1%	3.8%	6.1%	2.04 (n=24)
c. Cost (n=29)	13.8%	13.8%	51.7%	17.2%	3.4%	2.75 (n=28)
d. The features of my property make it difficult (n=27)	44.4%	25.9%	22.2%	0.0%	7.4%	1.76 (n=25)
e. Insufficient proof of water quality benefit (n=26)	46.2%	26.9%	11.5%	0.0%	15.4%	1.59 (n=22)
f. Desire to continue traditional farming practices/methods (n=27)	44.4%	18.5%	29.6%	0.0%	7.4%	1.84 (n=25)
g. Disapproval from others (n=27)	77.8%	3.7%	7.4%	0.0%	11.1%	1.21 (n=24)
h. Hard to use with my farming system (n=27)	25.9%	37.0%	18.5%	7.4%	11.1%	2.08 (n=24)
i. Lack of equipment (n=27)	33.3%	29.6%	14.8%	14.8%	7.4%	2.12 (n=25)

Grassed Waterways

7. Please select the option that best describes your experience with grassed waterways. (n=39)

17.9%	Not relevant
0.0%	Never heard of it and not willing to try it
0.0%	Never heard of it, but might be willing to try it
0.0%	Heard of it and not willing to try it
5.1%	Heard of it and might be willing to try it
2.6%	Used it in the past and not willing to try it again
2.6%	Used it in the past and might be willing to try it again
71.8%	Currently use it

8. What percentage of your waterways are grassed waterways? (n=28)

0.0%	0-25%
3.6%	26-50%
7.1%	51-75%
85.7%	76-100%

9. How much do the following factors limit your ability to implement grassed waterways?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=26)	92.3%	3.8%	3.8%	0.0%	0.0%	1.12 (n=26)
b. Time required (n=26)	73.2%	7.7%	15.4%	3.8%	0.0%	1.50 (n=26)
c. Cost (n=27)	44.4%	14.8%	22.2%	18.5%	0.0%	2.15 (n=27)
d. The features of my property make it difficult (n=27)	74.1%	14.8%	7.4%	3.7%	0.0%	1.41 (n=27)
e. Insufficient proof of water quality benefit (n=26)	88.5%	3.8%	3.8%	0.0%	3.8%	1.12 (n=25)
f. Desire to continue traditional farming practices/methods (n=26)	73.1%	23.1%	3.8%	0.0%	0.0%	1.31 (n=26)
g. Disapproval from others (n=26)	96.2%	0.0%	0.0%	0.0%	3.8%	1.00 (n=26)
h. Hard to use with my farming system (n=26)	65.4%	30.8%	0.0%	3.8%	0.0%	1.2 (n=26)
i. Lack of equipment (n=26)	62.9%	23.1%	3.8%	3.8%	0.0%	1.42 (n=26)

Denitrifying Bioreactors

10. Please select the option that best describes your experience with denitrifying bioreactors. (n=37)

32.4%	Not relevant
8.1%	Never heard of it and not willing to try it
5.4%	Never heard of it, but might be willing to try it
10.8%	Heard of it and not willing to try it
35.1%	Heard of it and might be willing to try it
2.7%	Used it in the past and not willing to try it again
0.0%	Used it in the past and might be willing to try it again
5.4%	Currently use it

11. What percentage of your cropland is drained by denitrifying bioreactors? (n=2)

0.0%	0-25%
0.0%	26-50%
100%	51-75%
0.0%	76-100%

12. How much do the following factors limit your ability to implement denitrifying bioreactors?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=17)	23.5%	17.6%	17.6%	29.4%	11.8%	2.60 (n=15)
b. Time required (n=17)	23.5%	23.5%	29.4%	11.8%	11.8%	2.33 (n=15)
c. Cost (n=18)	5.6%	11.1%	16.7%	55.6%	11.1%	3.38 (n=16)
d. The features of my property make it difficult (n=18)	11.1%	22.2%	27.8%	16.7%	22.2%	2.64 (n=14)
e. Insufficient proof of water quality benefit (n=18)	16.7%	22.2%	22.2%	11.1%	27.8%	2.38 (n=13)
f. Desire to continue traditional farming practices/methods (n=17)	58.8%	11.8%	11.8%	5.9%	11.8%	1.60 (n=15)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
g. Disapproval from others (n=18)	83.3%	0.0%	0.0%	0.0%	16.7%	1.00 (n=15)
h. Hard to use with my farming system (n=17)	35.3%	29.4%	5.9%	11.8%	17.6%	1.93 (n=14)
i. Lack of equipment (n=17)	41.2%	5.9%	23.5%	11.8%	17.6%	2.07 (n=14)

Saturated Buffers

13. Please select the option that best describes your experience with saturated buffers. (n=40)

32.5%	Not relevant
5.0%	Never heard of it and not willing to try it
15.0%	Never heard of it, but might be willing to try it
10.0%	Heard of it and not willing to try it
22.5%	Heard of it and might be willing to try it
0.0%	Used it in the past and not willing to try it again
0.0%	Used it in the past and might be willing to try it again
15.0%	Currently use it

14. What percentage of your cropland is drained by saturated buffers? (n=4)

25.0%	0-25%
0.0%	26-50%
50.0%	51-75%
25.0%	76-100%

15. How much do the following factors limit your ability to implement saturated buffers?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=11)	18.2%	9.1%	36.4%	27.3%	9.1%	2.80 (n=10)
b. Time required (n=12)	33.3%	0.0%	41.7%	8.3%	16.7%	2.30 (n=10)
c. Cost (n=14)	7.1%	28.6%	28.6%	14.3%	21.4%	2.64 (n=11)
d. The features of my property make it difficult (n=11)	9.1%	36.4%	9.1%	18.2%	27.3%	2.50 (n=8)
e. Insufficient proof of water quality benefit (n=11)	27.3%	18.2%	18.2%	0.0%	36.4%	1.86 (n=7)
f. Desire to continue traditional farming practices/methods (n=15)	58.3%	0.0%	8.3%	8.3%	25.0%	1.56 (n=9)
g. Disapproval from others (n=12)	83.3%	0.0%	0.0%	8.3%	8.3%	1.27 (n=11)
h. Hard to use with my farming system (n=15)	18.2%	27.3%	9.1%	18.2%	27.3%	2.38 (n=8)
i. Lack of equipment (n=15)	45.5%	18.2%	18.2%	0.0%	18.2%	1.67 (n=9)

Two Stage Ditch

16. Please select the option that best describes your experience with two stage ditches. (n=40)

40.0%	Not relevant
10.0%	Never heard of it and not willing to try it
7.5%	Never heard of it, but might be willing to try it
7.5%	Heard of it and not willing to try it
32.5%	Heard of it and might be willing to try it
0.0%	Used it in the past and not willing to try it again
0.0%	Used it in the past and might be willing to try it again
2.5%	Currently use it

17. What percentage of your ditches have you installed a two stage ditch? (n=1)

100.0%	0-25%
0.0%	26-50%
0.0%	51-75%
0.0%	76-100%

18. How much do the following factors limit your ability to implement two stage ditches?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know 5)	Mean (Without 5) (n)
a. Don't know how to do it (n=15)	20.0%	46.7%	0.0%	6.7%	26.7%	1.91 (n=11)
b. Time required (n=15)	20.0%	33.3%	13.3%	6.7%	26.7%	2.09 (n=11)
c. Cost (n=16)	6.3%	12.5%	12.5%	43.8%	25.0%	3.25 (n=12)
d. The features of my property make it difficult (n=17)	20.0%	26.7%	20.0%	20.0%	13.3%	2.46 (n=13)
e. Insufficient proof of water quality benefit (n=15)	40.0%	6.7%	20.0%	6.7%	26.7%	1.91 (n=11)
f. Desire to continue traditional farming practices/methods (n=17)	60.0%	13.3%	13.3%	6.7%	6.7%	1.64 (n=14)
g. Disapproval from others (n=15)	86.7%	0.0%	0.0%	0.0%	13.3%	1.00 (n=13)
h. Hard to use with my farming system (n=15)	46.7%	13.3%	13.3%	13.3%	13.3%	1.92 (n=13)
i. Lack of equipment (n=15)	33.3%	13.3%	13.3%	26.7%	13.3%	2.38 (n=13)

Stream Channel Restoration

19. Please select the option that best describes your experience with stream channel restoration. (n=40)

42.5%	Not relevant
10.0%	Never heard of it and not willing to try it
20.0%	Never heard of it, but might be willing to try it
10.0%	Heard of it and not willing to try it
12.5%	Heard of it and might be willing to try it
0.0%	Used it in the past and not willing to try it again
0.0%	Used it in the past and might be willing to try it again
5.0%	Currently use it

20. What percentage of your streams have undergone stream channel restoration? (n=1)

0.0%	0-25%
0.0%	26-50%
0.0%	51-75%
100.0%	76-100%

21. How much do the following factors limit your ability to implement stream channel restoration?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=10)	20.0%	20.0%	10.0%	20.0%	30.0%	2.43 (n=7)
b. Time required (n=10)	20.0%	10.0%	10.0%	30.0%	30.0%	2.71 (n=7)
c. Cost (n=10)	20.0%	10.0%	20.0%	2.0%	30.0%	2.57 (n=7)
d. The features of my property make it difficult (n=10)	10.0%	20.0%	20.0%	20.0%	30.0%	2.71 (n=7)
e. Insufficient proof of water quality benefit (n=10)	20.0%	10.0%	10.0%	20.0%	40.0%	2.50 (n=6)
f. Desire to continue traditional farming practices/methods (n=10)	40.0%	10.0%	10.0%	20.0%	20.0%	2.13 (n=8)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
g. Disapproval from others (n=10)	80.0%	0.0%	0.0%	0.0%	20.0%	1.00 (n=8)
h. Hard to use with my farming system (n=10)	20.0%	10.0%	20.0%	20.0%	30.0%	2.43 (n=7)
i. Lack of equipment (n=10)	30.0%	10.0%	10.0%	20.0%	30.0%	2.29 (n=7)

V. Conservation Tillage

22. How many of the corn and soybean acres that you manage in the Beargrass Creek watershed were no-till, strip-till, or ridge till in 2015?

Corn (n=28)

0.0%	50.0%
10.0%	3.6%
40.0%	3.6%
50.0%	7.1%
60.0%	3.6%
89.0%	3.6%
100.0%	25.0%

Soybeans (n=27)

0.0%	40.7%
50.0%	11.1%
80.0%	3.7%
100.0%	44.4%

VI. Targeted Conservation

23. Targeted conservation refers to soil and water conservation activities that use techniques such as satellite imagery and geographic information systems (GIS) to identify the areas of the landscape that are most vulnerable so soil erosion of water quality impairment. Targeted conservation approaches are seen by some as a way to improve the efficiency and effectiveness of soil and water conservation activities by focusing resources on areas of the landscape that would provide the most environmental

benefit. We are interested in learning about what you think regarding targeted conservation programs.

	Strongly Disagree (1)	Disagree (2)	Neither (3)	Agree (4)	Strongly Agree (5)	Mean (n)
a. Conservation funding should be higher for land that is most vulnerable to soil and water quality problems. (n=38)	10.5%	2.6%	21.1%	50.0%	15.8%	3.58 (n=38)
b. Targeted conservation is a good idea because limited resources should be spent where they have the most impact. (n=38)	7.9%	2.6%	18.4%	52.6%	18.4%	3.71 (n=38)
c. Satellite imagery, GIS and other technologies can be valuable tools to help farmers improve their farm's environmental performance. (n=37)	10.8%	2.7%	37.8%	45.9%	2.7%	3.27 (n=37)
d. If a conservation professional contacted me about a potential natural concern on my land, I would allow them to come assess it. (n=38)	7.9%	7.9%	34.2%	47.4%	2.6%	3.29 (n=38)
e. Targeted conservation programs are needed because current programs are not effective enough. (n=35)	5.7%	8.6%	57.1%	28.6%	0.0%	3.09 (n=35)
f. Government use of satellite imagery and GIS to map characteristics of private land is an invasion of privacy. (n=38)	7.9%	13.2%	50.0%	18.4%	10.5%	3.11 (n=38)
g. If a conservation professional contacted me about a potential natural resource concern on my land, I would feel unfairly singled out. (n=38)	2.6%	42.1%	44.7%	2.6%	7.9%	2.71 (n=38)

VII. Farming Operations

24. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

Owned (n=38)	Rented (n=33)	Total (n=36)
Range: 0-1,500	Range: 0-2,450	Range: 0-3,000
Mean: 434.37	Mean: 442.32	Mean: 807.99

25. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year that is located within the Beargrass Creek watershed.

Owned (n=35)	Rented (n=30)	Total (n=34)
Range: 0-1,250	Range: 0-700	Range: 0-2,750
Mean: 170.91	Mean: 105.90	Mean: 269.09

26. How many acres of the following did you manage in the Beargrass Creek watershed? ***If none, please enter a zero.***

a. **Corn (n=33)**
   Range: 0-1,240
   Mean: 150.12
b. **Soybeans (n=33)**
   Range: 0 -831
   Mean: 116.12
c. **Small grains (n=27)**
   Range: 0-100
   Mean: 10.78
d. **Canning crops (n=23)**
   Range: 0.0
   Mean: 0.0
e. **Clover/Alfalfa (n=27)**
   Range: 0-110
   Mean: 9.96
f. **Pasture (n=25)**
   Range: 0-15
   Mean: 1.12
g. **Forest/woodland (n=26)**
   Range: 0-40
   Mean: 6.27
h. **Conservation set aside/CRP (n=24)**
   Range: 0-25

Mean: 2.96

i. **Non-row crops for energy (n=0)**
   Range: 0
   Mean: 0
j. **Other (n=0)**
   Range: 0
   Mean: 0

27. Over how many of these acres in the Beargrass Creek watershed was manure spread? (n=38)

Range: 0-1,500
Mean: 73.21

28. What percentage of the manure originated inside the Beargrass Creek watershed? (n=31)

Range: 0%-100%
Mean: 36.16%

29. How many of the following animals are part of your farming operation? If none, please enter a zero.

a. **Dairy cattle, including heifers and young stock (n=6)**
   Range: 0-200
   Mean: 33.67
b. **Beef cattle, including heifers and young stock (n=6)**
   Range: 0-7
   Mean: 1.50
c. **Hogs, including contract hog barns (n=4)**
   Range: 0-50,000
   Mean: 16,750
d. **Poultry (n=5)**
   Range: 0-20
   Mean: 4.00
e. **Other livestock (please specify): See Appendix I (n=2)**

30. How many years have you been farming? (n=35)

Range: 4-68
Mean: 39.9

31. Does the property you manage touch a stream, river, lake, or wetland? (n=38)

42.1%	No
57.9%	Yes

32. Do you plan to improve your drainage within the next 10 years? (n=39)

53.8% No
46.2% Yes

33. If yes, how do you plan to finance it? (n=14)

See Appendix I

34. Five years from now, which statement will best describe your farm operation? (n=38)

42.1% It will be about the same size as it is today
7.9% It will be larger
7.9% It will be smaller
42.1% I don't know

VIII. Beargrass Creek Watershed Approach Project

35. Before this survey, I was aware of The Beargrass Creek Watershed Approach Project. (n=35)

17.1% No
82.9% Yes

36. I have attended a Beargrass Creek Watershed Producer Meeting. (n=36)

50.0% No
50.0% % Yes, please specify what year (see Appendix I)

37. I have met with Susi Stephan (SWCD) and Joe Magner (University of Minnesota) about implementing targeted conservation practices on my land. (n=36)

61.1% No
38.9% Yes

38. I have seen Lidar maps of the Beargrass Creek watershed that depict practice opportunities. (n=35)

48.6% No
51.4% Yes, and I think these maps are: (n=17)
- 0.0% Not at all accurate
- 0.0% Not very accurate
- 64.7% Somewhat accurate
- 35.3% Very accurate

39. I have seen the "Strategies for Voluntarily Improving the Soil Health on Your Farm" booklet. (n=34)

47.1% No
52.9% Yes, and I think the booklet is: (n=18)
- 0.0% Not at all useful
- 5.6% Not very useful
- 66.7% Somewhat useful
- 27.8% Very useful

40. Please select how strongly you agree or disagree with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree or Disagree (3)	Agree (4)	Strongly Agree (5)	Mean (n)
a. I believe producers in the Beargrass Creek watershed play a key role in meeting the 45% nutrient reduction goal. (n=34)	5.9%	8.8%	26.5%	32.4%	26.5%	3.65 (n=34)
b. I believe the 45% nutrient reduction goal is achievable (n=34)	5.9%	2.9%	55.9%	32.4%	2.9%	3.24 (n=34)
c. I am willing to implement targeted conservation practices on my land. (n=34)	8.8%	5.9%	41.2%	38.2%	5.9%	3.26 (n=34)
d. I plan to apply for cost-share to help fund the implementation of conservation practices on my land. (n=34)	11.8%	14.7%	41.2%	26.5%	5.9%	3.00 (n=34)

IX. About You

41. What is your gender? (n=37)

94.6% Male
5.4% Female

42. What is your age? (n=34)

Range: 31-89
Mean: 61

43. What is the highest level of school you completed? (n=37)

2.7%	Some formal schooling
56.8%	High school diploma / GED
27.0%	Some college
2.7%	2 year college degree
8.1%	4 year college degree
2.7%	Post-graduate degree

44. In the last year, how many days did you work at least 4 hours off-farm? (Include work on someone else's farm for pay) (n=36)

58.3%	None
11.1%	1-49 days
2.8%	50-99 days
5.6%	100-199 days
22.2%	200 days or more

45. Researchers at Purdue are interested in your opinions regarding "sustainable farming." Please select the answer choice that best represents your opinion.

	Strongly Disagree (1)	Disagree (2)	Neither Agree or Disagree (3)	Agree (4)	Strongly Agree (5)	Mean (n)
a. I consider my farm to be "sustainable." (n=36)	2.8%	0.0%	19.4%	58.3%	19.4%	3.92 (n=36)
b. "Sustainable farming" means keeping my farm running for future generations. (n=35)	2.9%	0.0%	17.1%	60.0%	20.0%	3.94 (n=35)
c. I believe farmers in the U.S. have a responsibility to feed our nation. (n=35)	2.9%	5.7%	5.7%	57.1%	28.6%	4.03 (n=35)
d. I believe farmers in the U.S. have a responsibility to feed the world. (n=36)	5.6%	11.1%	25.0%	41.7%	16.7%	3.53 (n=36)
e. Nothing is truly "sustainable." (n=34)	8.8%	35.3%	35.3%	11.8%	8.8%	2.76 (n=34)
f. "Sustainable farming" means protecting my soil. (n=37)	2.7%	5.4%	10.8%	62.2%	18.9%	3.89 (n=37)

		Strongly Disagree (1)	Disagree (2)	Neither Agree or Disagree (3)	Agree (4)	Strongly Agree (5)	Mean (n)
g.	I think companies that say they make "sustainable" products are not being honest about such claims. (n=36)	2.8%	5.6%	61.1%	22.2%	8.3%	3.28 (n=36)
h.	I think "sustainable" labels are just a marketing ploy. (n=36)	2.8%	5.6%	50.0%	33.3%	8.3%	3.39 (n=36)
i.	I think most consumers in the U.S. are not well-informed about the agricultural industry. (n=36)	2.8%	0.0%	8.3%	52.8%	36.1%	4.19 (n=36)
j.	I think "sustainability" and "conservation" mean the same thing. (n=36)	5.6%	16.7%	30.6%	41.7%	5.6%	3.25 (n=36)

Appendix I: "Other" Responses to Survey Questions

Q29e. (Farming Operations) How many of the following animals are part of your farming operation? If none, please enter a zero. (n=2)

Other livestock (specify)

"goats, horses" [no quantity listed]

10 [type of livestock not listed]

Q33. (Farming Operations) If yes [improving drainage within next 10 years], how do you plan to finance it? (n=14)

Cash (n=5)
Cash out of pocket (n=1)
Cash/Loan (n=1)
Mortgage (n=1)
Profit from crops (n=1)
ME (n=1)
Don't know (n=1)
Not sure (n=1)
Myself (n=1)
No (n=1)

Q36. (I have attended a Beargrass Creek Watershed Producer Meeting) Yes, please specify what year: (n=18)

2013, 2014, 2015 (n=1)
2014, 2015 (n=2)

2015 (n=8)
2015 or 2016 (n=1)
2015, 2016 (n=1)
2016 (n=2)
All (n=1)
Don't know (n=1)
Manchester U. (n=1)

Appendix II: Additional Comments

"I am concerned about all the forest and wood lands we're losing. More emphasis should be placed on restoring and keeping the trees and woodlands to protect our wildlife and environment. In our area, trees, woods, fence lines are being destroyed at an alarming rate."

"Do this in the winter when I have more time"

Nutrient loading into the Eel River from cities and towns are more of a concern than livestock and crops.

"All land near creek is all in grass for hay. All acreage is in pasture + hay."

"My 37 acres is totally woodland we planted 6600 trees on 13 acres CRP"

"As was the case this spring, using cover crops require intense management. It takes weather cooperating with the farmer to allow cover crops to work so the farmer avoids disastrous financial results. This spring was a prime example of why I am hesitant to jump in with both feet. Several local farmers had an extremely difficult time getting crops seeded into wet soils with cover crops as the land didn't warm and dry out. I applaud the efforts for soil conservation, but not at the risk of financial ruin. There has to be a happy medium somewhere. We try to leave as much residue on top of the soil as is possible and soil as permeable as possible so soil runoff during severe rainfall is at a minimum. This seems to curb soil erosion but heavy rainfall after herbicide application does concern me. Wonder if any testing has been done in water quality testing for herbicides after heavy rainfall events?"

Appendix C: Beargrass Creek Pre-Post Survey Results

I. Methods

Mail Survey

2014: 82 surveys distributed, 0 bad addresses. A total of 60 surveys were completed (73% response rate).
2016: 86 surveys distributed, 1 bad address. A total of 40 surveys were complete (47% response rate).

A total of 28 respondents completed the survey in 2014 and in 2016. The following report compares this group's responses before and after the implementation of the Beargrass Creek Watershed Approach Project.

II. Water Quality: Water Impairments

1. Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
a. Sedimentation/silt						
2016 (n=26)	1	9	8	3	5	2.62 (n=21)
2014 (n=25)	6	5	12	1	1	2.33 (n=24)
b. Nitrate/nitrogen						
2016 (n=26)	2	8	8	1	7	2.42 (n=19)
2014 (n=27)	5	7	9	1	5	2.27 (n=22)
c. Phosphorus						
2016 (n=26)	2	7	6	2	9	2.47 (n=17)
2014 (n=26)	6	6	8	0	6	2.10 (n=20)

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
d. Bacteria in the water (such as E. coli)						
2016 (n=26)	4	3	2	1	16	2.00 (n=10)
2014 (n=27)	8	7	4	1	7	1.90 (n=20)

III. Water Quality: Sources of Water Pollution

2. The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
a. Discharges from industry into streams and lakes						
2016 (n=27)	9	8	3	0	7	1.70 (n=20)
2014 (n=27)	13	6	3	1	4	1.65 (n=23)
b. Discharges from sewage treatment plants						
2016 (n=27)	9	6	3	3	6	2.00 (n=21)
2014 (n=26)	12	3	7	1	3	1.87 (n=23)
c. Soil erosion from farm fields						
2016 (n=27)	1	15	6	3	2	2.44 (n=25)
2014 (n=26)	4	8	11	2	1	2.44 (n=25)

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
d. Soil erosion from shorelines and/or streambanks						
2016 (n=26)	6	9	6	3	2	2.25 (n=24)
2014 (n=26)	8	7	7	2	2	2.13 (n=24)
e. Lawn fertilizers and/or pesticides						
2016 (n=27)	8	11	4	0	4	1.83 (n=23)
2014 (n=26)	11	6	4	1	4	1.77 (n=22)
f. Fertilizers or manure used for crop production						
2016 (n=25)	4	11	6	1	3	2.18 (n=22)
2014 (n=26)	6	9	8	1	2	2.17 (n=24)
g. Improperly maintained septic systems						
2016 (n=27)	7	7	7	0	6	2.00 (n=21)
2014 (n=26)	7	8	4	2	5	2.05 (n=21)
h. Manure from farm animals						
2016 (n=27)	8	9	6	0	4	1.91 (n=23)
2014 (n=26)	8	13	3	0	2	1.79 (n=24)
i. Littering/illegal dumping of trash						
2016 (n=27)	7	12	3	0	5	1.82 (n=22)
2014 (n=27)	9	14	1	1	2	1.76 (n=25)

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
j. Pesticides or herbicides used for crop production						
2016 (n=27)	5	12	6	1	3	2.13 (n=24)
2014 (n=27)	8	11	5	0	3	1.88 (n=24)
k. Animal feeding operations						
2016 (n=27)	8	7	7	1	4	2.00 (n=26)
2014 (n=26)	9	12	3	0	2	1.75 (n=24)
l. Urban storm water runoff (e.g. highways, rooftops, parking lots)						
2016 (n=27)	8	9	4	0	6	1.81 (n=21)
2014 (n=26)	12	8	3	1	2	1.81 (n=21)
m. Removal of streambank vegetation						
2016 (n=26)	9	10	2	1	4	1.77 (n=22)
2014 (n=26)	11	11	1	1	2	1.67 (n=24)

IV. Management Practices

Cover Crops

3. Please select the option that best describes your experience with cover crops.

2016 (n=27)	2014 (n=26)	
6	3	Not relevant
0	0	Never heard of it and not willing to try it
0	0	Never heard of it, but might be willing to try it
5	4	Heard of it and not willing to try it
2	7	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
3	1	Used it in the past and might be willing to try it again
11	11	Currently use it

4. On what percentage of your cropland do you use cover crops?

2016 (n=11)	2014 (n=11)	
5	4	0-25%
1	2	26-50%
1	1	51-75%
4	4	76-100%

5. How many of the corn and soybean acres that you manage in the Beargrass Creek watershed were in cover crops in [2015 or 2014]?

	2016 (n=9)	2014 (n=19)
Range	0-450	0-320
Mean	134.15	62.05

6. How much do the following factors limit your ability to implement cover crops?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=18)	10	4	2	0	2	1.50 (n=16)
2014 (n=21)	13	4	4	0	0	1.57 (n=21)
b. Time required						
2016 (n=17)	5	6	3	1	2	2.00 (n=15)
2014 (n=21)	7	9	3	2	0	2.00 (n=21)
c. Cost						
2016 (n=19)	3	4	8	3	1	2.61 (n=18)
2014 (n=21)	7	2	8	4	0	2.43 (n=21)
d. The features of my property make it difficult						
2016 (n=17)	8	5	2	0	2	1.60 (n=15)
2014 (n=21)	14	3	3	0	1	1.45 (n=20)
e. Insufficient proof of water quality benefit						
2016 (n=16)	8	4	1	0	3	1.46 (n=13)
2014 (n=21)	14	4	2	0	1	1.40 (n=20)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
f. Desire to continue traditional farming practices/methods						
2016 (n=18)	8	3	5	0	2	1.81 (n=16)
2014 (n=23)	14	3	3	3	0	1.78 (n=23)
g. Disapproval from others						
2016 (n=18)	15	0	1	0	2	1.13 (n=16)
2014 (n=21)	19	1	0	0	1	1.10 (n=20)
h. Hard to use with my farming system						
2016 (n=17)	5	4	4	2	2	2.20 (n=15)
2014 (n=22)	11	4	3	3	1	1.90 (n=21)
i. Lack of equipment						
2016 (n=17)	5	4	4	3	1	2.31 (n=16)
2014 (n=22)	6	6	6	3	1	2.29 (n=21)

Grassed Waterways

7. Please select the option that best describes your experience with grassed waterways.

2016 (n=27)	2014 (n=28)	
5	2	Not relevant
0	0	Never heard of it and not willing to try it
0	0	Never heard of it, but might be willing to try it
0	1	Heard of it and not willing to try it
1	2	Heard of it and might be willing to try it
1	1	Used it in the past and not willing to try it again
0	2	Used it in the past and might be willing to try it again
20	20	Currently use it

8. What percentage of your waterways are grassed waterways?

2016 (n=20)	2014 (n=20)	
0	0	0-25%
1	0	26-50%
2	0	51-75%
17	20	76-100%

9. How much do the following factors limit your ability to implement grassed waterways?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=18)	17	1	0	0	0	1.06 (n=18)
2014 (n=22)	18	2	1	1	0	1.32 (n=22)
b. Time required						
2016 (n=18)	14	0	3	1	0	1.50 (n=18)
2014 (n=22)	13	5	1	3	0	1.73 (n=22)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
c. Cost						
2016 (n=19)	8	3	5	3	0	2.16 (n=19)
2014 (n=22)	9	5	1	7	0	2.27 (n=22)
d. The features of my property make it difficult						
2016 (n=18)	14	3	1	0	0	1.28 (n=18)
2014 (n=22)	17	2	0	2	1	1.48 (n=21)
e. Insufficient proof of water quality benefit						
2016 (n=18)	17	0	1	0	0	1.11 (n=18)
2014 (n=22)	18	2	1	0	1	1.19 (n=21)
f. Desire to continue traditional farming practices/methods						
2016 (n=18)	13	4	1	0	0	1.33 (n=18)
2014 (n=23)	18	1	2	1	1	1.36 (n=22)
g. Disapproval from others						
2016 (n=18)	18	0	0	0	0	1.00 (n=18)
2014 (n=23)	22	0	0	0	1	1.00 (n=22)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
h. Hard to use with my farming system						
2016 (n=18)	12	5	0	1	0	1.44 (n=18)
2014 (n=23)	16	5	0	1	1	1.36 (n=22)
i. Lack of equipment						
2016 (n=18)	12	5	1	0	0	1.39 (n=18)
2014 (n=23)	15	3	4	0	1	1.50 (n=22)

Denitrifying Bioreactors

10. Please select the option that best describes your experience with denitrifying bioreactors.

2016 (n=25)	**2014 (n=28)**	
8	3	Not relevant
0	5	Never heard of it and not willing to try it
1	12	Never heard of it, but might be willing to try it
4	1	Heard of it and not willing to try it
11	6	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
0	0	Used it in the past and might be willing to try it again
1	1	Currently use it

11. What percentage of your cropland is drained by denitrifying bioreactors?

2016 (n=1)	**2014 (n=1)**	
0	1	0-25%
0	0	26-50%
1	0	51-75%
0	0	76-100%

12. How much do the following factors limit your ability to implement denitrifying bioreactors?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=13)	3	2	3	4	1	2.67 (n=12)
2014 (n=7)	2	0	0	4	1	3.00 (n=6)
b. Time required						
2016 (n=13)	3	2	5	2	1	2.50 (n=12)
2014 (n=7)	3	0	1	1	2	2.00 (n=5)
c. Cost						
2016 (n=14)	0	2	3	8	1	3.46 (n=13)
2014 (n=7)	3	0	0	2	2	2.20 (n=5)
d. The features of my property make it difficult						
2016 (n=15)	2	3	4	3	3	2.67 (n=12)
2014 (n=7)	2	0	0	1	4	2.00 (n=3)
e. Insufficient proof of water quality benefit						
2016 (n=14)	2	3	3	2	4	2.50 (n=10)
2014 (n=7)	3	1	0	0	3	1.25 (n=4)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
f. Desire to continue traditional farming practices/methods						
2016 (n=13)	14	1	2	1	1	1.67 (n=12)
2014 (n=8)	4	0	2	0	2	1.67 (n=6)
g. Disapproval from others						
2016 (n=14)	12	0	0	0	2	1.00 (n=12)
2014 (n=7)	5	0	0	0	2	1.00 (n=5)
h. Hard to use with my farming system						
2016 (n=13)	4	4	1	2	2	2.09 (n=11)
2014 (n=7)	2	0	1	1	3	2.25 (n=4)
i. Lack of equipment						
2016 (n=13)	5	1	3	2	2	2.18 (n=11)
2014 (n=6)	2	0	0	1	3	2.00 (n=3)

Saturated Buffers

13. Please select the option that best describes your experience with saturated buffers.

2016 (n=28)	2014 (n=28)	
9	3	Not relevant
0	8	Never heard of it and not willing to try it
4	9	Never heard of it, but might be willing to try it
3	1	Heard of it and not willing to try it
8	7	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
0	0	Used it in the past and might be willing to try it again
4	0	Currently use it

14. What percentage of your cropland is drained by saturated buffers?

2016 (n=4)	2014 (n=0)	
1	0	0-25%
0	0	26-50%
2	0	51-75%
1	0	76-100%

15. How much do the following factors limit your ability to implement saturated buffers?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=10)	2	1	4	2	1	2.67 (n=9)
2014 (n=8)	4	1	1	1	1	1.86 (n=7)
b. Time required						
2016 (n=11)	4	0	5	1	1	2.30 (n=10)
2014 (n=8)	4	0	2	0	2	1.67 (n=6)
c. Cost						
2016 (n=13)	1	4	4	2	2	2.64 (n=11)
2014 (n=7)	2	0	1	2	2	2.60 (n=5)
d. The features of my property make it difficult						
2016 (n=10)	1	4	1	2	2	2.50 (n=8)
2014 (n=8)	2	1	3	0	2	2.17 (n=6)
e. Insufficient proof of water quality benefit						
2016 (n=10)	3	2	2	0	3	1.86 (n=7)
2014 (n=8)	3	1	2	0	2	1.83 (n=6)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
f. Desire to continue traditional farming practices/methods						
2016 (n=11)	7	0	1	1	2	1.56 (n=9)
2014 (n=8)	4	0	3	0	1	1.86 (n=7)
g. Disapproval from others						
2016 (n=11)	9	0	0	1	1	1.30 (n=10)
2014 (n=8)	7	0	0	0	1	1.00 (n=7)
h. Hard to use with my farming system						
2016 (n=10)	2	3	1	2	2	2.38 (n=8)
2014 (n=8)	2	3	0	1	2	2.00 (n=6)
i. Lack of equipment						
2016 (n=10)	5	2	2	0	1	1.67 (n=9)
2014 (n=8)	3	3	0	0	2	1.50 (n=6)

Two Stage Ditch

16. Please select the option that best describes your experience with two stage ditches.

2016 (n=28)	2014 (n=25)	
12	3	Not relevant
1	3	Never heard of it and not willing to try it
2	8	Never heard of it, but might be willing to try it
2	2	Heard of it and not willing to try it
11	7	Heard of it and might be willing to try it
0	1	Used it in the past and not willing to try it again
0	0	Used it in the past and might be willing to try it again
0	1	Currently use it

17. What percentage of your ditches have you installed a two stage ditch?

2016 (n=0)	2014 (n=1)	
0	1	0-25%
0	0	26-50%
0	0	51-75%
0	0	76-100%

18. How much do the following factors limit your ability to implement two stage ditches?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=12)	2	5	0	1	4	2.00 (n=8)
2014 (n=11)	5	3	1	0	2	1.56 (n=9)
b. Time required						
2016 (n=13)	2	4	2	1	4	2.22 (n=9)
2014 (n=8)	3	2	0	2	1	2.14 (n=7)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
c. Cost						
2016 (n=13)	1	1	2	5	4	3.22 (n=9)
2014 (n=9)	2	0	2	3	2	2.86 (n=7)
d. The features of my property make it difficult						
2016 (n=12)	2	2	3	3	2	2.70 (n=10)
2014 (n=8)	2	2	0	3	1	2.57 (n=7)
e. Insufficient proof of water quality benefit						
2016 (n=12)	5	1	2	0	4	1.63 (n=8)
2014 (n=8)	5	1	1	0	1	1.43 (n=7)
f. Desire to continue traditional farming practices/methods						
2016 (n=12)	6	2	2	1	1	1.82 (n=11)
2014 (n=8)	4	1	1	1	1	1.86 (n=7)
g. Disapproval from others						
2016 (n=12)	10	0	0	0	2	1.00 (n=10)
2014 (n=8)	7	1	0	0	0	1.13 (n=8)
h. Hard to use with my farming system						
2016 (n=12)	4	2	2	2	2	2.20 (n=10)
2014 (n=8)	3	2	0	2	1	2.14 (n=7)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
i. Lack of equipment						
2016 (n=12)	3	1	2	4	2	2.70 (n=10)
2014 (n=8)	1	1	3	1	2	2.67 (n=6)

Stream Channel Restoration

19. Please select the option that best describes your experience with stream channel restoration.

2016 (n=28)	2014 (n=23)	
13	2	Not relevant
1	5	Never heard of it and not willing to try it
7	9	Never heard of it, but might be willing to try it
3	4	Heard of it and not willing to try it
3	2	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
0	0	Used it in the past and might be willing to try it again
1	1	Currently use it

20. What percentage of your streams have undergone stream channel restoration?

2016 (n=1)	2014 (n=1)	
0	1	0-25%
0	0	26-50%
0	0	51-75%
1	0	76-100%

21. How much do the following factors limit your ability to implement stream channel restoration?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=7)	1	2	3	2	2	2.80 (n=5)
2014 (n=6)	4	0	0	0	2	1.00 (n=4)
b. Time required						
2016 (n=7)	1	1	1	2	2	2.80 (n=5)
2014 (n=5)	1	2	0	0	2	1.67 (n=3)
c. Cost						
2016 (n=7)	1	1	1	2	2	2.80 (n=5)
2014 (n=6)	2	1	1	0	2	1.75 (n=4)
d. The features of my property make it difficult						
2016 (n=7)	1	2	1	2	1	2.67 (n=6)
2014 (n=5)	2	0	1	1	1	2.25 (n=4)
e. Insufficient proof of water quality benefit						
2016 (n=7)	2	1	1	1	2	2.20 (n=5)
2014 (n=5)	2	1	1	0	1	2.25 (n=4)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
f. Desire to continue traditional farming practices/methods						
2016 (n=7)	4	0	1	1	1	1.83 (n=6)
2014 (n=5)	3	1	0	0	1	1.25 (n=4)
g. Disapproval from others						
2016 (n=7)	6	0	0	0	1	1.00 (n=6)
2014 (n=5)	4	0	0	0	1	1.00 (n=4)
h. Hard to use with my farming system						
2016 (n=7)	1	2	1	2	1	2.67 (n=6)
2014 (n=5)	1	2	0	1	1	2.25 (n=4)
i. Lack of equipment						
2016 (n=7)	1	1	1	2	2	2.67 (n=6)
2014 (n=5)	2	1	0	0	2	1.33 (n=3)

V. Conservation Tillage

22. How many of the corn and soybean acres that you manage in the Beargrass Creek watershed were no-till, strip-till, or ridge till in [2015 or 2014]?

	Acres		Percentage of Acres	
	2016	**2014**	**2016**	**2014**
Corn	**(n=18)**	**(n=18)**	**(n=20)**	**(n=18)**
Range	0-143	0-200	0-100	0-100
Mean	39.23	53.11	39.95	37.08
Soybeans	**(n=19)**	**(n=20)**	**(n=20)**	**(n=20)**
Range	0-364	0-401	0-100	0-100
Mean	52.05	92.65	51.50	60.67

VI. Targeted Conservation

23. Targeted conservation refers to soil and water conservation activities that use techniques such as satellite imagery and geographic information systems (GIS) to identify the areas of the landscape that are most vulnerable so soil erosion of water quality impairment. Targeted conservation approaches are seen by some as a way to improve the efficiency and effectiveness of soil and water conservation activities by focusing resources on areas of the landscape that would provide the most environmental benefit. We are interested in learning about what you think regarding targeted conservation programs.

	Strongly Disagree (1)	Disagree (2)	Neither (3)	Agree (4)	Strongly Agree (5)	Mean (n)
a. Conservation funding should be higher for land that is most vulnerable to soil and water quality problems.						
2016 (n=27)	2	1	3	16	5	3.78 (n=27)
2014 (n=26)	2	1	3	13	7	3.85 (n=26)
b. Targeted conservation is a good idea because limited resources should be spent where they have the most impact.						
2016 (n=27)	2	0	2	17	6	3.93 (n=27)
2014 (n=26)	2	0	2	14	8	4.00 (n=26)
c. Satellite imagery, GIS and other technologies can be valuable tools to help farmers improve their farm's environmental performance.						
2016 (n=26)	2	0	9	14	1	3.46 (n=26)
2014 (n=26)	2	0	8	14	2	3.54 (n=26)
d. If a conservation professional contacted me about a potential natural concern on my land, I would allow them to come assess it.						
2016 (n=27)	1	1	8	16	1	3.56 (n=27)
2014 (n=26)	2	0	9	14	1	3.46 (n=26)

	Strongly Disagree (1)	Disagree (2)	Neither (3)	Agree (4)	Strongly Agree (5)	Mean (n)
e. Targeted conservation programs are needed because current programs are not effective enough.						
2016 (n=25)	1	1	15	8	0	3.20 (n=25)
2014 (n=26)	2	3	14	7	0	3.00 (n=26)
f. Government use of satellite imagery and GIS to map characteristics of private land is an invasion of privacy.						
2016 (n=27)	2	4	14	6	1	3.00 (n=27)
2014 (n=26)	0	5	12	5	4	3.31 (n=26)
g. If a conservation professional contacted me about a potential natural resource concern on my land, I would feel unfairly singled out.						
2016 (n=27)	0	14	10	1	2	2.67 (n=27)
2014 (n=27)	0	10	14	1	2	2.81 (n=27)

VII. Farming Operations

24. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

	Owned		Rented		Total	
	2016 (n=28)	2014 (n=27)	2016 (n=24)	2014 (n=21)	2016 (n=27)	2014 (n=27)
Range	0-1,250	0-1,603	0-2,450	0-2,450	0-3,000	0-3,000
Mean	368.00	398.36	367.56	413.43	707.43	718.93

25. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year that is located within the Beargrass Creek watershed.

	Owned		Rented		Total	
	2016 (n=25)	2014 (n=25)	2016 (n=21)	2014 (n=21)	2016 (n=24)	2014 (n=24)
Range	0-550	0-1,000	0-600	0-2,200	0-1,150	0-2,750
Mean	146.40	196.86	70.90	212.19	214.13	379.10

26. How many acres of the following did you manage in the Beargrass Creek watershed? *If none, please enter a zero.*

	2016	2014
a. Corn	**(n=23)**	**(n=22)**
Range	0-357	0-1,500
Mean	102.74	169.86
b. Soybeans	**(n=23)**	**(n=22)**
Range	0-831	0-1,200
Mean	111.30	166.86
c. Small grains	**(n=20)**	**(n=17)**
Range	0-40	0-250
Mean	4.55	34.18
d. Canning crops	**(n=17)**	**(n=14)**
Range	0	0
Mean	0.00	0.00
e. Clover/Alfalfa	**(n=20)**	**(n=18)**
Range	0-110	0-120
Mean	13.30	16.83

	2016	2014
f. Pasture	**(n=19)**	**(n=17)**
Range	0-15	0-18
Mean	1.47	1.97
g. Forest/Woodland	**(n=20)**	**(n=18)**
Range	0-40	0-80
Mean	8.15	13.28
h. Conservation set aside/CRP	**(n=17)**	**(n=14)**
Range	0-13	0-13
Mean	2.00	1.81
i. Non-row crops for energy	**(n=17)**	**(n=15)**
Range	0	0-500
Mean	0.00	33.93
j. Other	**(n=28)**	**(n=23)**
Range	0	0
Mean	0.00	0.00

27. Over how many of these acres in the Beargrass Creek watershed was manure spread?

	2016 (n=28)	2014 (n=27)
Range	0-125	0-200
Mean	11.14	29.63

28. What percentage of the manure originated inside the Beargrass Creek watershed?

	2016 (n=22)	2014 (n=20)
Range	0-100	0-100
Mean	32.77	33.25

29. How many of the following animals are part of your farming operation? If none, please enter a zero.

	2016	2014
a. Dairy cattle	**(n=24)**	**(n=21)**
Range	0-200	0-20
Mean	8.33	0.95
b. Beef cattle	**(n=18)**	**(n=21)**
Range	0-7	0-9
Mean	0.50	0.57
c. Hogs	**(n=18)**	**(n=22)**
Range	0	0-4,000
Mean	0.00	206.82
d. Poultry	**(n=18)**	**(n=20)**
Range	0-20	0
Mean	1.11	0.00
e. Other	**(n=0)**	**(n=17)**
Range	0-10	0
Mean	0.56	0.00

30. How many years have you been farming?

	2016 (n=26)	2014 (n=26)
Range	19-68	0-70
Mean	41.71	37.54

31. Does the property you manage touch a stream, river, lake, or wetland?

	2016 (n=28)	2014 (n=28)
No	12	12
Yes	16	16

32. Do you plan to improve your drainage within the next 10 years?

	2016 (n=28)	2014 (n=28)
No	16	13
Yes	12	15

33. If yes, how do you plan to finance it?

See Appendix I

34. Five years from now, which statement will best describe your farm operation?

2016 (n=28)	2014 (n=27)	
13	12	It will be about the same size as it is today
2	5	It will be larger
2	2	It will be smaller
11	8	I don't know

VIII. About You

35. What is your gender?

2016 (n=26)	2014 (n=28)	
25	26	Male
1	2	Female

36. What is your age?

	2016 (n=25)	2014 (n=28)
Range	45-89	41-87
Mean	65.76	64.71

37. What is the highest level of school you completed?

2016 (n=26)	2014 (n=27)	
1	2	Some formal schooling
13	13	High school diploma / GED
9	7	Some college
0	2	2 year college degree
2	2	4 year college degree
1	1	Post-graduate degree

38. In the last year, how many days did you work at least 4 hours off-farm? (Include work on someone else's farm for pay) (n=36)

2016 (n=26)	2014 (n=28)	
17	19	None
3	2	1-49 days
0	0	50-99 days
2	1	100-199 days
4	6	200 days or more

Appendix I: "Other" Responses to Survey Questions

Q33. (Farming Operations) If yes [improving drainage within next 10 years], how do you plan to finance it?

2016 (n=11)	**2014 (n=14)**
Cash (n=4)	Cash (n=4)
Cash out of pocket (n=1)	Crop or farm income (n=2)
Cash/Loan (n=1)	Landowner (n=1)
Profit from crops (n=1)	Loan (n=1)
ME (n=1)	None (n=1)
Not sure (n=1)	Not sure- crop revenue (n=1)
Myself (n=1)	Pay as do (n=1)
No (n=1)	Self (n=2)
	Write check (n=1)

Q39. (Farming Operations) How many of the following animals are part of your farming operation? If none, please enter a zero.

10 [type of livestock not listed]

I. Methods

Mail Survey

69 Surveys distributed
2 Bad address
31 (46%) Completed (% not including bad addresses)

II. Water Quality: Water Impairments

1. Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
a. Sedimentation/silt (n=31)	16.1%	29.0%	35.5%	12.9%	6.5%	2.48 (n=29)
b. Nitrate/nitrogen (n=30)	23.3%	23.3%	26.7%	0.0%	26.7%	2.05 (n=22)
c. Phosphorus (n=30)	23.3%	30.0%	13.3%	0.0%	33.3%	1.85 (n=20)
d. Bacteria in the water (such as E. coli) (n=31)	29.0%	29.0%	9.7%	3.2%	29.0%	1.82 (n=22)

III. Water Quality: Sources of Water Pollution

2. The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

		Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
a.	Discharges from industry into streams and lakes (n=31)	48.5%	16.1%	12.9%	3.2%	19.4%	1.64 (n=25)
b.	Discharges from sewage treatment plants (n=31)	41.9%	25.8%	25.8%	0.0%	6.5%	1.83 (n=29)
c.	Soil erosion from farm fields (n=30)	6.7%	46.7%	30.0%	13.3%	3.3%	2.52 (n=29)
d.	Soil erosion from shorelines and/or streambanks (n=31)	19.4%	41.9%	25.8%	9.7%	3.2%	2.27 (n=30)
e.	Lawn fertilizers and/or pesticides (n=31)	22.6%	32.3%	22.6%	6.5%	16.1%	2.15 (n=26)
f.	Fertilizers or manure used for crop production (n=31)	25.8%	32.3%	29.0%	0.0%	12.9%	2.04 (n=27)
g.	Improperly maintained septic systems (n=30)	20.0%	43.3%	23.3%	0.0%	13.3%	2.04 (n=26)
h.	Manure from farm animals (n=30)	30.0%	43.3%	16.7%	0.0%	10.0%	1.85 (n=27)
i.	Littering/illegal dumping of trash (n=31)	19.4%	51.6%	12.9%	12.9%	3.2%	2.20 (n=30)
j.	Pesticides or herbicides used for crop production (n=31)	25.8%	35.5%	19.4%	0.0%	19.4%	1.92 (n=25)
k.	Animal feeding operations (n=31)	32.3%	38.7%	12.9%	3.2%	12.9%	1.85 (n=27)
l.	Urban storm water runoff (e.g. highways, rooftops, parking lots) (n=30)	40.0%	33.3%	16.7%	3.3%	6.7%	1.82 (n=28)
m.	Removal of streambank vegetation (n=31)	35.5%	41.9%	9.7%	0.0%	12.9%	1.70 (n=27)

IV. Management Practices

Cover Crops

3. **Please select the option that best describes your experience with cover crops. (n=29)**

10.3%	Not relevant
0.0%	Never heard of it and not willing to try it
0.0%	Never heard of it, but might be willing to try it
0.0%	Heard of it and not willing to try it
20.7%	Heard of it and might be willing to try it
0.0%	Used it in the past and not willing to try it again
13.8%	Used it in the past and might be willing to try it again
55.2%	Currently use it

4. **On what percentage of your cropland do you use cover crops? (n=15)**

20.0%	0-25%
20.0%	26-50%
13.3%	51-75%
46.7%	76-100%

5. **How many of the corn and soybean acres that you manage in the Flowers Creek watershed were in cover crops in 2015?**

Corn (n=15)	
13.3%	0%
13.3%	10%
6.7%	14%
6.7%	20%
6.7%	40%
6.7%	90%
26.7%	100%
20.0%	NA

Soybeans (n=13)	
15.4%	0%
7.7%	10%
7.7%	15%
7.7%	20%
7.7%	65%
7.7%	70%
7.7%	80%
15.4%	100%
23.1%	NA

6. How much do the following factors limit your ability to implement cover crops?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=22)	81.8%	4.5%	9.1%	0.0%	2.5%	1.24 (n=21)
b. Time required (n=25)	28.0%	24.0%	32.0%	12.0%	4.0%	2.29 (n=24)
c. Cost (n=24)	33.3%	4.2%	45.8%	12.5%	4.2%	2.39 (n=23)
d. The features of my property make it difficult (n=22)	59.1%	4.5%	9.1%	18.2%	9.1%	1.85 (n=20)
e. Insufficient proof of water quality benefit (n=23)	60.9%	13.3%	13.3%	0.0%	13.3%	1.45 (n=20)
f. Desire to continue traditional farming practices/methods (n=24)	45.8%	29.2%	12.5%	12.5%	0.0%	1.92 (n=24)
g. Disapproval from others (n=24)	79.2%	8.3%	8.3%	0.0%	4.2%	1.26 (n=23)
h. Hard to use with my farming system (n=24)	41.7%	25.0%	16.7%	8.3%	8.3%	1.91 (n=22)
i. Lack of equipment (n=24)	37.5%	25.0%	16.7%	16.7%	4.2%	2.13 (n=23)

Grassed Waterways

7. Please select the option that best describes your experience with grassed waterways. (n=29)

10.3%	Not relevant
0.0%	Never heard of it and not willing to try it
0.0%	Never heard of it, but might be willing to try it
0.0%	Heard of it and not willing to try it
3.4%	Heard of it and might be willing to try it
0.0%	Used it in the past and not willing to try it again
3.4%	Used it in the past and might be willing to try it again
82.8%	Currently use it

8. What percentage of your waterways are grassed waterways? (n=23)

0.0%	0-25%
8.7%	26-50%
34.8%	51-75%
56.5%	76-100%

9. How much do the following factors limit your ability to implement grassed waterways?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=26)	73.9%	4.3%	8.7%	4.3%	8.7%	1.38 (n=21)
b. Time required (n=23)	43.5%	21.7%	26.1%	4.3%	4.3%	1.91 (n=22)
c. Cost (n=22)	27.3%	9.1%	50.0%	9.1%	4.5%	2.43 (n=21)
d. The features of my property make it difficult (n=22)	68.2%	13.6%	9.1%	0.0%	9.1%	1.35 (n=20)
e. Insufficient proof of water quality benefit (n=21)	81.0%	4.8%	4.8%	0.0%	9.5%	1.16 (n=19)
f. Desire to continue traditional farming practices/methods (n=22)	68.2%	22.7%	4.5%	4.5%	0.0%	1.45 (n=22)
g. Disapproval from others (n=21)	90.5%	4.8%	4.8%	4.8%	4.8%	1.14 (n=21)
h. Hard to use with my farming system (n=22)	72.7%	13.6%	4.5%	4.5%	4.5%	1.38 (n=21)
i. Lack of equipment (n=23)	47.8%	26.1%	13.0%	4.3%	8.7%	1.71 (n=21)

Denitrifying Bioreactors

10. Please select the option that best describes your experience with denitrifying bioreactors. (n=29)

24.1%	Not relevant
6.9%	Never heard of it and not willing to try it
34.5%	Never heard of it, but might be willing to try it
3.4%	Heard of it and not willing to try it
27.6%	Heard of it and might be willing to try it
0.0%	Used it in the past and not willing to try it again
0.0%	Used it in the past and might be willing to try it again
3.4%	Currently use it

11. What percentage of your cropland is drained by denitrifying bioreactors? (n=1)

0.0%	0-25%
0.0%	26-50%
100%	51-75%
0.0%	76-100%

12. How much do the following factors limit your ability to implement denitrifying bioreactors?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=8)	12.5%	25.0%	25.0%	25.0%	12.5%	2.71 (n=7)
b. Time required (n=8)	12.5%	12.5%	50.0%	0.0%	25.0%	2.50 (n=6)
c. Cost (n=8)	0.0%	0.0%	50.0%	25.0%	25.0%	3.33 (n=6)
d. The features of my property make it difficult (n=8)	0.0%	12.5%	62.5%	0.0%	25.0%	2.83 (n=6)
e. Insufficient proof of water quality benefit (n=9)	33.3%	22.2%	22.2%	0.0%	22.2%	1.86 (n=7)
f. Desire to continue traditional farming practices/methods (n=8)	50.0%	37.5%	0.0%	0.0%	12.5%	1.43 (n=7)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
g. Disapproval from others (n=8)	62.5%	12.5%	12.5%	0.0%	12.5%	1.43 (n=7)
h. Hard to use with my farming system (n=8)	25.0%	25.0%	12.5%	12.5%	25.0%	2.17 (n=6)
i. Lack of equipment (n=9)	22.2%	0.0%	33.3%	11.1%	33.3%	2.50 (n=6)

Saturated Buffers

13. Please select the option that best describes your experience with saturated buffers. (n=29)

31.0%	Not relevant
3.4%	Never heard of it and not willing to try it
44.8%	Never heard of it, but might be willing to try it
0.0%	Heard of it and not willing to try it
17.2%	Heard of it and might be willing to try it
0.0%	Used it in the past and not willing to try it again
0.0%	Used it in the past and might be willing to try it again
3.4%	Currently use it

14. What percentage of your cropland is drained by saturated buffers? (n=1)

100.0%	0-25%
0.0%	26-50%
0.0%	51-75%
0.0%	76-100%

15. How much do the following factors limit your ability to implement saturated buffers?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=5)	0.0%	100.0%	0.0%	0.0%	0.0%	2.00 (n=5)
b. Time required (n=5)	0.0%	40.0%	40.0%	0.0%	20.0%	2.50 (n=4)
c. Cost (n=5)	0.0%	20.0%	40.0%	20.0%	20.0%	3.00 (n=4)
d. The features of my property make it difficult (n=5)	20.0%	20.0%	40.0%	0.0%	20.0%	2.25 (n=4)
e. Insufficient proof of water quality benefit (n=5)	80.0%	0.0%	0.0%	0.0%	20.0%	1.00 (n=4)
f. Desire to continue traditional farming practices/methods (n=5)	20.0%	60.0%	20.0%	0.0%	0.0%	2.00 (n=5)
g. Disapproval from others (n=5)	60.0%	40.0%	0.0%	0.0%	0.0%	1.40 (n=5)
h. Hard to use with my farming system (n=6)	16.7%	33.3%	16.7%	0.0%	33.3%	1.60 (n=5)
i. Lack of equipment (n=5)	20.0%	20.0%	20.0%	20.0%	20.0%	2.50 (n=4)

Two Stage Ditch

16. Please select the option that best describes your experience with two stage ditches. (n=29)

27.6%	Not relevant
13.8%	Never heard of it and not willing to try it
27.6%	Never heard of it, but might be willing to try it
6.9%	Heard of it and not willing to try it
20.7%	Heard of it and might be willing to try it
0.0%	Used it in the past and not willing to try it again
0.0%	Used it in the past and might be willing to try it again
3.4%	Currently use it

17. What percentage of your ditches have you installed a two stage ditch? (n=1)

0.0%	0-25%
0.0%	26-50%
0.0%	51-75%
100.0%	76-100%

18. How much do the following factors limit your ability to implement two stage ditches?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know 5)	Mean (Without 5) (n)
a. Don't know how to do it (n=9)	66.7%	11.1%	11.1%	0.0%	11.1%	1.38 (n=8)
b. Time required (n=9)	22.2%	44.4%	11.1%	0.0%	22.2%	1.86 (n=7)
c. Cost (n=9)	0.0%	0.0%	22.2%	55.6%	22.2%	3.71 (n=7)
d. The features of my property make it difficult (n=7)	0.0%	28.6%	57.1%	0.0%	14.3%	3.50 (n=6)
e. Insufficient proof of water quality benefit (n=9)	22.2%	22.2%	22.2%	11.1%	22.2%	2.29 (n=7)
f. Desire to continue traditional farming practices/methods (n=8)	25.0%	37.5%	12.5%	12.5%	12.5%	2.14 (n=7)
g. Disapproval from others (n=7)	71.4%	14.3%	0.0%	0.0%	14.3%	1.67 (n=6)
h. Hard to use with my farming system (n=8)	12.5%	37.5%	25.0%	0.0%	25.0%	2.50 (n=6)
i. Lack of equipment (n=8)	25.0%	12.5%	12.5%	25.0%	25.0%	2.50 (n=6)

Stream Channel Restoration

19. Please select the option that best describes your experience with stream channel restoration. (n=29)

44.8%	Not relevant
10.3%	Never heard of it and not willing to try it
24.1%	Never heard of it, but might be willing to try it
0.0%	Heard of it and not willing to try it
13.8%	Heard of it and might be willing to try it
0.0%	Used it in the past and not willing to try it again
3.4%	Used it in the past and might be willing to try it again
3.4%	Currently use it

20. What percentage of your streams have undergone stream channel restoration? (n=1)

100.0%	0-25%
0.0%	26-50%
0.0%	51-75%
0.0%	76-100%

21. How much do the following factors limit your ability to implement stream channel restoration?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it (n=6)	0.0%	50.0%	50.0%	0.0%	0.0%	2.50 (n=6)
b. Time required (n=6)	0.0%	0.0%	83.3%	00.0%	16.7%	3.00 (n=5)
c. Cost (n=6)	0.0%	0.0%	33.3%	50.0%	16.7%	3.60 (n=5)
d. The features of my property make it difficult (n=6)	33.3%	0.0%	50.0%	0.0%	16.7%	2.20 (n=5)
e. Insufficient proof of water quality benefit (n=6)	16.7%	33.3%	33.3%	0.0%	16.7%	2.20 (n=5)
f. Desire to continue traditional farming practices/methods (n=6)	50.0%	16.7%	33.3%	0.0%	0.0%	1.83 (n=6)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
g. Disapproval from others (n=6)	50.0%	16.7%	16.7%	0.0%	16.7%	1.33 (n=5)
h. Hard to use with my farming system (n=6)	16.7%	16.7%	33.3%	0.0%	33.3%	2.25 (n=4)
i. Lack of equipment (n=6)	16.7%	16.7%	16.7%	33.3%	16.7%	2.80 (n=5)

V. Conservation Tillage

22. How many of the corn and soybean acres that you manage in the Flowers Creek watershed were no-till, strip-till, or ridge till in 2015?

Corn (n=28)	
21.4%	0%
3.6%	2%
7.1%	25%
10.7%	50%
7.1%	75%
3.6%	90%
25.0%	100%
21.4%	NA

Soybeans (n=29)	
6.9%	0%
3.4%	4%
3.4%	10%
3.4%	50%
3.4%	75%
3.4%	80%
55.2%	100%
20.7%	NA

VI. Targeted Conservation

23. Targeted conservation refers to soil and water conservation activities that use techniques such as satellite imagery and geographic information systems (GIS) to identify the areas of the landscape that are most vulnerable so soil erosion of water quality impairment. Targeted conservation approaches are seen by some as a way to improve the efficiency and effectiveness of soil and water conservation activities by focusing resources on areas of the landscape that would provide the most environmental benefit. We are interested in learning about what you think regarding targeted conservation programs.

	Strongly Disagree (1)	Disagree (2)	Neither (3)	Agree (4)	Strongly Agree (5)	Mean (n)
a. Conservation funding should be higher for land that is most vulnerable to soil and water quality problems. (n=29)	3.4%	3.4%	13.8%	65.5%	13.8%	3.83 (n=29)
b. Targeted conservation is a good idea because limited resources should be spent where they have the most impact. (n=29)	3.4%	0.0%	20.7%	55.2%	20.7%	3.90 (n=29)
c. Satellite imagery, GIS and other technologies can be valuable tools to help farmers improve their farm's environmental performance. (n=29)	3.4%	3.4%	24.1%	51.7%	17.2%	3.76 (n=29)
d. If a conservation professional contacted me about a potential natural concern on my land, I would allow them to come assess it. (n=29)	6.9%	6.9%	31.0%	44.8%	10.3%	3.45 (n=29)
e. Targeted conservation programs are needed because current programs are not effective enough. (n=29)	3.4%	20.7%	55.2%	17.2%	3.4%	2.97 (n=29)
f. Government use of satellite imagery and GIS to map characteristics of private land is an invasion of privacy. (n=29)	10.3%	20.7%	37.9%	13.8%	17.2%	3.07 (n=29)
g. If a conservation professional contacted me about a potential natural resource concern on my land, I would feel unfairly singled out. (n=29)	10.3%	37.9%	41.4%	6.9%	3.4%	2.55 (n=29)

VII. Farming Operations

24. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

Owned (n=31)	Rented (n=26)	Total (n=31)
Range: 0-3,200	Range: 0-2,400	Range: 0-5,200
Mean: 414.75	Mean: 480.53	Mean: 790.33

25. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year that is located within the Flowers Creek watershed.

Owned (n=27)	Rented (n=21)	Total (n=29)
Range: 0-705	Range: 0-1,250	Range: 0-1,600
Mean: 157.16	Mean: 189.18	Mean: 272.97

26. How many acres of the following did you manage in the Flowers Creek watershed? ***If none, please enter a zero.***

a. **Corn (n=26)**
   Range: 0-600
   Mean: 117.72
b. **Soybeans (n=23)**
   Range: 0-1,540
   Mean: 232.26
c. **Small grains (n=20)**
   Range: 0-350
   Mean: 32.00
d. **Canning crops (n=16)**
   Range: 0.0
   Mean: 0.0
e. **Clover/Alfalfa (n=16)**
   Range: 0-180
   Mean: 11.94
f. **Pasture (n=17)**
   Range: 0-110
   Mean: 8.82
g. **Forest/woodland (n=18)**
   Range: 0-220
   Mean: 28.25
h. **Conservation set aside/CRP (n=17)**
   Range: 0-26

Mean: 3.62

i. **Non-row crops for energy (n=0)**
Range: 0.0
Mean: 0.0

j. **Other (n=3)**
"310 seed corn," "5, ditch and bank," "60 Fruit trees/grass"

27. Over how many of these acres in the Flowers Creek watershed was manure spread? (n=27)
Range: 0-610
Mean: 57.96

28. What percentage of the manure originated inside the Flowers Creek watershed? (n=23)
Range: 0%-100%
Mean: 26.09%

29. How many of the following animals are part of your farming operation? If none, please enter a zero.

a. **Dairy cattle, including heifers and young stock (n=7)**
Range: 0-1,000
Mean: 171.43

b. **Beef cattle, including heifers and young stock (n=7)**
Range: 0-120
Mean: 28.14

c. **Hogs, including contract hog barns (n=9)**
Range: 0-8,000
Mean: 1,783.33

d. **Poultry (n=6)**
Range: 0-30
Mean: 6.83

e. **Other livestock (specify): (n=7)**
"0," "12, meat goats," "chickens 500"

30. How many years have you been farming? (n=27)
Range: 0-66
Mean: 32.81

31. Does the property you manage touch a stream, river, lake, or wetland? (n=28)

17.9%	No
82.1%	Yes

32. Do you plan to improve your drainage within the next 10 years? (n=29)

24.1% No
75.9% Yes

33. If yes, how do you plan to finance it? (n=28)

See Appendix I

34. Five years from now, which statement will best describe your farm operation? (n=29)

41.4% It will be about the same size as it is today
27.6% It will be larger
3.4% It will be smaller
27.6% I don't know

35. Please select how strongly you agree or disagree with the following statements.

	Strongly Disagree (1)	Disagree (2)	Neither Agree or Disagree (3)	Agree (4)	Strongly Agree (5)	Mean (n)
a. I am willing to implement targeted conservation practices on my land. (n=29)	3.4%	3.4%	37.9%	48.3%	6.9%	3.52 (n=29)
b. I plan to apply for cost-share to help fund the implementation of conservation practices on my land. (n=28)	10.7%	7.1%	25.0%	50.0%	7.1%	3.36 (n=28)

VIII. About You

36. What is your gender? (n=30)

93.3% Male
6.7% Female

37. What is your age? (n=30)

Range: 28-89
Mean: 57.4

38. What is the highest level of school you completed? (n=30)

3.3%	Some formal schooling
43.3%	High school diploma / GED
10.0%	Some college
16.7%	2 year college degree
20.0%	4 year college degree
6.7%	Post-graduate degree

39. In the last year, how many days did you work at least 4 hours off-farm? (Include work on someone else's farm for pay) (n=30)

50.0%	None
16.7%	1-49 days
3.3%	50-99 days
0.0%	100-199 days
30.0%	200 days or more

40. Researchers at Purdue are interested in your opinions regarding "sustainable farming." Please select the answer choice that best represents your opinion.

	Strongly Disagree (1)	Disagree (2)	Neither Agree or Disagree (3)	Agree (4)	Strongly Agree (5)	Mean (n)
a. I consider my farm to be "sustainable." (n=28)	2.8%	0.0%	19.4%	58.3%	19.4%	3.89 (n=28)
b. "Sustainable farming" means keeping my farm running for future generations. (n=28)	2.9%	0.0%	17.1%	60.0%	20.0%	3.82 (n=28)
c. I believe farmers in the U.S. have a responsibility to feed our nation. (n=28)	2.9%	5.7%	5.7%	57.1%	28.6%	4.07 (n=28)
d. I believe farmers in the U.S. have a responsibility to feed the world. (n=28)	5.6%	11.1%	25.0%	41.7%	16.7%	3.25 (n=28)
e. Nothing is truly "sustainable." (n=28)	8.8%	35.3%	35.3%	11.8%	8.8%	2.93 (n=28)
f. "Sustainable farming" means protecting my soil. (n=28)	2.7%	5.4%	10.8%	62.2%	18.9%	3.96 (n=28)

		Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (n)
g.	I think companies that say they make "sustainable" products are not being honest about such claims. (n=28)	2.8%	5.6%	61.1%	22.2%	8.3%	3.14 (n=28)
h.	I think "sustainable" labels are just a marketing ploy. (n=28)	2.8%	5.6%	50.0%	33.3%	8.3%	3.36 (n=28)
i.	I think most consumers in the U.S. are not well-informed about the agricultural industry. (n=28)	2.8%	0.0%	8.3%	52.8%	36.1%	4.39 (n=28)
j.	I think "sustainability" and "conservation" mean the same thing. (n=28)	5.6%	16.7%	30.6%	41.7%	5.6%	2.93 (n=28)

Appendix A: "Other" Responses to Survey Questions

Q33. (Farming Operations) If yes [improving drainage within next 10 years], how do you plan to finance it? (n=24)

? (n=1)
Cash (n=4)
Equip and cash (n=1)
Myself (n=1)
Myself like always (n=1)
NA (n=3)
NRCS (n=1)
On my own (n=1)
Operations (n=1)
Out of pocket (n=1)
Pay as I can afford (n=1)
Pay cash (n=1)
Personal finances (n=1)
Row crop profits (n=1)
Self (n=3)
Well, by 'improve' I intend to restore a wetland on the agricultural field. Cost-share is coming from nrcs (n=1)

Appendix E: Flowers Creek Pre-Post Survey Results

I. Methods

Mail Survey

2014: 70 surveys distributed, 0 bad addresses. A total of 39 surveys were completed (56% response rate).
2016: 69 surveys distributed, 2 bad address. A total of 31 surveys were complete (46% response rate).

A total of 25 respondents completed the survey in 2014 and in 2016. The following report compares this group's responses before and after the implementation of the Flowers Creek Watershed Approach Project.

II. Water Quality: Water Impairments

1. Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
a. Sedimentation/silt						
2016 (n=25)	3	8	8	4	2	2.57 (n=23)
2014 (n=21)	4	4	6	4	3	2.56 (n=18)
b. Nitrate/nitrogen						
2016 (n=24)	4	7	5	0	8	2.06 (n=16)
2014 (n=21)	4	7	2	1	7	2.00 (n=14)
c. Phosphorus						
2016 (n=24)	5	7	3	0	9	1.87 (n=15)
2014 (n=21)	5	7	0	1	8	1.77 (n=13)

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
d. Bacteria in the water (such as E. coli)						
2016 (n=25)	6	8	2	1	8	1.88 (n=17)
2014 (n=21)	5	3	1	1	11	1.80 (n=10)

III. Water Quality: Sources of Water Pollution

2. The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
a. Discharges from industry into streams and lakes						
2016 (n=25)	12	4	3	0	6	1.53 (n=19)
2014 (n=22)	7	5	3	0	7	1.73 (n=15)
b. Discharges from sewage treatment plants						
2016 (n=25)	12	5	6	0	2	1.74 (n=23)
2014 (n=22)	5	6	5	1	5	2.12 (n=17)
c. Soil erosion from farm fields						
2016 (n=24)	2	11	7	3	1	2.48 (n=23)
2014 (n=22)	1	7	7	2	5	2.59 (n=17)

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
d. Soil erosion from shorelines and/or streambanks						
2016 (n=25)	5	11	6	2	1	2.21 (n=24)
2014 (n=23)	3	6	8	2	4	2.47 (n=19)
e. Lawn fertilizers and/or pesticides						
2016 (n=25)	5	8	6	1	5	2.15 (n=20)
2014 (n=22)	5	5	6	0	6	2.06 (n=16)
f. Fertilizers or manure used for crop production						
2016 (n=25)	6	8	7	0	4	2.05 (n=21)
2014 (n=22)	2	9	6	0	5	2.24 (n=17)
g. Improperly maintained septic systems						
2016 (n=24)	4	12	4	0	4	2.00 (n=20)
2014 (n=23)	3	10	2	0	8	1.93 (n=15)
h. Manure from farm animals						
2016 (n=24)	9	10	2	0	3	1.67 (n=21)
2014 (n=22)	4	10	3	0	5	1.94 (n=17)
i. Littering/illegal dumping of trash**						
2016 (n=25)	6	13	4	1	1	2.00 (n=24)
2014 (n=23)	2	8	8	1	4	2.42 (n=19)

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know (5)	Mean (Without 5) (n)
j. Pesticides or herbicides used for crop production						
2016 (n=25)	8	7	5	0	5	1.85 (n=20)
2014 (n=22)	4	10	3	0	5	1.94 (n=17)
k. Animal feeding operations						
2016 (n=25)	9	8	4	0	4	1.76 (n=21)
2014 (n=23)	6	10	2	0	5	1.78 (n=18)
l. Urban storm water runoff (e.g. highways, rooftops, parking lots)						
2016 (n=24)	10	8	3	1	2	1.77 (n=22)
2014 (n=22)	8	4	5	2	3	2.05 (n=19)
m. Removal of streambank vegetation						
2016 (n=25)	9	10	3	0	3	1.73 (n=22)
2014 (n=22)	8	4	5	0	5	1.82 (n=17)

IV. Management Practices

Cover Crops

3. Please select the option that best describes your experience with cover crops.

2016 (n=23)	2014 (n=22)	
2	2	Not relevant
0	1	Never heard of it and not willing to try it
0	0	Never heard of it, but might be willing to try it
0	1	Heard of it and not willing to try it
5	5	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
4	4	Used it in the past and might be willing to try it again
12	9	Currently use it

4. On what percentage of your cropland do you use cover crops?

2016 (n=12)	2014 (n=9)	
2	2	0-25%
3	1	26-50%
2	2	51-75%
5	4	76-100%

5. How many of the corn and soybean acres that you manage in the Flowers Creek watershed were in cover crops in [2015 or 2014]?

	2016 (n=9)	2014 (n=16)
Range	0-1,120	0-300
Mean	281.23	27.81

6. How much do the following factors limit your ability to implement cover crops?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=17)	14	0	2	0	1	1.25 (n=16)
2014 (n=19)	14	3	0	1	1	1.33 (n=18)
b. Time required						
2016 (n=20)	5	4	7	3	1	2.42 (n=19)
2014 (n=19)	6	5	6	1	1	2.11 (n=18)
c. Cost						
2016 (n=19)	5	1	10	2	1	2.50 (n=18)
2014 (n=19)	5	8	3	3	0	2.21 (n=19)
d. The features of my property make it difficult						
2016 (n=17)	10	1	1	3	2	1.80 (n=15)
2014 (n=19)	15	2	1	1	0	1.37 (n=19)
e. Insufficient proof of water quality benefit						
2016 (n=18)	11	2	3	0	2	1.50 (n=16)
2014 (n=19)	14	1	1	0	3	1.19 (n=16)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
f. Desire to continue traditional farming practices/methods						
2016 (n=19)	7	7	3	2	0	2.00 (n=19)
2014 (n=18)	11	3	2	1	1	1.59 (n=17)
g. Disapproval from others						
2016 (n=19)	16	1	1	0	1	1.17 (n=18)
2014 (n=18)	17	0	1	0	0	1.11 (n=18)
h. Hard to use with my farming system						
2016 (n=19)	7	5	3	2	2	2.00 (n=17)
2014 (n=17)	7	5	3	1	2	1.80 (n=15)
i. Lack of equipment						
2016 (n=19)	5	6	3	4	1	2.33 (n=18)
2014 (n=17)	7	5	3	1	1	1.88 (n=16)

Grassed Waterways

7. Please select the option that best describes your experience with grassed waterways.

2016 (n=24)	2014 (n=24)	
1	2	Not relevant
0	0	Never heard of it and not willing to try it
0	0	Never heard of it, but might be willing to try it
0	0	Heard of it and not willing to try it
1	2	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
1	2	Used it in the past and might be willing to try it again
21	19	Currently use it

8. What percentage of your waterways are grassed waterways?

2016 (n=20)	2014 (n=19)	
0	1	0-25%
1	1	26-50%
6	3	51-75%
13	13	76-100%

9. How much do the following factors limit your ability to implement grassed waterways?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=20)	15	1	2	1	1	1.42 (n=19)
2014 (n=19)	15	2	0	1	1	1.28 (n=18)
b. Time required**						
2016 (n=20)	8	5	6	0	1	1.89 (n=19)
2014 (n=19)	9	6	3	0	1	1.67 (n=18)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
c. Cost						
2016 (n=19)	5	2	10	1	1	2.39 (n=18)
2014 (n=19)	8	4	4	2	1	2.00 (n=18)
d. The features of my property make it difficult						
2016 (n=19)	13	2	2	0	2	1.29 (n=17)
2014 (n=18)	13	3	1	0	1	1.56 (n=17)
e. Insufficient proof of water quality benefit						
2016 (n=18)	15	0	1	0	2	1.13 (n=16)
2014 (n=19)	14	0	2	0	3	1.25 (n=16)
f. Desire to continue traditional farming practices/methods						
2016 (n=19)	14	3	1	1	0	1.42 (n=18)
2014 (n=17)	15	2	0	0	2	1.12 (n=17)
g. Disapproval from others						
2016 (n=18)	17	1	0	0	0	1.06 (n=18)
2014 (n=19)	17	0	0	0	2	1.00 (n=17)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
h. Hard to use with my farming system						
2016 (n=19)	14	3	1	0	1	1.28 (n=18)
2014 (n=19)	14	2	1	0	2	1.24 (n=17)
i. Lack of equipment						
2016 (n=20)	10	5	3	1	1	1.74 (n=19)
2014 (n=19)	13	4	1	0	1	1.33 (n=18)

Denitrifying Bioreactors

10. Please select the option that best describes your experience with denitrifying bioreactors.

2016 (n=24)	**2014 (n=21)**	
5	2	Not relevant
2	3	Never heard of it and not willing to try it
8	8	Never heard of it, but might be willing to try it
1	1	Heard of it and not willing to try it
8	7	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
0	0	Used it in the past and might be willing to try it again
0	0	Currently use it

11. What percentage of your cropland is drained by denitrifying bioreactors?

2016 (n=0)	**2014 (n=0)**	
0	0	0-25%
0	0	26-50%
0	0	51-75%
0	0	76-100%

12. How much do the following factors limit your ability to implement denitrifying bioreactors?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=7)	1	2	2	1	1	2.50 (n=6)
2014 (n=7)	0	2	2	2	1	3.00 (n=6)
b. Time required						
2016 (n=7)	1	0	4	0	2	2.60 (n=5)
2014 (n=7)	0	2	2	1	2	2.80 (n=5)
c. Cost						
2016 (n=7)	0	0	3	2	2	3.40 (n=5)
2014 (n=8)	0	0	4	2	2	3.33 (n=6)
d. The features of my property make it difficult						
2016 (n=7)	0	1	4	0	2	2.80 (n=5)
2014 (n=8)	0	1	2	3	2	3.33 (n=6)
e. Insufficient proof of water quality benefit						
2016 (n=8)	3	1	2	0	2	1.83 (n=6)
2014 (n=7)	0	3	1	0	3	2.25 (n=4)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
f. Desire to continue traditional farming practices/methods						
2016 (n=7)	3	3	0	0	1	1.50 (n=6)
2014 (n=7)	2	2	0	1	2	2.00 (n=5)
g. Disapproval from others						
2016 (n=7)	5	1	0	0	1	1.17 (n=6)
2014 (n=7)	4	0	0	1	2	1.60 (n=5)
h. Hard to use with my farming system						
2016 (n=7)	2	2	1	0	2	1.80 (n=5)
2014 (n=7)	1	2	1	0	3	2.00 (n=4)
i. Lack of equipment						
2016 (n=8)	2	0	3	1	2	2.50 (n=6)
2014 (n=7)	1	2	2	0	2	2.20 (n=5)

Saturated Buffers

13. Please select the option that best describes your experience with saturated buffers.

2016 (n=23)	2014 (n=22)	
7	2	Not relevant
1	3	Never heard of it and not willing to try it
11	11	Never heard of it, but might be willing to try it
0	1	Heard of it and not willing to try it
4	3	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
0	0	Used it in the past and might be willing to try it again
0	2	Currently use it

14. What percentage of your cropland is drained by saturated buffers?

2016 (n=0)	2014 (n=2)	
0	1	0-25%
0	1	26-50%
0	0	51-75%
0	0	76-100%

15. How much do the following factors limit your ability to implement saturated buffers?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=3)	0	3	0	0	0	2.00 (n=3)
2014 (n=6)	2	1	0	1	2	2.00 (n=4)
b. Time required						
2016 (n=2)	0	0	2	0	0	3.00 (n=2)
2014 (n=6)	2	1	0	1	2	2.00 (n=4)
c. Cost						
2016 (n=3)	0	0	1	1	1	3.50 (n=2)
2014 (n=6)	1	1	1	1	2	2.50 (n=4)
d. The features of my property make it difficult						
2016 (n=3)	1	0	1	0	1	2.00 (n=2)
2014 (n=6)	1	0	0	3	2	3.50 (n=4)
e. Insufficient proof of water quality benefit						
2016 (n=3)	2	0	0	0	1	1.00 (n=2)
2014 (n=5)	2	1	0	0	3	1.33 (n=2)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
f. Desire to continue traditional farming practices/methods						
2016 (n=3)	0	3	0	0	0	2.00 (n=3)
2014 (n=6)	2	1	0	1	2	2.00 (n=4)
g. Disapproval from others						
2016 (n=3)	2	1	0	0	0	1.33 (n=3)
2014 (n=6)	3	0	1	0	2	1.50 (n=4)
h. Hard to use with my farming system						
2016 (n=4)	0	2	1	0	1	2.33 (n=3)
2014 (n=6)	0	2	1	1	2	2.75 (n=4)
i. Lack of equipment						
2016 (n=2)	0	1	1	0	0	2.50 (n=2)
2014 (n=6)	1	2	0	1	2	2.25 (n=4)

Two Stage Ditch

16. Please select the option that best describes your experience with two stage ditches.

2016 (n=23)	2014 (n=22)	
6	2	Not relevant
3	4	Never heard of it and not willing to try it
7	9	Never heard of it, but might be willing to try it
2	2	Heard of it and not willing to try it
5	5	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
0	0	Used it in the past and might be willing to try it again
0	0	Currently use it

17. What percentage of your ditches have you installed a two stage ditch?

2016 (n=0)	2014 (n=0)	
0	0	0-25%
0	0	26-50%
0	0	51-75%
0	0	76-100%

18. How much do the following factors limit your ability to implement two stage ditches?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=7)	5	1	1	0	0	2.43 (n=7)
2014 (n=7)	4	1	0	1	1	1.67 (n=6)
b. Time required						
2016 (n=7)	2	3	1	0	1	1.83 (n=6)
2014 (n=7)	0	4	1	1	1	2.50 (n=6)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
c. Cost						
2016 (n=7)	0	0	2	4	1	3.67 (n=6)
2014 (n=7)	0	1	0	5	1	3.67 (n=6)
d. The features of my property make it difficult						
2016 (n=5)	0	2	3	0	0	2.60 (n=5)
2014 (n=7)	1	1	3	1	1	2.67 (n=6)
e. Insufficient proof of water quality benefit						
2016 (n=7)	1	2	2	1	1	2.50 (n=6)
2014 (n=7)	3	1	0	2	1	2.17 (n=6)
f. Desire to continue traditional farming practices/methods						
2016 (n=6)	1	3	1	1	0	2.33 (n=6)
2014 (n=6)	4	1	0	1	1	1.67 (n=6)
g. Disapproval from others						
2016 (n=5)	4	1	0	0	0	1.20 (n=5)
2014 (n=7)	5	0	0	1	1	1.50 (n=7)
h. Hard to use with my farming system						
2016 (n=6)	1	2	0	2	1	2.60 (n=5)
2014 (n=7)	2	2	1	1	1	2.17 (n=6)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
i. Lack of equipment						
2016 (n=6)	2	1	1	1	1	2.20 (n=5)
2014 (n=7)	5	0	0	1	1	1.50 (n=6)

Stream Channel Restoration

19. Please select the option that best describes your experience with stream channel restoration.

2016 (n=23)	2014 (n=20)	
11	2	Not relevant
3	3	Never heard of it and not willing to try it
6	9	Never heard of it, but might be willing to try it
0	1	Heard of it and not willing to try it
3	5	Heard of it and might be willing to try it
0	0	Used it in the past and not willing to try it again
0	0	Used it in the past and might be willing to try it again
0	0	Currently use it

20. What percentage of your streams have undergone stream channel restoration?

2016 (n=0)	2014 (n=0)	
0	0	0-25%
0	0	26-50%
0	0	51-75%
0	0	76-100%

21. How much do the following factors limit your ability to implement stream channel restoration?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
a. Don't know how to do it						
2016 (n=3)	0	2	1	0	0	2.33 (n=3)
2014 (n=6)	1	0	2	3	0	3.17 (n=4)
b. Time required						
2016 (n=3)	0	0	2	0	1	3.00 (n=2)
2014 (n=6)	0	1	2	3	0	3.33 (n=6)
c. Cost						
2016 (n=3)	0	0	0	2	1	4.00 (n=2)
2014 (n=6)	0	1	0	3	2	3.50 (n=4)
d. The features of my property make it difficult						
2016 (n=3)	1	0	1	0	1	2.00 (n=2)
2014 (n=6)	1	1	1	2	1	2.80 (n=5)
e. Insufficient proof of water quality benefit						
2016 (n=3)	0	1	1	0	1	2.50 (n=2)
2014 (n=6)	2	1	1	2	0	2.50 (n=6)

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (5)	Mean (Without 5) (n)
f. Desire to continue traditional farming practices/methods						
2016 (n=3)	1	1	1	0	0	2.00 (n=3)
2014 (n=6)	3	0	1	2	0	2.33 (n=6)
g. Disapproval from others						
2016 (n=3)	1	1	0	0	1	1.50 (n=2)
2014 (n=6)	4	0	1	1	0	1.83 (n=6)
h. Hard to use with my farming system						
2016 (n=3)	1	0	0	0	2	1.00 (n=1)
2014 (n=6)	2	2	0	1	1	2.00 (n=5)
i. Lack of equipment						
2016 (n=3)	1	0	0	1	1	2.50 (n=2)
2014 (n=6)	2	1	0	2	1	2.40 (n=5)

V. Conservation Tillage

22. How many of the corn and soybean acres that you manage in the Flowers Creek watershed were no-till, strip-till, or ridge till in [2015 or 2014]?

	Acres		Percentage of Acres	
	2016	**2014**	**2016**	**2014**
Corn	**(n=16)**	**(n=16)**	**(n=16)**	**(n=12)**
Range	0-432	0-650	0-100	0-100
Mean	65.19	63.25	50.94	42.60
Soybeans	**(n=20)**	**(n=15)**	**(n=19)**	**(n=12)**
Range	0-1,200	0-600	0-100	0-100
Mean	236.67	85.73	85.00	42.60

VI. Targeted Conservation

23. Targeted conservation refers to soil and water conservation activities that use techniques such as satellite imagery and geographic information systems (GIS) to identify the areas of the landscape that are most vulnerable so soil erosion of water quality impairment. Targeted conservation approaches are seen by some as a way to improve the efficiency and effectiveness of soil and water conservation activities by focusing resources on areas of the landscape that would provide the most environmental benefit. We are interested in learning about what you think regarding targeted conservation programs.

	Strongly Disagree (1)	Disagree (2)	Neither (3)	Agree (4)	Strongly Agree (5)	Mean (n)
a. Conservation funding should be higher for land that is most vulnerable to soil and water quality problems.						
2016 (n=23)	0	0	4	16	3	3.96 (n=23)
2014 (n=23)	0	0	5	15	3	3.91 (n=23)
b. Targeted conservation is a good idea because limited resources should be spent where they have the most impact.						
2016 (n=23)	0	0	5	13	5	4.00 (n=23)
2014 (n=23)	0	0	3	16	4	4.04 (n=23)
c. Satellite imagery, GIS and other technologies can be valuable tools to help farmers improve their farm's environmental performance.						
2016 (n=23)	0	1	6	12	4	3.83 (n=23)
2014 (n=23)	0	0	7	14	2	3.78 (n=23)
d. If a conservation professional contacted me about a potential natural concern on my land, I would allow them to come assess it.						
2016 (n=23)	1	1	7	12	2	3.57 (n=23)
2014 (n=23)	1	1	9	11	1	3.43 (n=23)

	Strongly Disagree (1)	Disagree (2)	Neither (3)	Agree (4)	Strongly Agree (5)	Mean (n)
e. Targeted conservation programs are needed because current programs are not effective enough.						
2016 (n=23)	0	5	14	3	1	3.00 (n=23)
2014 (n=23)	1	3	15	3	1	3.00 (n=23)
f. Government use of satellite imagery and GIS to map characteristics of private land is an invasion of privacy.						
2016 (n=23)	2	5	8	3	5	3.17 (n=23)
2014 (n=23)	1	3	13	5	1	3.09 (n=23)
g. If a conservation professional contacted me about a potential natural resource concern on my land, I would feel unfairly singled out.						
2016 (n=23)	2	7	12	2	0	2.61 (n=23)
2014 (n=23)	1	5	13	3	1	2.91 (n=23)

VII. Farming Operations

24. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

	Owned		Rented		Total	
	2016 (n=25)	2014 (n=23)	2016 (n=20)	2014 (n=19)	2016 (n=25)	2014 (n=21)
Range	0-3,200	0-1,200	0-2,400	0-1,900	0-5,200	0-2,270
Mean	438.83	311.16	477.94	272.74	792.43	537.37

25. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year that is located within the Flowers Creek watershed.

	Owned		Rented		Total	
	2016 (n=22)	2014 (n=20)	2016 (n=16)	2014 (n=15)	2016 (n=23)	2014 (n=18)
Range	0-705	0-1,200	0-1,250	0-1,000	0-1,600	0-1,370
Mean	179.21	160.70	227.11	130.00	322.07	264.39

26. How many acres of the following did you manage in the Flowers Creek watershed? ***If none, please enter a zero.***

	2016	2014
a. Corn	**(n=23)**	**(n=19)**
Range	0-480	0-800
Mean	106.99	150.84
b. Soybeans	**(n=23)**	**(n=19)**
Range	0-1,200	0-800
Mean	164.35	129.26
c. Small grains	**(n=23)**	**(n=19)**
Range	0-160	0-1,100
Mean	12.61	64.47
d. Canning crops	**(n=23)**	**(n=19)**
Range	0	0
Mean	0.00	0.00
e. Clover/Alfalfa	**(n=23)**	**(n=19)**
Range	0-180	0-40
Mean	8.30	4.21

	2016	2014
f. Pasture	**(n=23)**	**(n=19)**
Range	0-110	0-40
Mean	6.48	6.58
g. Forest/Woodland	**(n=23)**	**(n=19)**
Range	0-220	0-100
Mean	21.30	10.37
h. Conservation set aside/CRP	**(n=23)**	**(n=19)**
Range	0-26	0-15
Mean	1.87	1.26
i. Non-row crops for energy	**(n=23)**	**(n=19)**
Range	0-0	0-0
Mean	0.00	0.00
j. Other	**(n=23)**	**(n=19)**
Range	0-0	0-0
Mean	0.00	0.00

27. Over how many of these acres in the Flowers Creek watershed was manure spread?

	2016 (n=24)	2014 (n=19)
Range	0-610	0-250
Mean	65.17	44.47

28. What percentage of the manure originated inside the Flowers Creek watershed?

	2016 (n=6)	2014 NA
Range	0-100	NA
Mean	83.33	NA

29. How many of the following animals are part of your farming operation? If none, please enter a zero.

	2016	2014
a. Dairy cattle	**(n=7)**	**(n=20)**
Range	0-1,000	0-100
Mean	171.43	5.85
b. Beef cattle	**(n=7)**	**(n=20)**
Range	0-120	0-130
Mean	27.71	10.50
c. Hogs	**(n=7)**	**(n=20)**
Range	0-4,000	0-8,000
Mean	1,150.00	1,000.00
d. Poultry	**(n=7)**	**(n=20)**
Range	0-11	0
Mean	1.57	0.00
e. Other	**(n=0)**	**(n=20)**
Range	0-0	0-6
Mean	0.00	0.30

30. How many years have you been farming?

	2016 (n=22)	2014 (n=20)
Range	10-66	4-55
Mean	33.45	31.35

31. Does the property you manage touch a stream, river, lake, or wetland?

	2016 (n=23)	2014 (n=22)
No	5	4
Yes	18	18

32. Do you plan to improve your drainage within the next 10 years?

	2016 (n=23)	2014 (n=22)
No	5	8
Yes	18	14

33. If yes, how do you plan to finance it?

See Appendix I

34. Five years from now, which statement will best describe your farm operation?

2016 (n=24)	2014 (n=22)	
12	10	It will be about the same size as it is today
6	6	It will be larger
1	0	It will be smaller
5	6	I don't know

VIII. About You

35. What is your gender?

2016 (n=25)	2014 (n=24)	
23	23	Male
2	1	Female

36. What is your age?

	2016 (n=25)	2014 (n=24)
Range	28-89	26-87
Mean	57.64	55.96

37. What is the highest level of school you completed?

2016 (n=25)	2014 (n=24)	
0	0	Some formal schooling
12	9	High school diploma / GED
2	4	Some college
4	4	2 year college degree
4	5	4 year college degree
2	2	Post-graduate degree

38. In the last year, how many days did you work at least 4 hours off-farm? (Include work on someone else's farm for pay) (n=36)

2016 (n=25)	2014 (n=21)	
14	8	None
4	3	1-49 days
1	3	50-99 days
0	3	100-199 days
6	6	200 days or more

Appendix I: "Other" Responses to Survey Questions

Q33. (Farming Operations) If yes [improving drainage within next 10 years], how do you plan to finance it?

2016 (n=17)	**2014 (n=12)**
Cash (n=4)	Cash (n=2)
Myself (n=1)	Cash flow (n=2)
Myself like always (n=1)	It will have to fit into the cash flow from profits of row crop farming (n=1)
NRCS (n=1)	No (n=1)
On my own (n=1)	Not sure-hopefully Ag Production (n=1)
Operations (n=1)	Pay as I go (n=1)
Out of pocket (n=1)	Self (n=4)
Pay as I can afford (n=1)	
Pay as I go (n=1)	
Pay cash (n=1)	
Row crop profits (n=1)	
Self (n=2)	
Well, by 'improve', I intend to restore (n=1)	

Q39. (Farming Operations) How many of the following animals are part of your farming operation? If none, please enter a zero.

6 [type of livestock not listed]

Appendix II: Significant Differences from Paired T-Tests

2. The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

	Mean	N	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
i. Littering/illegal dumping of trash	-0.316	19	0.582	0.134	-2.364	18	0.030

9. How much do the following factors limit your ability to implement grassed waterways?

	Mean	N	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
b. Time required	-0.438	16	0.727	0.182	2.406	15	0.029

18. How much do the following factors limit your ability to implement two stage ditches?

	Mean	N	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
f. Desire to continue traditional farming practices/methods	1.250	4	0.500	0.250	5.000	3	0.015