YOUR AGRICULTURE– YOUR WATER – YOUR FUTURE

EXECUTIVE SUMMARY REPORT

Findings From An Agricultural Survey to Assess Practices for our Water Future

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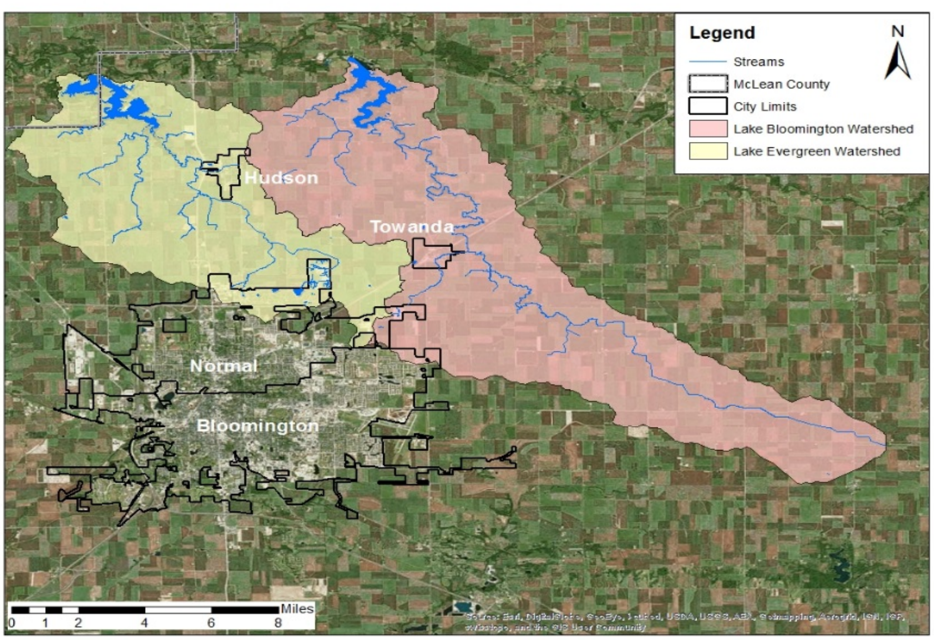
This survey of Lake Bloomington and Evergreen Lake agricultural landowners was conducted by the McLean County Soil and Water Conservation District, in partnership with The Nature Conservancy and Illinois State University, with funding from the Walton Family Foundation.

Introduction

Lake Bloomington and Evergreen Lake serve as drinking water reservoirs for nearly 80,000 residents of the City of Bloomington, Towanda, Hudson, and Bloomington Township. The watersheds draining to these reservoirs are predominantly agricultural, and at certain times of the year, farmland in the watershed contributes high levels of nitrates to these reservoirs. High nitrate levels can increase the cost associated with providing clean, safe drinking water. Runoff also carries sediment, which can reduce the water storage capacity of the reservoirs, and phosphorus, which can fuel summer algal blooms.

This study was conducted by the McLean County Soil and Water Conservation District, in partnership with The Nature Conservancy and Illinois State University, with funding from the Walton Family Foundation. These and other partners from the City of Bloomington and the U.S. Department of Agriculture (USDA) are working in the Lake Bloomington and Evergreen Lake watersheds to promote and implement management practices that can improve water quality. This survey of the farm community of Lake Bloomington and Evergreen Lake watersheds was conducted to meet the following objectives:

- Demonstrate current efforts by local producers and landowners to reduce nutrient losses from farmland.
- Identify management strategies and conservation programs that are of greatest interest to area producers and landowners.
- Understand perceived barriers to implementing new management strategies and to participating in conservation programs.
- Develop new outreach approaches, technical assistance and tools to catalyze voluntary implementation of practical and effective conservation strategies.

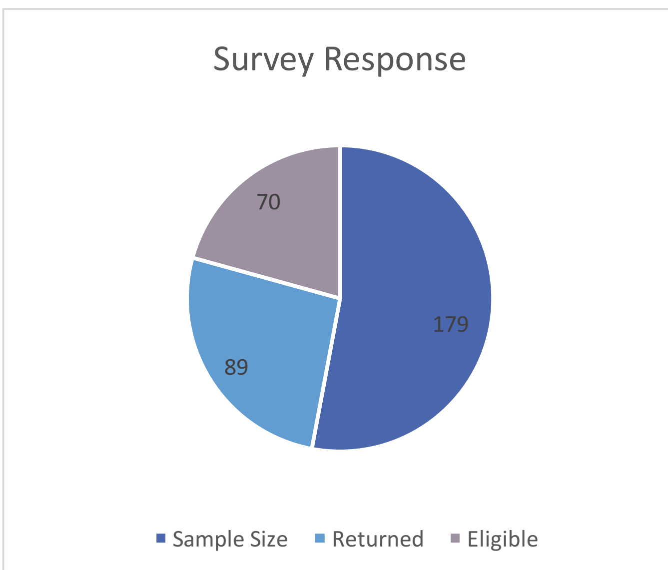


Research Methods

A self-administered questionnaire survey was administered to a full census of landowners in the Lake Bloomington and Evergreen Lake watersheds. A total of 179 landowners were identified by the McLean County Soil and Water Conservation District, which provided the full mailing addresses for each landowner. Of the 179 surveys mailed out, 89 surveys were returned, resulting in a response rate of 50%. Of the 89 completed surveys, 19 respondents indicated that they do not own land in the watershed, and therefore they did not complete the remainder of the survey. This resulted in 39% of respondents completing the entire survey, based on the criteria of owning land in the watershed (Figure 1).

The survey was administered using a modified version of the Tailored Design Method (Dillman 2009) that employed many techniques intended to enhance response rates including customizing letters, using multiple waves of contacts with carefully timed reminders, and providing clear information about the need for responses and how they will be used. First, respondents received a package that included a letter informing them about the project, the survey questionnaire, and a postage-paid response envelope. The second and third contact consisted of a postcard mailed at two week intervals as a reminder to complete and mail in the questionnaire. A final contact, which contained a letter reiterating the importance of responses as well as a replacement questionnaire and return envelope, was sent two to three weeks after the reminder postcard. We also employed two incentives with the survey. An initial incentive of a $10 gift card to Farm and Fleet was included with every first mailing, and we noted the inclusion in a drawing for a $100 gift card for those that returned the survey by a certain date.

Figure 1: Overview of Survey Responses

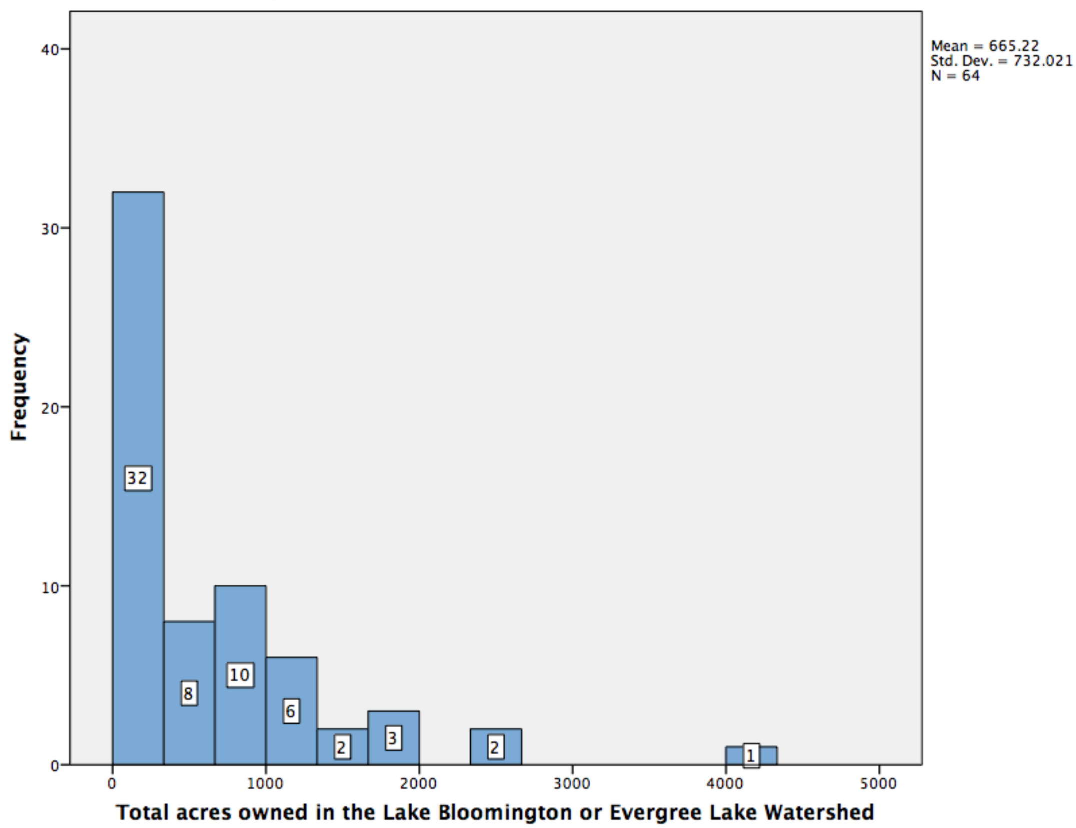


Results

Demographics

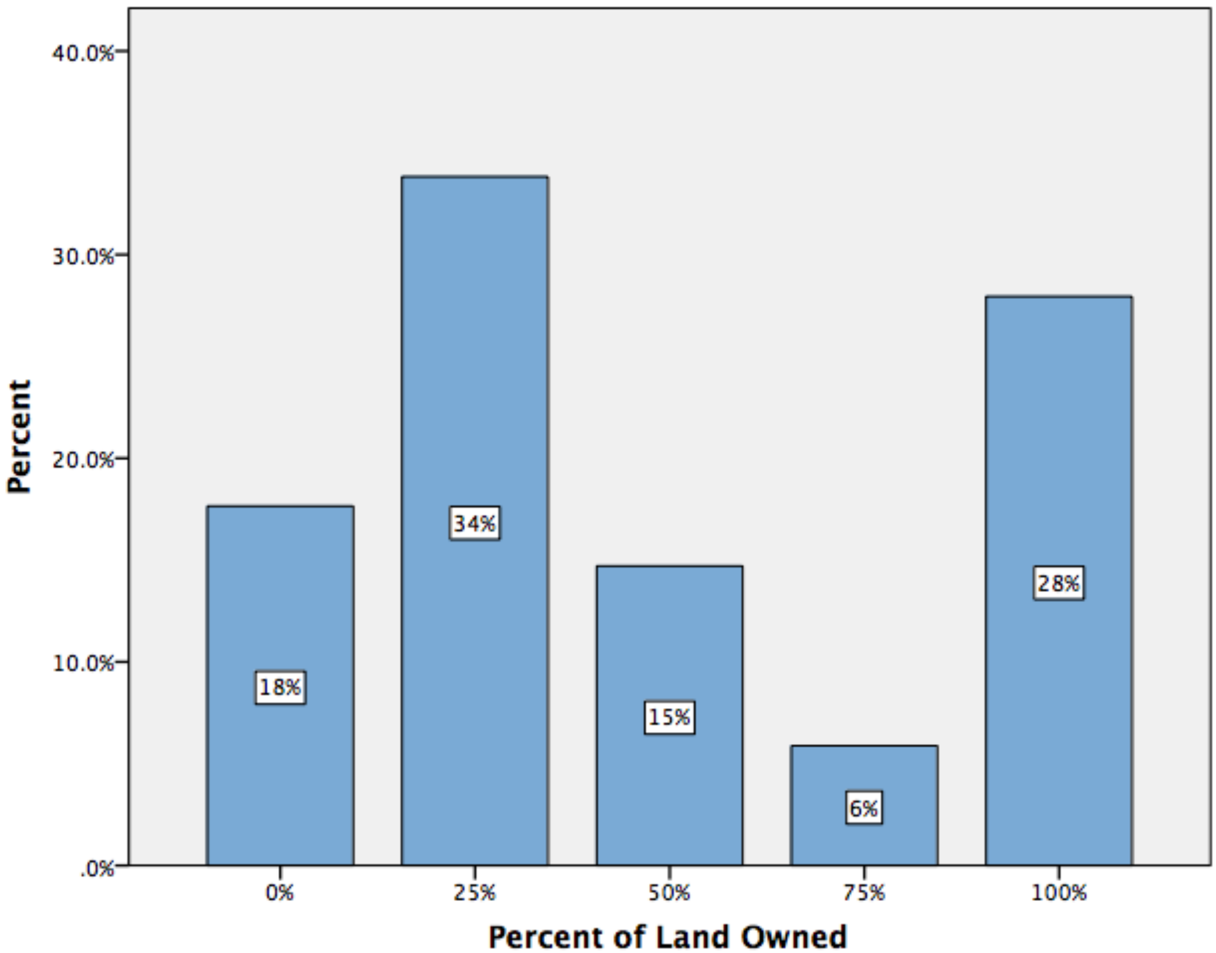
The age of respondents ranged from 26 to 91 years, with a mean age of 62, and 91% of respondents were male. For all 89 respondents, 78% indicated that they owned land in the watershed (and therefore completed the full survey), while 22% indicated that they did not own land in the watershed, and therefore did not complete the remainder of the survey (Figure 1). Figure 2 illustrates that the majority of landowners own and/or farm less than 1,000 acres, with a mean acreage of 665 acres per respondent.

Figure 2: Total Acreas Owned and/or Farmed



Of those who responded, 28% indicated that they owned 100% of the land that they farmed and 49% of respondents indicated that they owned 50% or more of the land that they farmed. In comparison, 27% indicated that they did not rent any of the land they farmed, while 22% indicated that they rented 50% or less of the land that they farmed (Figures 3,4).

Figure 3: Percent of Total Acreage Owned



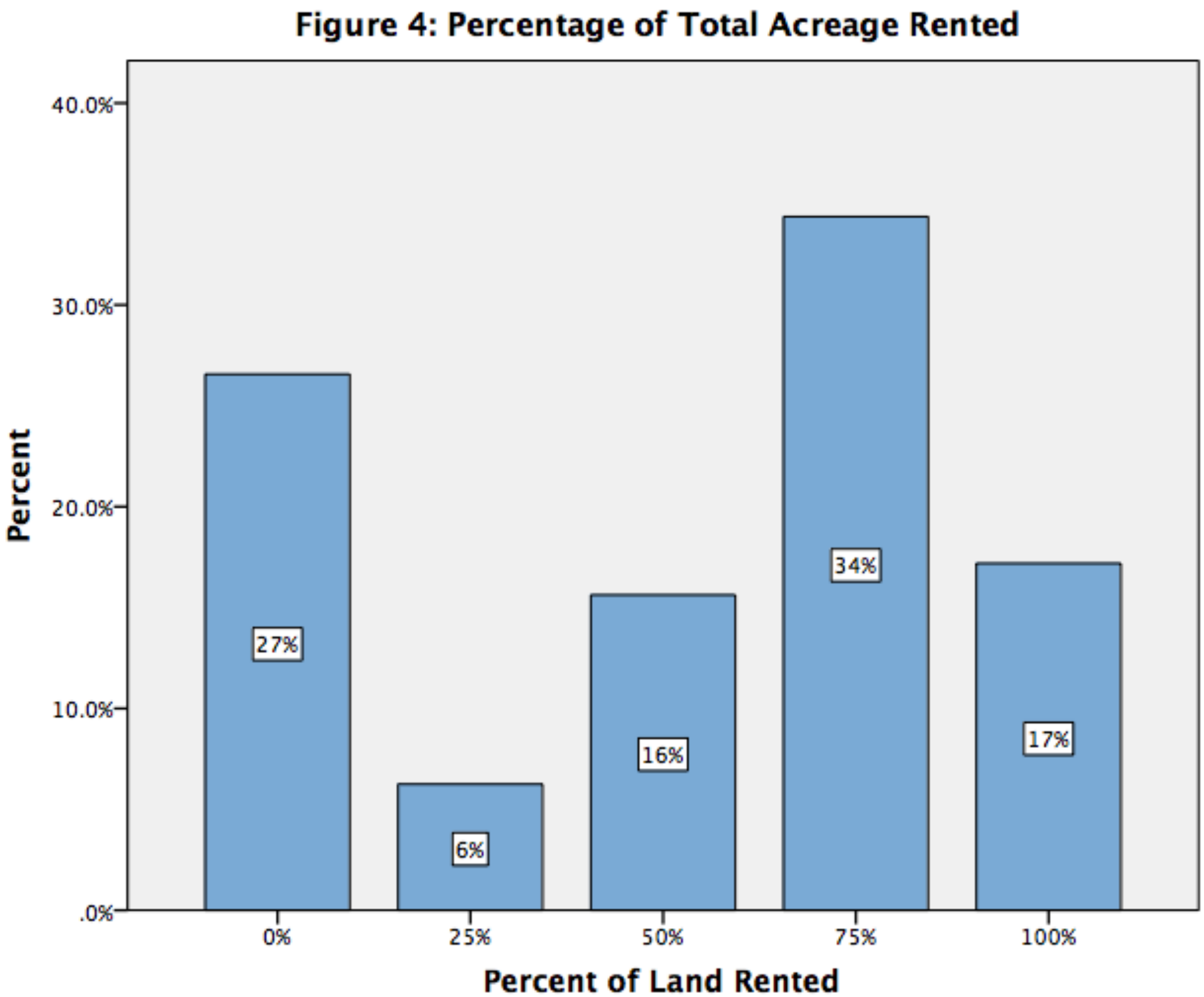


Figure 5 shows that of those respondents who own land in the watershed, 70% are responsible for both production and conservation decisions, while 21% are responsible for only production decisions and 7% are responsible for only conservation decisions. It is encouraging to see that a large majority of landowners in the watershed still maintain both production and conservation decision-making power, which will improve the effectiveness of outreach efforts in terms of adoption for Best Management Practices (BMPs) among landowners.

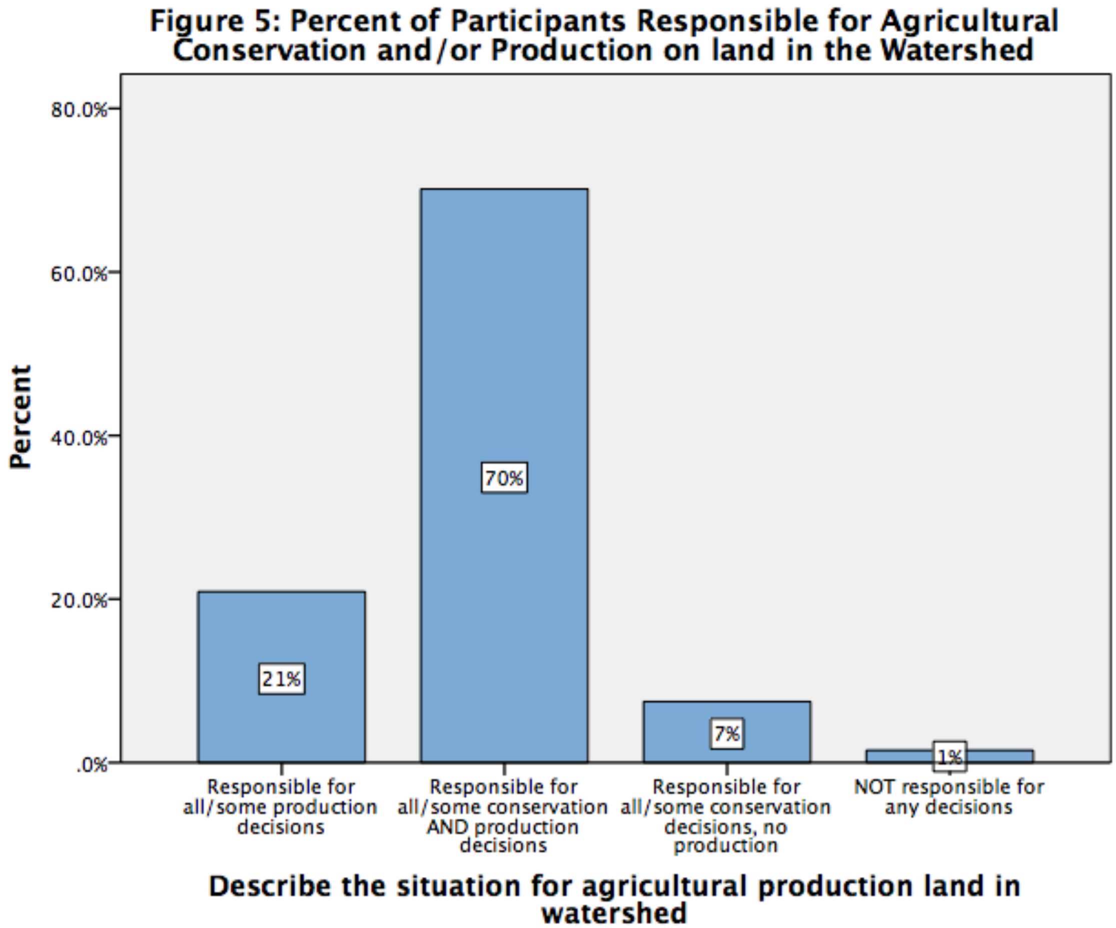


Figure 5: Percent of Participants Responsible for Agricultural Conservation and/or Production on land in the Watershed
Percent
80.0%
60.0%
40.0%
20.0%
.0%
21%
70%
7%
1%
Responsible for all/some production decisions
Responsible for all/some conservation AND production decisions
Responsible for all/some conservation decisions, no production
NOT responsible for any decisions
Describe the situation for agricultural production land in watershed

Production Results

The next set of variables pertain to land management and production practices, focusing on the percentage of land that uses conservation tillage, fall tillage, tile drainage, and drainage water management. Table 1 summarizes an overview of use for these practices. Nearly all respondents (97%) indicated some portion of their land is tile-drained, and 53% of respondents indicated that they use this tool on 100% of their total acreage. The second most widely used practice is conservation tillage, which is used on some percentage of land by 95% of respondents. A total of 69% of respondents reported using conservation tillage on 100% of their total acreage. Fall tillage is used by 79% of respondents, with the largest majority (42%) using this on 50% of their total acreage. The least employed conservation practice is drainage water management, with only 56% of respondents indicating that they use this tool on any of their acreage. However, of those who do use this tool, 35% of respondents indicated that they use it on 100% of their acreage. It is important to note that the research team feels that the term "drainage water management" may have been misunderstood by respondents and therefore the data may not be reliable for this variable. The Natural Resources Conservation Service and the Soil and Water Conservation District report no knowledge of these practices in the watershed.

Table 1: Percentage of Conservation Practice in Use by Percentage of Land

Practice	**Percentage of all land under practice**				
	0%	**25%**	**50%**	**75%**	**100%**
Conservation tillage (at least 30% of the residue from the previous crop)	5%	3%	15%	8%	69%
Fall tillage	21%	9%	42%	7%	21%
Tile drainage	3%	7%	10%	21%	53%
Drainage water management	44%	15%	2%	4%	35%

Respondents were asked whether or not they have strip-tilled or no-tilled in the past two years on the most common crops, corn and soybeans (Table 2). For corn, 37% of respondents indicated that they have either strip or no-tilled corn in the past two years. Of those respondents, 54% have employed no-till and 46% have employed strip-till practices.

Table 2: Percentage Use of Strip-Till and No-Till Practices in Past Two Years

Corn:	63% No	37% Yes		
			46% **strip-till**	54% **no-till**
Soybeans:	41% No	59% Yes		
			10% **strip-till**	90% **no-till**

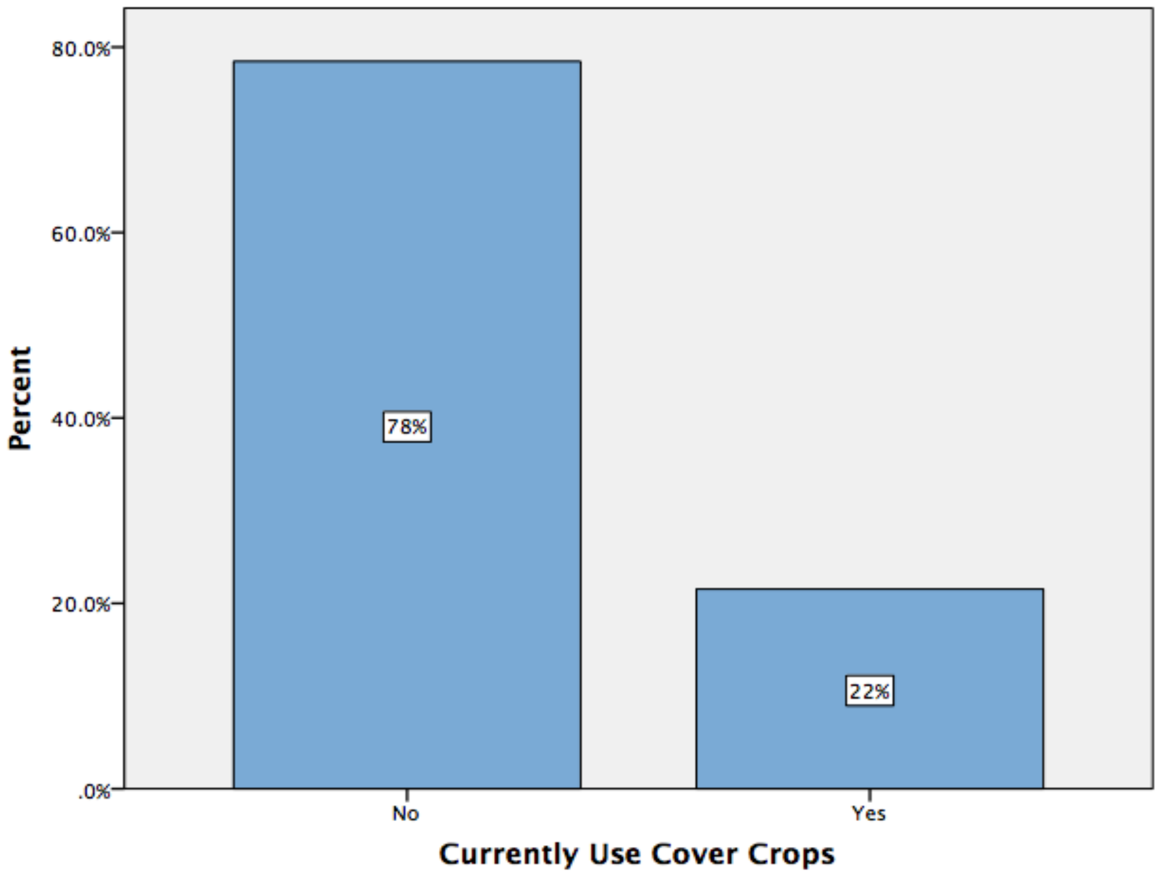
Cover Crops

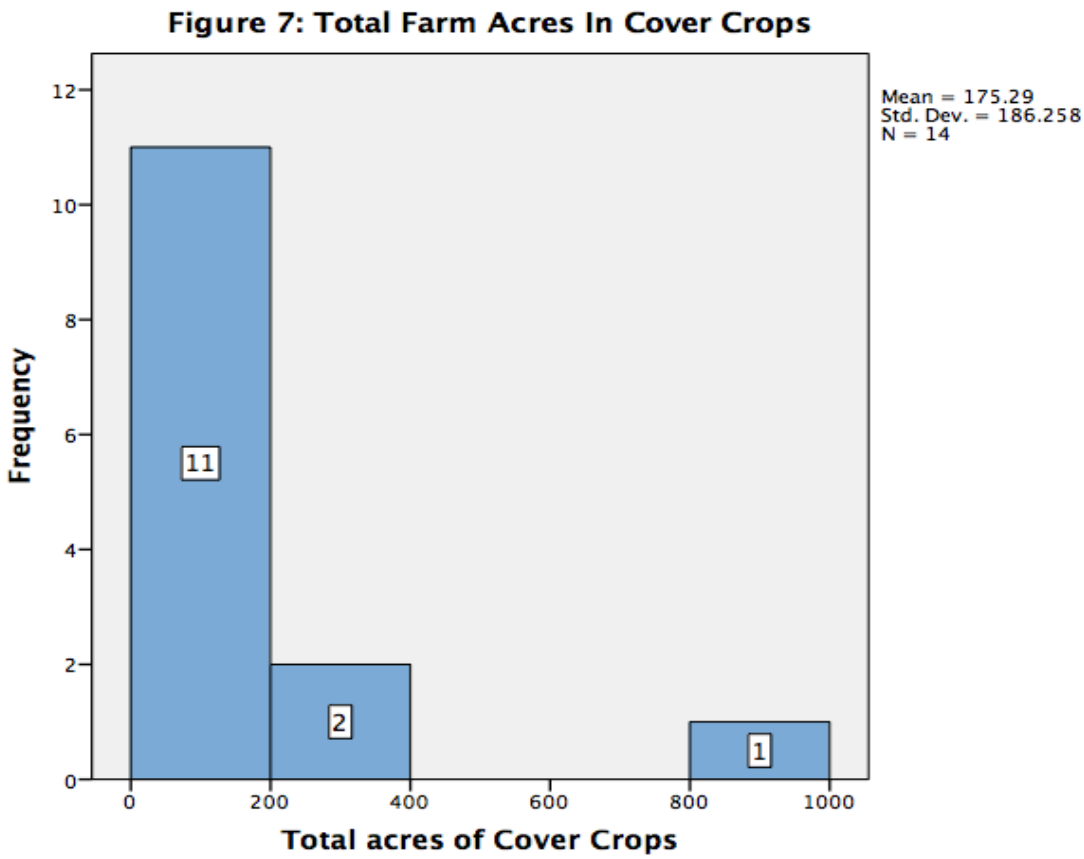
The survey also investigated the use of cover crops in the two watersheds. This is not a widely used practice among respondents, with only 22% of respondents indicating that they currently use cover crops (Figure 6). Among those producers who use this practice, the majority use cover crops on less than 200 acres, with the mean acreage in cover crops at 175 acres (Figure 7). The most commonly used cover crop is oilseed or tillage radish with oats (53% planted in the last year) followed by cereal ryegrass (40% planted in the last year), annual ryegrass (20% planted in the last year) and then crimson clover (7% planted in the last year) (Table 3).

Table 3: Percentage of Cover Crop Types Planted in 2016

Cover Crop	**Percentage Planted in the Past Year**
Oilseed or Tillage Radish with Oats	53%
Cereal Ryegrass	40%
Annual Ryegrass	20%
Crimson Clover	7%
Other	13%

Figure 6: Percent of Respondents Using Cover Crops

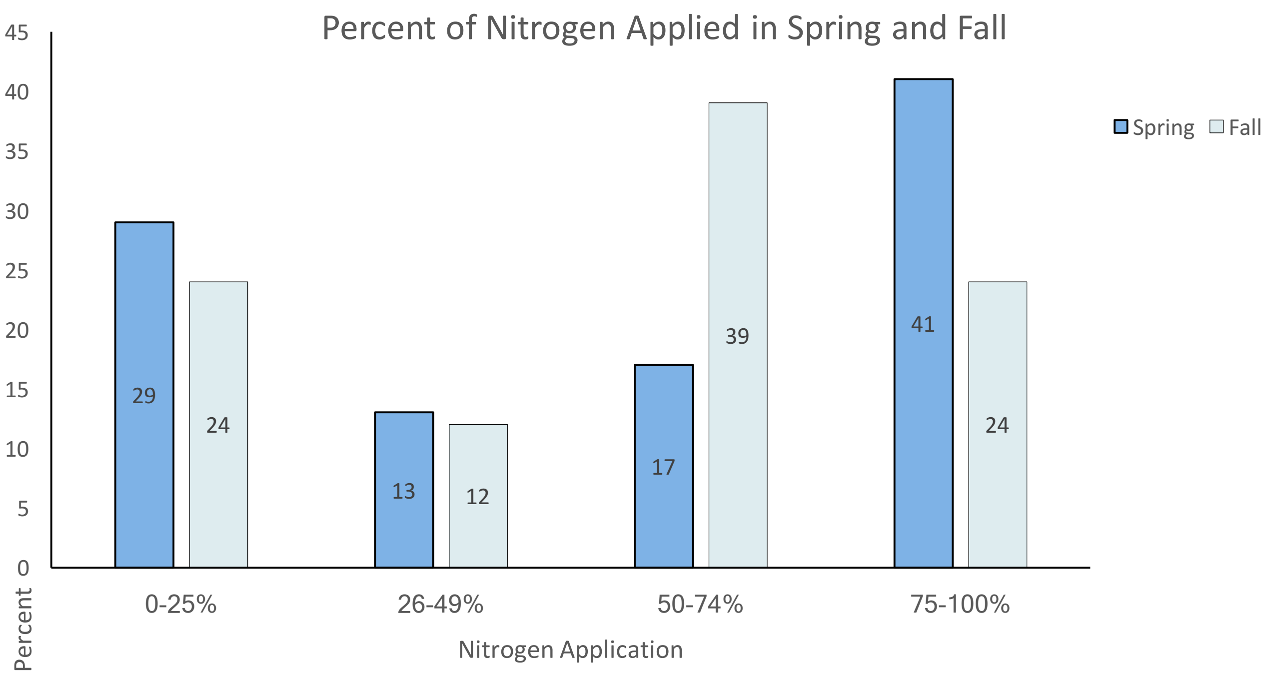




Nitrogen Application

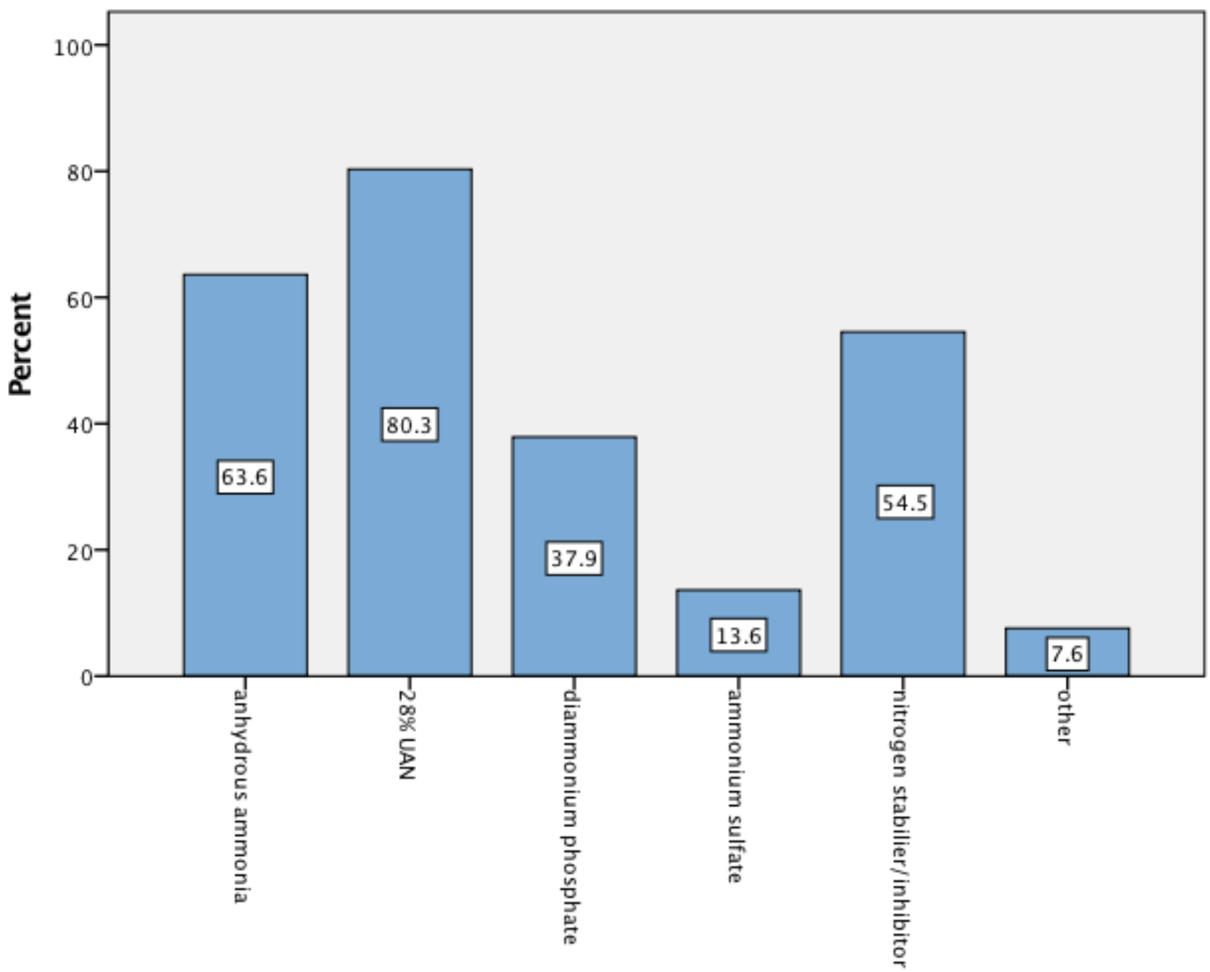
The timing of nitrogen application appears to be somewhat variable between spring and fall. However, spring application appears to have a slight advantage, with 41% of respondents indicating that they apply 75-100% of their nitrogen in the spring. For fall application, only 24% of respondents indicated that they apply 75-100% of their nitrogen in the fall. The more common practice is for producers to split their fertilizer applications by applying 50-74% of their nitrogen in the fall and the remainder in the spring (Figure 8). Overall, it appears that the use of spring nitrogen application is increasing among respondents compared to fall application. Finally, 62% of respondents also indicated that they side-dress at least some of their nitrogen.

Figure 8: Percent Nitrogen Applied in Spring and Fall



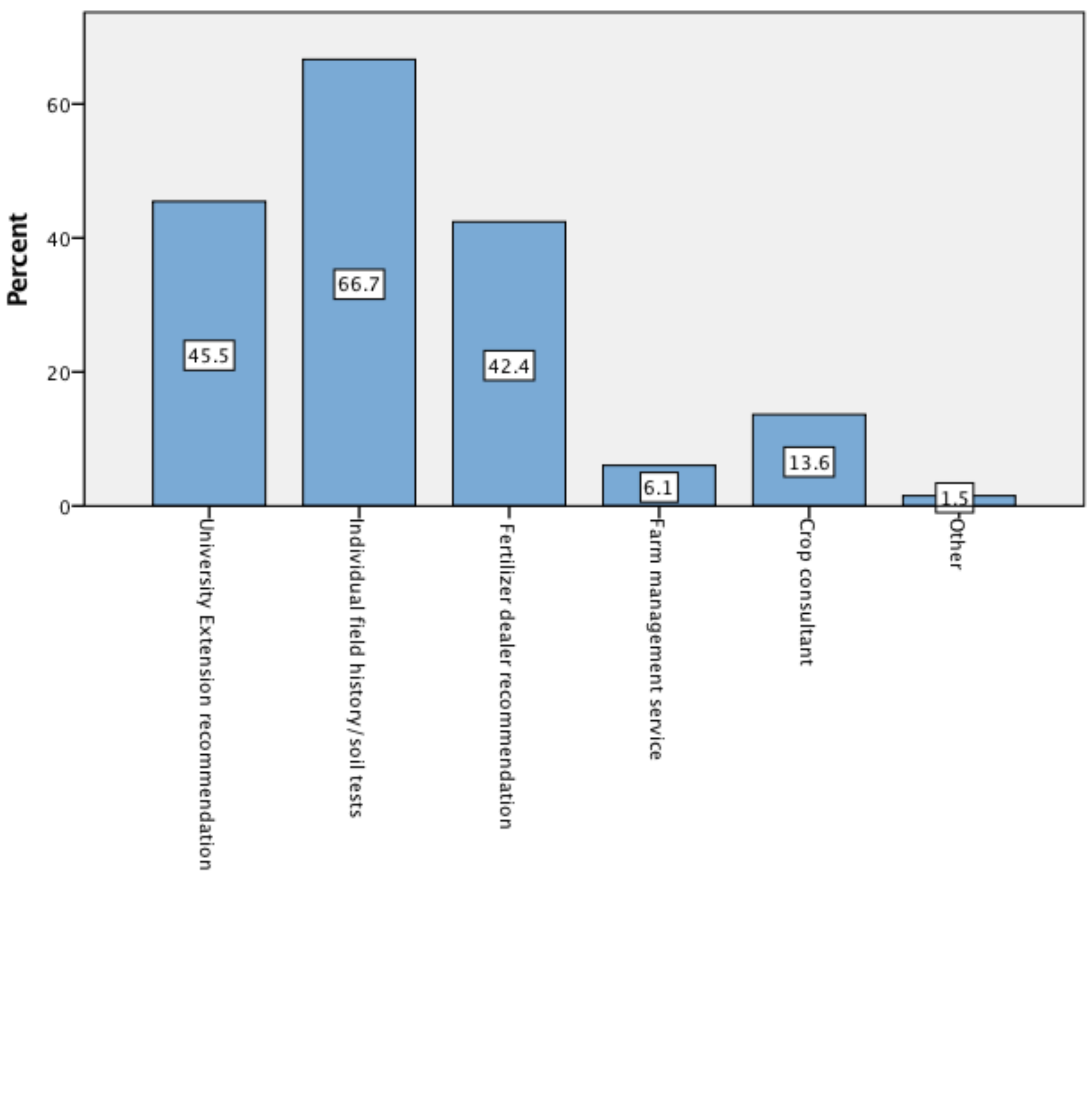
When respondents were asked to indicate which forms of nitrogen they use, 20% UAN 28-0-0 was the most commonly used (80%) followed by Anhydrous Ammonia 82-0-0 (64%). A total of 55% of the respondents reported using Nitrogen Stabilizer/Inhibitor (55%) (Figure 9).

Figure 9: Forms of Nitrogen by Percentage of Use



When respondents were asked how they determined nitrogen application rates, the majority of respondents indicated that they use individual field history and soil tests (67%), followed by University or Extension recommendations (45%) and fertilizer dealer recommendations (42%). Crop consultants (14%) and farm management services (6%) were not commonly used among respondents, and 2% of respondents indicated they used “other” means to determine application rates (Figure 10).

Figure 10: Resources for Determining Fertilizer Application Rates



Conservation Program Results

Respondents were asked to indicate how much of their current acreage is under common conservation practices. Grass waterways are the most commonly used practice measured by percent of land (Table 4), with 49% of respondents indicating that grass waterways are used to intercept or convey surface flow from 50% or more of their land. The least commonly used practice is saturated buffers, which are NOT used on any acreage by 98% of respondents, followed by constructed wetlands which again are NOT used to treat nutrient runoff for any farm acres by 91% of respondents.

Table 4: Percentage of Conservation Practices by Percentage of Land

Practice	**Percentage of all land under practice**				
	0%	**25%**	**50%**	**75%**	**100%**
Grass waterway	19%	32%	10%	10%	29%
Filter strip	57%	29%	4%	2%	8%
Saturated buffer	98%	0%	0%	2%	0%
Constructed wetland	91%	7%	0%	0%	2%
Other_______________________	0%	25%	0%	0%	0%

Respondents were asked about their level of familiarity with various conservation programs. Results showed that respondents were most familiar with the Conservation Reserve Program (CRP) with a mean score of 3.85 on a scale of 1= not at all familiar to 5= very familiar (Figure 11). Familiarity scores for the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP) averaged 2.52. Respondents were least familiar with the Wetland Reserve Program (WRP) program, with a mean score of 2.09. Similarly, CRP had the highest level of participation, with 59% of respondents indicating that they had participated in the program in the past 2 years. This was followed by CSP, with 24% of respondents indicting that they had participated in the program during the past 2 years (see Table 5). Finally, 54% of respondents indicated that they currently own land that is enrolled in CRP, with a mean acreage of 17.83 per respondent currently in the program (Figures 12,13).

Figure 11: Mean of Level of Familiarity with Conservation Programs

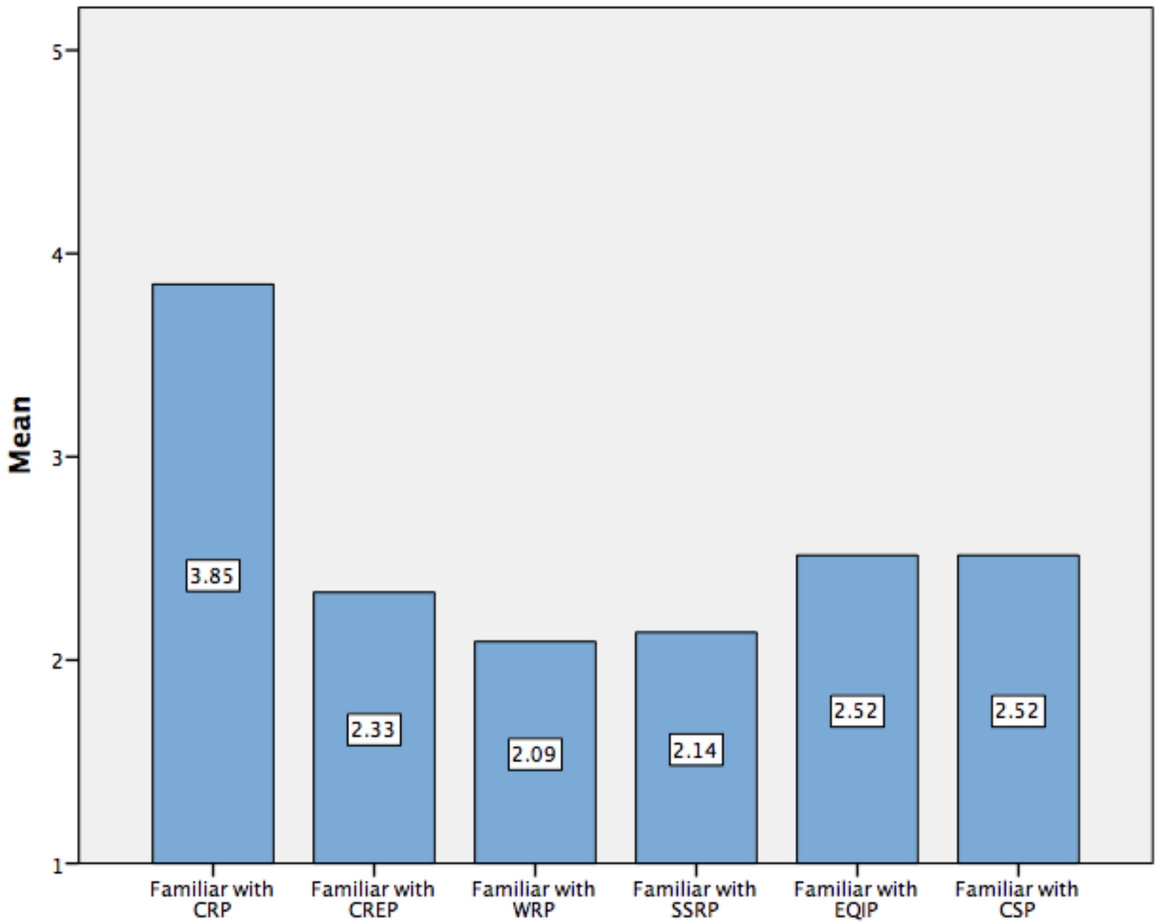


Table 5: Percent that Participated Conservation Programs in the Last Two Years

	Yes	No
a) Conservation Reserve Program (CRP)	57%	43%
b) Conservation Reserve Enhancement Program (CREP)	9%	91%
c) Wetland Reserve Program (WRP)	5%	95%
d) Streambank Stabilization Restoration Program (SSRP)	3%	97%
e) Environmental Quality Incentives Program (EQIP)	12%	88%
f) Conservation Stewardship Program (CSP)	24%	76%

Figure 12: Percent of Participants that Currently Own Land Enrolled in the Conservation Reserve Program (CRP)

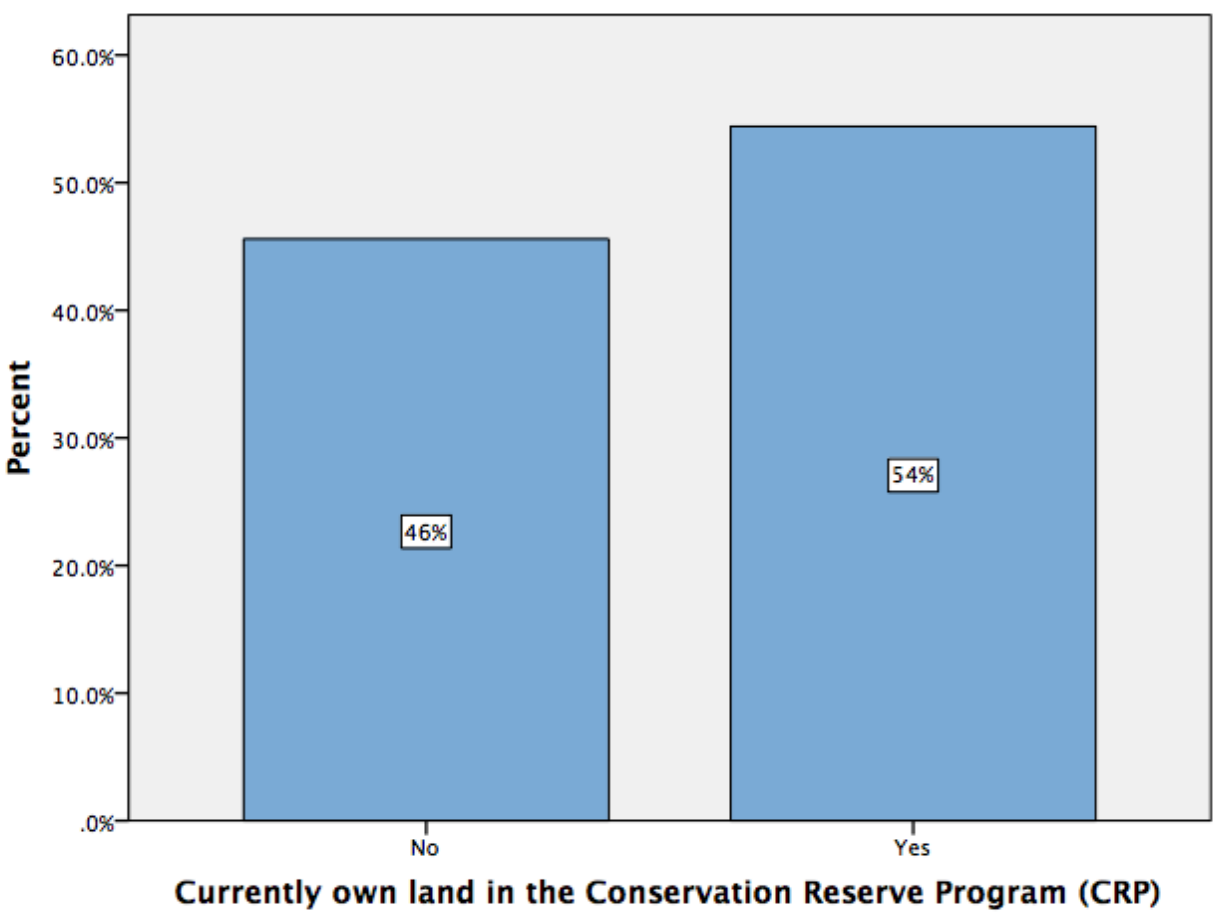
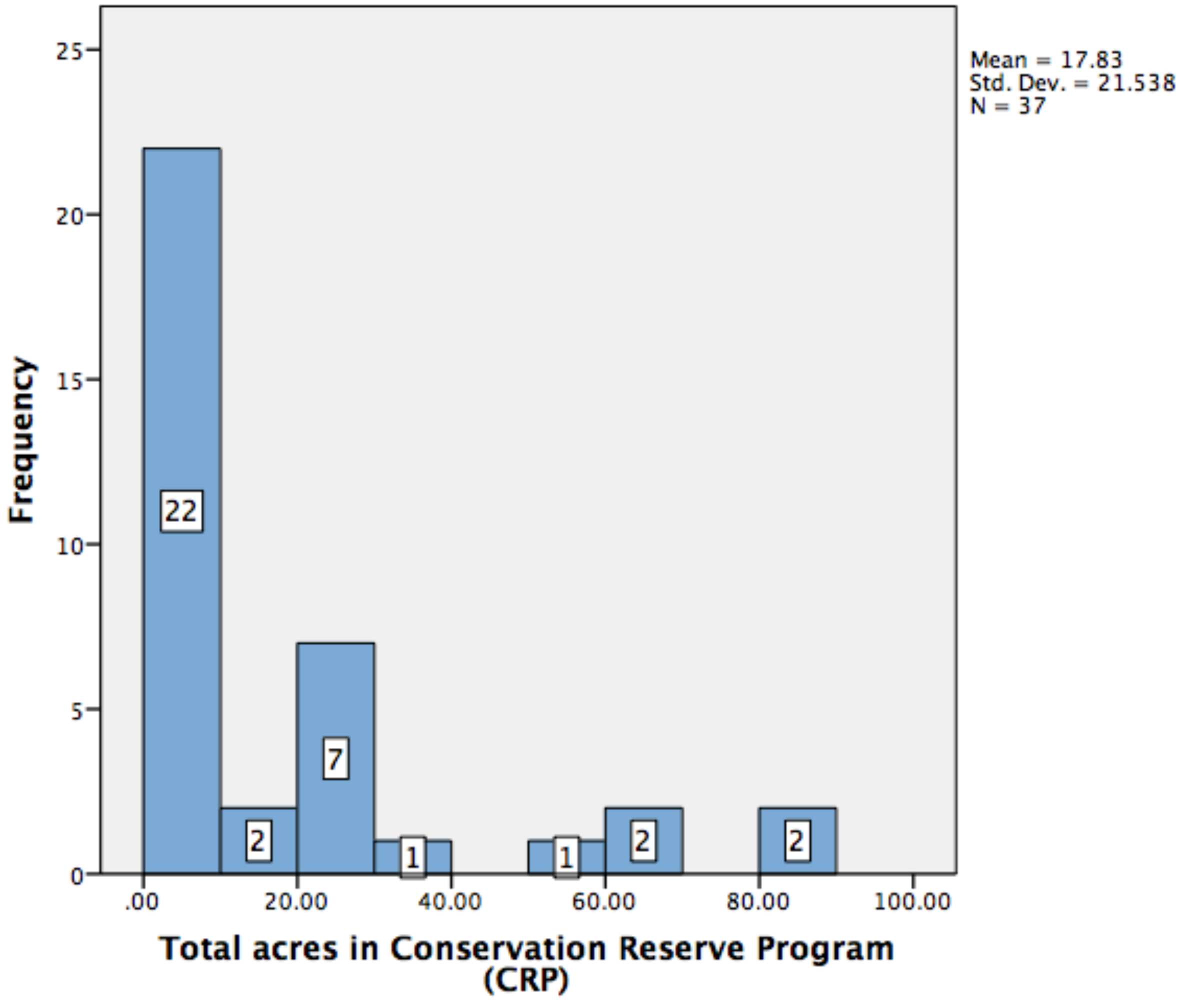


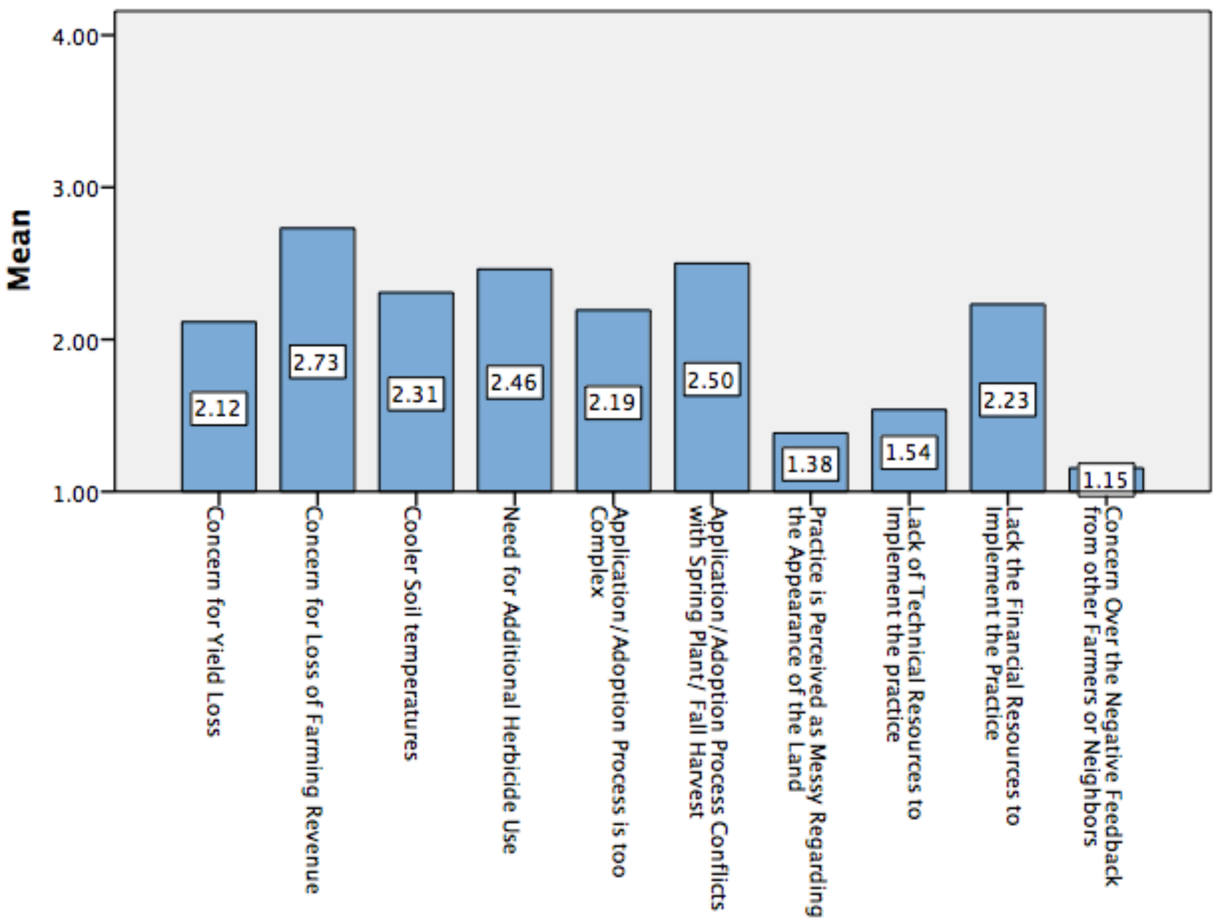
Figure 13: Total Number of Acres in the Conservation Reserve Program per Participant in the Program



Barriers to Adoption of Best Management Practices (BMPs)

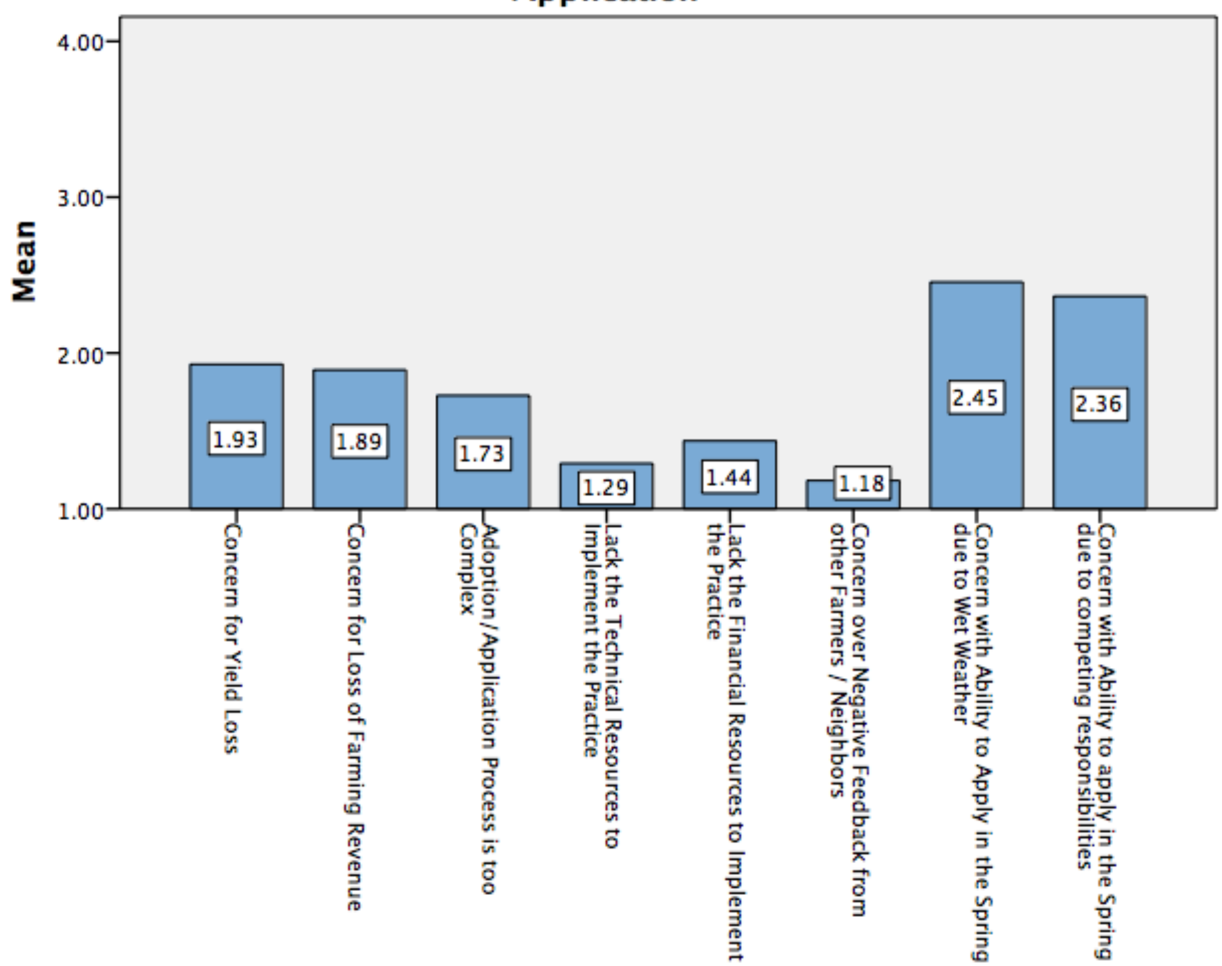
Respondents were asked to rate potential obstacles to the adoption of cover crops, reducing fall nitrogen application, and installing constructed wetlands as “not at all a problem” (1) to a “severe problem” (4). The biggest obstacles for winter cover crops were related to economics. Concern for loss of farming revenue had a mean score of 2.73, followed by timing of the application process conflicting with spring plant or fall harvest (2.50), and the need for additional herbicide (2.45). The least important barrier was a concern with negative feedback from neighbors or other farmers, with a mean score of 1.15 (Figure 14).

Figure 14: Mean Scores for Potential Obstacles Related to Adopting Winter Cover Crops



When asked about the barriers to reducing fall nitrogen application, there was a greater concern for the logistics and environmental conditions rather than just the economics. Concern for ability to apply in the spring due to wet weather was the largest obstacle (2.45), followed closely by a concern with the ability to apply nitrogen in the spring due to competing responsibilities (2.36). As with adoption of cover crops, concern over negative feedback from other farmers and neighbors was seen as the least problematic, with a mean score of 1.16 (Figure 15).

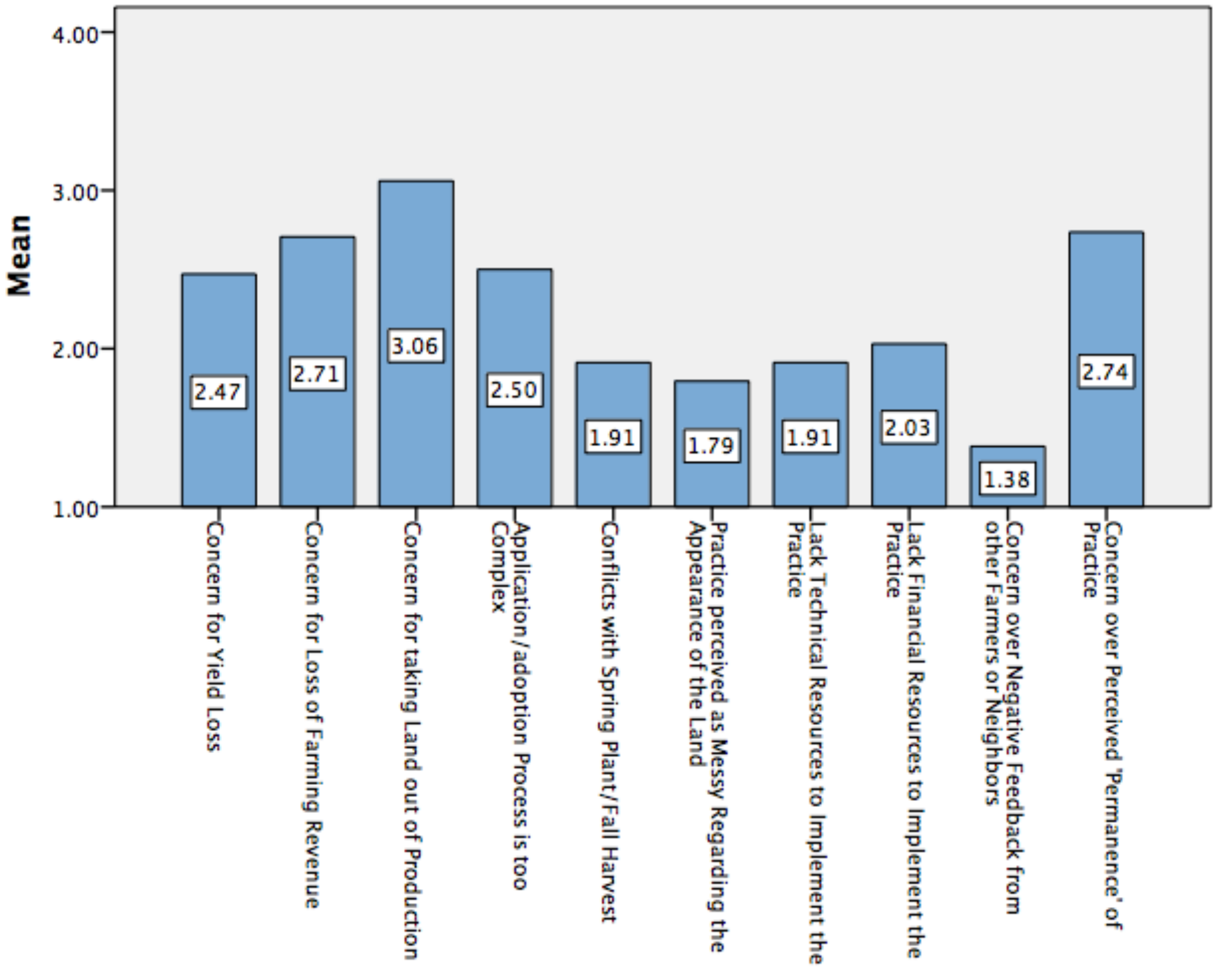
Figure 15: Mean Scores for Potential Obstacles to Reducing Fall Nitrogen Application



Respondents' responses to potential barriers related to installing constructed wetlands showed that economic concerns were again the greatest concern, primarily the issue of removing farmland from agricultural production (3.05). Concerns also existed over perceived permanence of the practice (2.74) and potential loss of farming revenue (2.71). Again, the least problematic barrier was concerns over negative feedback from farmers and neighbors (Figure 16).

Examination of perceived barriers among these 3 conservation practices shows that economic-related concerns mattered the most and that perceptions of their neighbors and other farmers mattered the least.

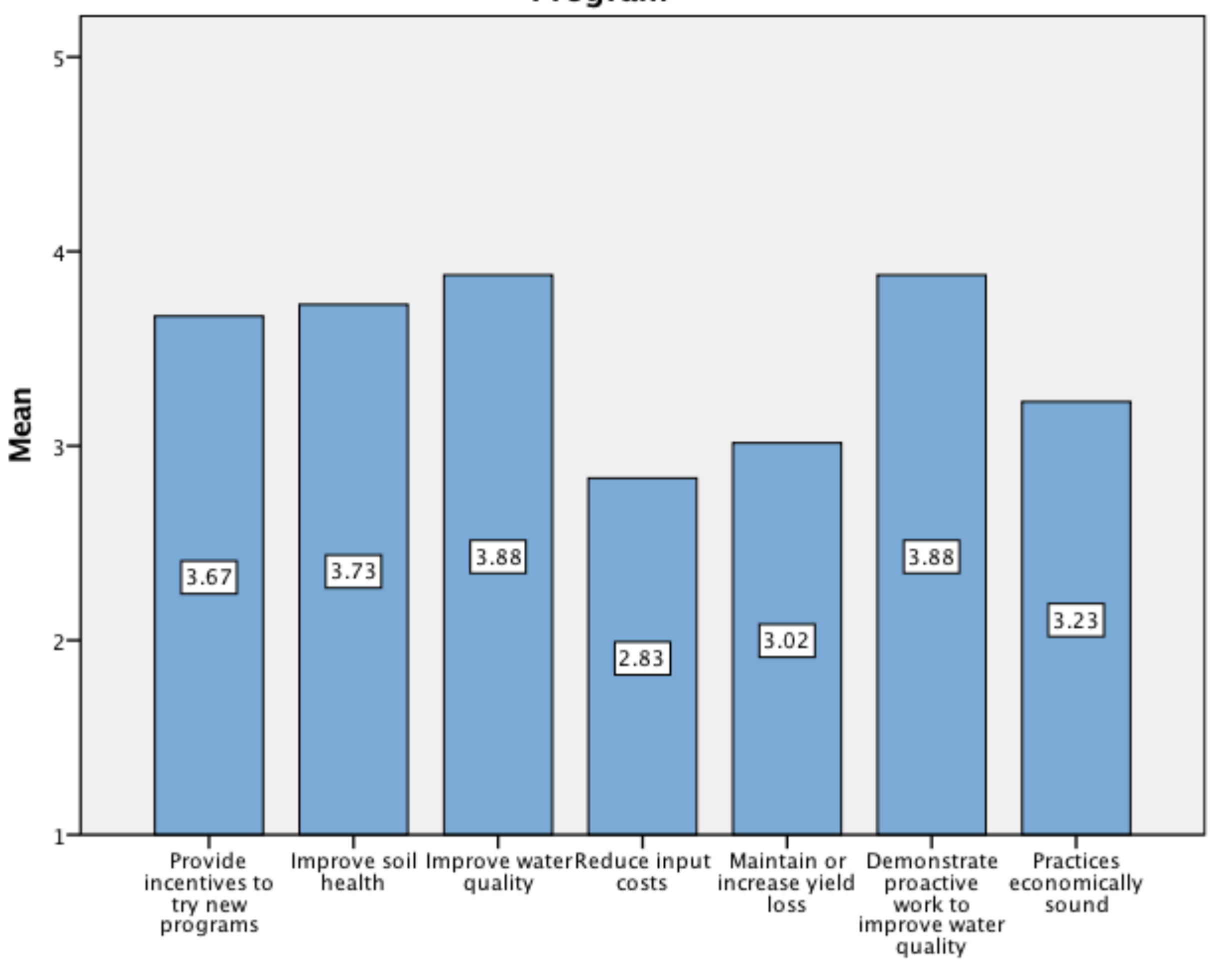
Figure 16: Mean Scores for Potential Obstacles to Constructed Wetlands



Benefits of Participation in Conservation Programs

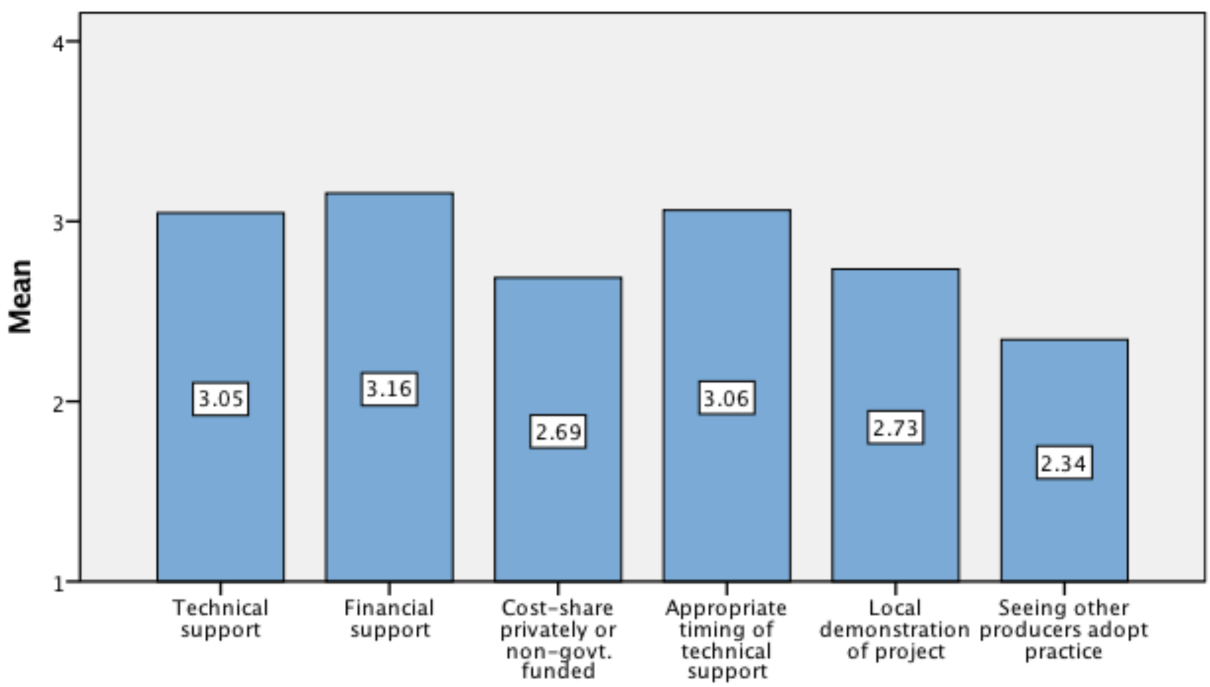
Respondents were fairly consistent in their perceptions of the benefits of participating in conservation programs. Respondents were asked to rate their level of agreement related to a series of statements about the benefits of conservation programs on a scale of 1 = strongly disagree to 5= strongly agree. The highest scores related to conservation practices providing incentives to try new programs, improving soil health, improving water quality and demonstrating proactive work to improve water quality (4.0). Results for reducing input costs, maintaining or increasing yield loss, and economic soundness of practices showed moderate agreement, each with a mean score of 3.0 (Figure 17).

Figure 17: Mean Scores for Benefits of Participating in a Conservation Program



Respondents were asked how important certain elements were when considering adoption of additional conservation practices. Financial support was the most important (3.15) on a scale of 1= not at all important to 4=extremely important. Technical support and appropriate timing of technical support were moderately important (3.05 and 3.06, respectively) and seeing other producers adopt the practice was least important, with a mean score of 2.34 (Figure 18).

Figure 18: Mean Scores for Level of Importance of Elements When Considering Additional Conservation Practices



Respondents were asked to rank 7 different sources of information in terms of importance to their agricultural operations, with 1 = most important and 7 = least important (see Table 6). The Soil and Water Conservation District (SWCD) or the Natural Resource Conservation Service (NRCS) were ranked as the most important by 62% of participants. The next highest ranked sources of information were agronomists or crop consultants (14%), with a significant drop in the percentage of respondents that viewed this as the most important source of information compared to SWCD/NRCS. The least important source of information was social media.

Table 6: Rankings of the Importance of Information Sources by Survey Respondents
(1= most important, 7=least important)

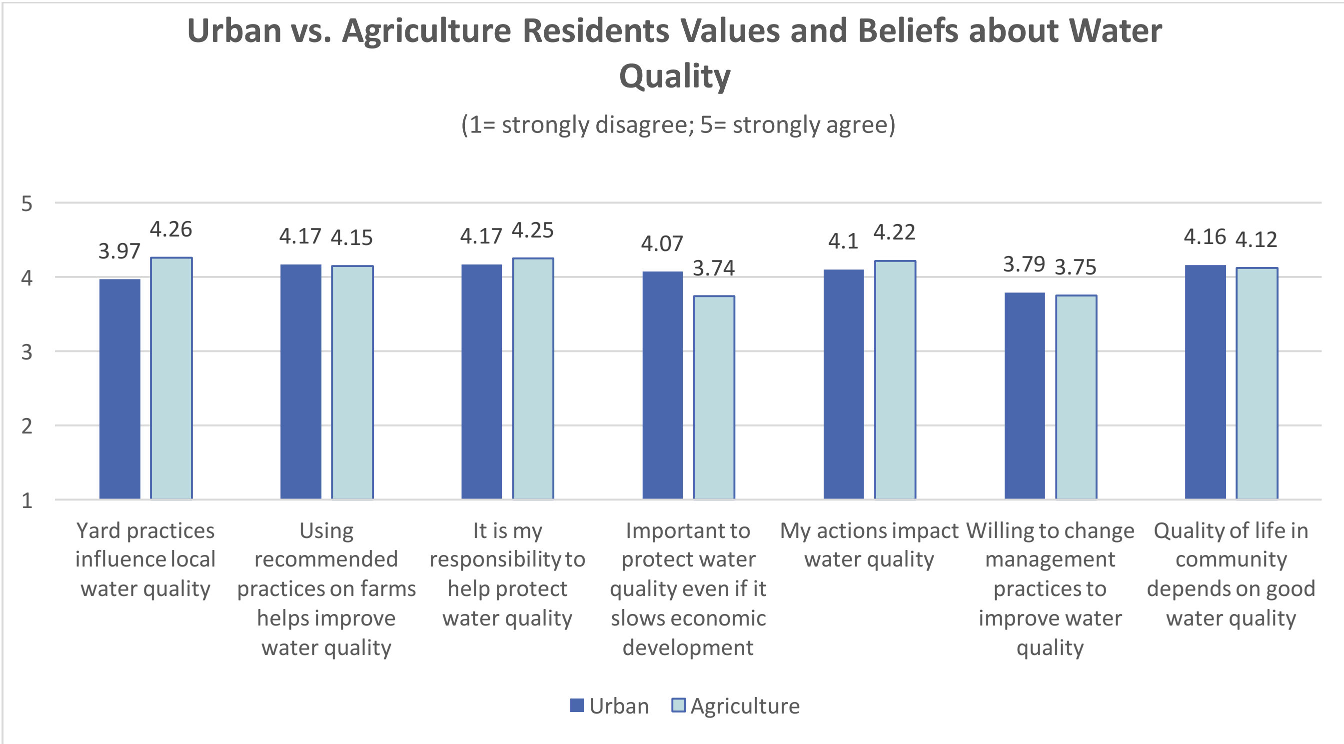
	Ranking						
AGENCY	1	2	3	4	5	6	7
Soil/Water District or NRCS	62%	15%	9%	2%	0%	5%	8%
Farm Service Agency (FSA)	8%	38%	15%	18%	9%	9%	2%
University Extension Service	6%	19%	36%	14%	14%	9%	2%
Neighbors	11%	3%	14%	8%	30%	20%	14%
Social Media	6%	5%	0%	3%	3%	27%	56%
Farm magazine or Publication	3%	5%	14%	20%	25%	25%	8%
Agronomists or Crop Consultants	14%	6%	20%	28%	18%	8%	6%

Values and Beliefs about Water Quality

Respondents were asked to rate their level of agreement with a series of statements that measured their values and beliefs about water quality and human roles and responsibilities in protecting that water quality. This same series of questions was asked of a randomly selected residential population in both watersheds as part of an earlier social assessment (2015). As a result, the following findings represent both the data from the current agricultural survey respondents as well as the data from the urban/residential respondents from 2015. The urban/residential respondents included a total of 558 respondents from Bloomington, Hudson, Towanda, Lake Bloomington, and North Normal (residential areas that fall within the Lake Bloomington and Evergreen Lake watersheds boundaries).

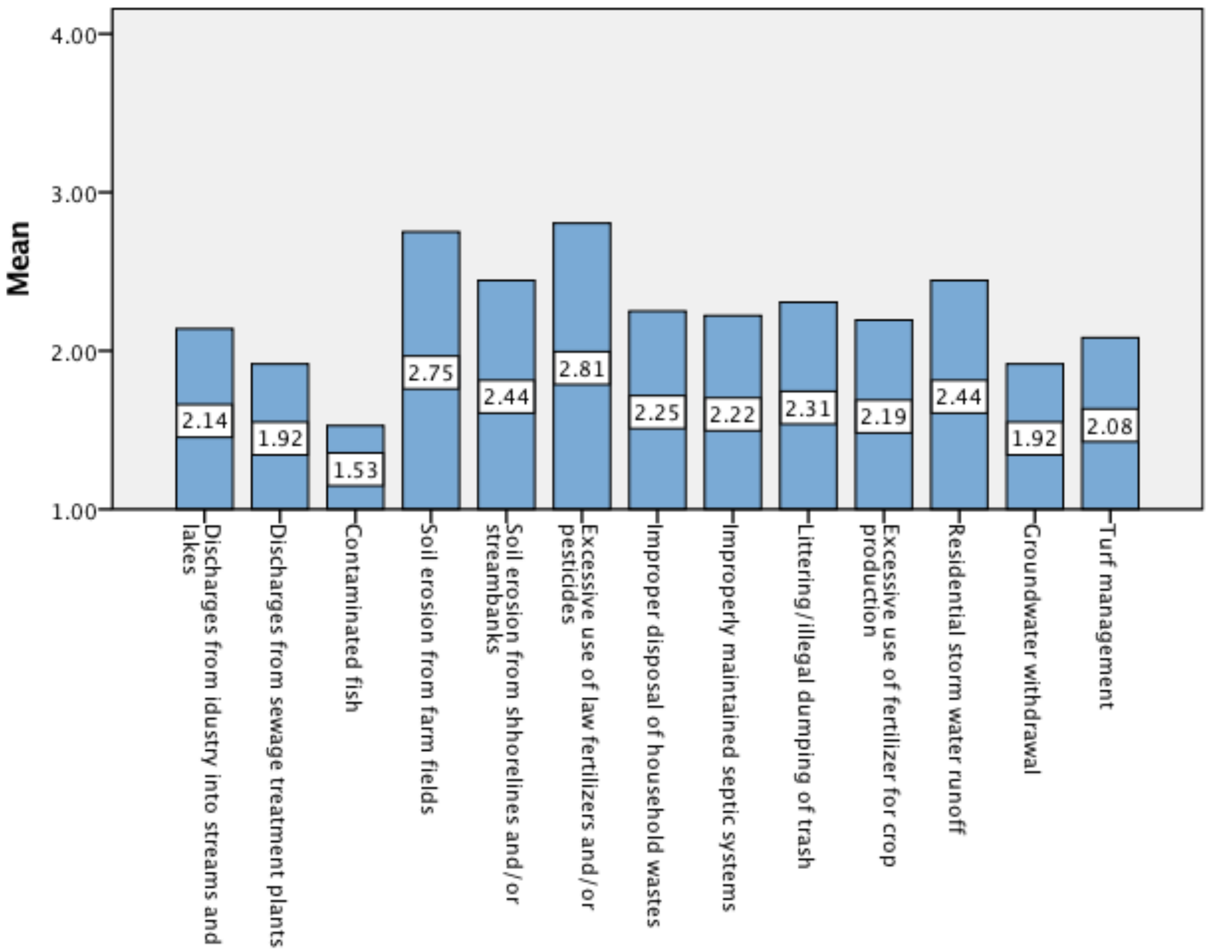
When the mean score for agricultural and urban respondents were compared using t-tests, we see that there is no statistically significant difference in overall values and beliefs about water quality. Both populations see the importance of recommended practices on farms, but urban residents are less likely to see the importance of yard practices on water quality. Farmers are less willing to support the protection of water quality if it slows economic development compared to urban residents. However, in general, there is strong synergy in values and beliefs between the two populations (Figure 19).

Figure 19: Urban vs. Agricultural Responses to Values and Beliefs Related to Water Quality



When respondents were asked about the level of severity from various sources of water pollution, agricultural respondents felt that excessive use of lawn fertilizers and/or pesticides was the biggest problem with a mean of 2.81 on a scale of 1= not at all a problem to 4=severe problem. The second biggest problem was soil erosion from farm fields (mean 2.75), followed by residential storm water runoff (mean 2.44). The least problematic sources of water pollution were contaminated fish (mean 1.53), groundwater withdrawal (mean 1.92) and discharge from sewage treatment plants (mean 1.92). Excessive use of fertilizer for crop production was also seen as not much of a problem, with a mean score of 2.19. In comparison, the urban respondents ranked the excessive use of fertilizer for crop production as the most problematic (mean 2.91) followed by excessive use of law fertilizers and/or pesticides (mean 2.76), indicating that urban residents had a greater concern for the use of pesticides and chemicals in both a residential and an agricultural context, compared to other problems (Figure 20).

Figure 20: Mean Responses for Sources of Pollution (Agriculture Respondents)



When comparing the responses of the agricultural respondents to those of the residential respondents from 2015, there were several statistically significant differences in mean responses on the various sources of pollution. Table 7 illustrates those variables that were statistically significant in their differences. For example, agricultural respondents felt that pollution from soil erosion from farm fields and excessive lawn fertilizers and/or pesticides were more of a problem compared to residential respondents. In contrast, residential respondents felt that excessive use of fertilizers for crop production were a greater source of pollution compared to the agricultural respondents. Residential respondents were more concerned with sources of pollution such as discharge from sewage treatment plants, soil erosion from shorelines/streambanks, improper disposal of household wastes, improperly maintained septic systems, littering, groundwater withdrawal, and turf management, compared to agricultural respondents. These findings are consistent with qualitative data which has also shown that each group tends to see the 'other' group as more 'responsible' for water quality contamination.

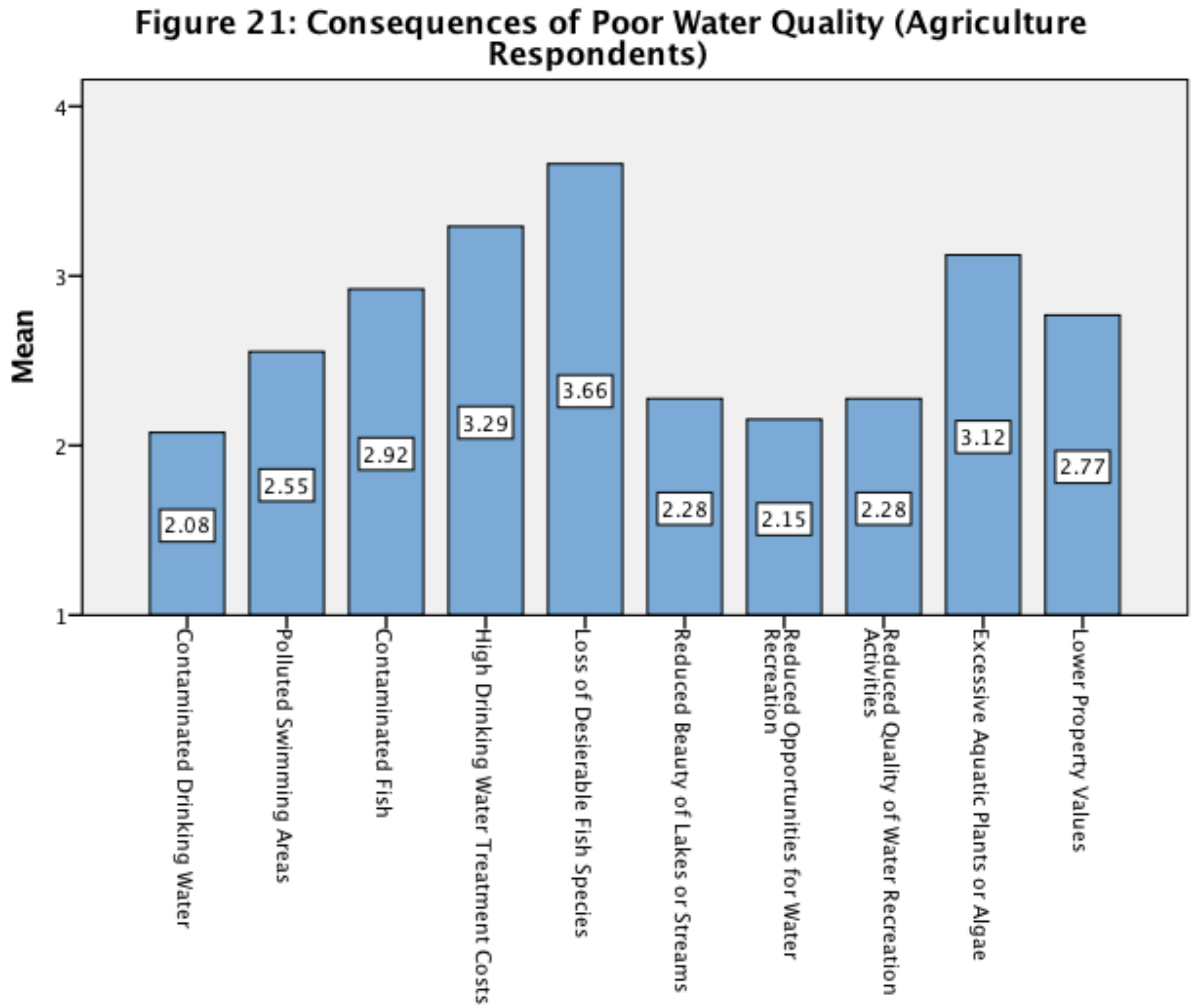
Urban residents tend to view the water quality problems as coming more from farming, while farmers tend to view the problems as coming more from residential lawn care practices.

Table 7: T-tests Comparing Mean Differences Between Agricultural and Urban Respondents on Sources of Pollution

	Agricultural Respondents			***Residential Respondents***			
Source of Pollution	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**t-test**
Discharge from industry into lakes/streams	2.05	.948	62	2.13	1.091	340	-.648**
Discharge from sewage treatment plants	2.00	.863	60	2.06	1.097	308	-.483***
Soil erosion from farm fields	2.78	.653	64	2.75	.902	373	.382***
Soil erosion from shorelines and/or streambanks	2.47	.721	61	2.52	.988	345	-.435***
Excessive lawn fertilizers and/or pesticides	2.81	.884	62	2.77	.959	374	.275*
Improper disposal of household wastes	2.29	.929	59	2.59	1.061	360	-2.319**
Improperly maintained septic systems	2.24	.829	57	2.46	.979	297	-1.797**
Littering/Illegal dumping of trash	2.47	.837	59	2.55	.973	395	-.647*
Excessive use of fertilizers for crop production	2.24	.729	65	2.91	.956	347	-6.388*
Groundwater withdrawal	2.06	.801	49	2.20	1.032	218	-1.048***
Turf management	2.10	.685	55	2.17	1.007	307	-.614***

1= Not a problem; 5 = severe problem   ** = P<.05; ** = P<.01; *** = P<.001*

Respondents were asked to consider the severity of a variety of consequences from poor water quality. Respondents were most concerned about the loss of desirable fish species, followed by high drinking water treatment costs. The least concern was for contaminated drinking water. This may be due to the fact that many agricultural respondents may be on private wells. (Figure 21).



When comparing the mean differences between agricultural and residential respondents, we again see some statistically significant differences. Overall, the urban respondents viewed contaminated fish, loss of desirable fish species, reduced opportunity for water recreation, reduced quality of water recreation activities, and lower property values as more of a significant consequence of poor water quality compared to agricultural respondents (see Table 8). Although not statistically significant, residential respondents were less concerned about contaminated drinking water, indicating that urban respondents who rely on city water supplies, rather than a private well, may have more confidence in the overall quality of their drinking water.

Table 8: T-tests Comparing Mean Differences Between Agricultural and Urban Respondents on Consequences of Poor Water Quality

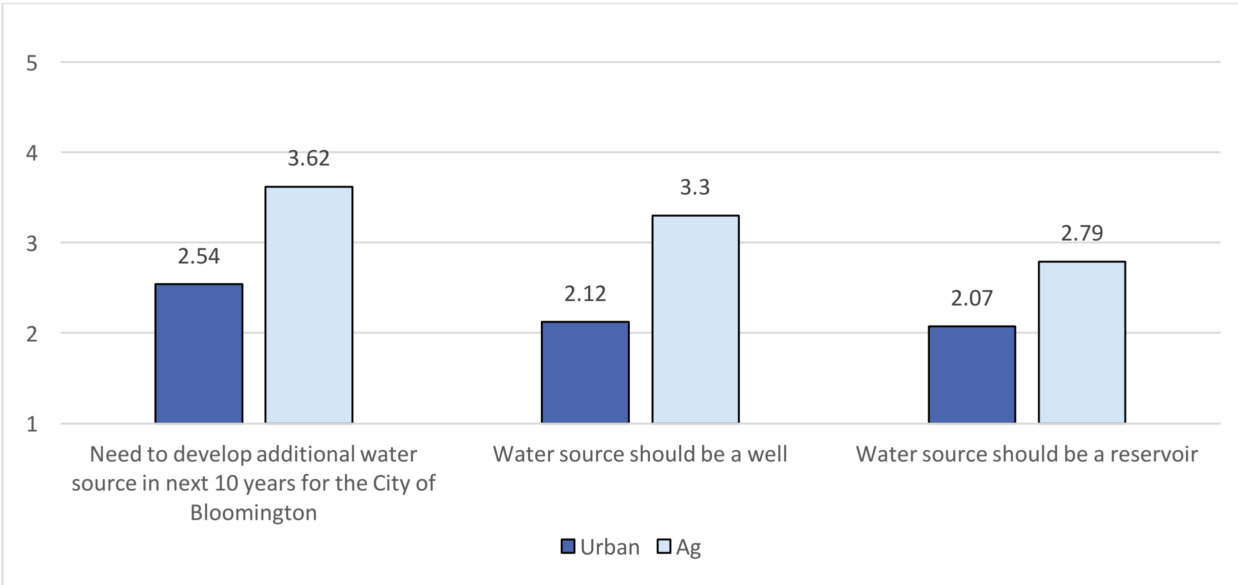
	Agricultural Respondents			***Residential Respondents***			
Consequences of Poor Water Quality	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**t-test**
Contaminated fish	1.64	.790	57	1.90	.991	323	-2.128**
Loss of desirable fish species	1.44	.678	49	2.00	1.04	277	-4.733**
Reduced opportunity for water recreation	1.45	.593	61	1.86	.955	402	-4.477***
Reduced quality of water recreation activities	1.57	.717	61	1.89	.971	389	-3.102**
Lower property values	1.33	.580	56	1.611	.914	342	-2.954***

1= Not a problem; 5 = severe problem ** = P<.05; ** = P<.01; *** = P<.001*

Future Water Needs

Respondents were asked about their views on the future water supply and demand for the City of Bloomington. Specifically, they were asked to indicate their level of agreement with the statement that the City of Bloomington needs to develop an additional water source in the next 10 years, and that this source should be a drilled well or a reservoir. Figure 23 shows that the agricultural respondents were much more in agreement with the statement that the City of Bloomington needed to develop an additional water supply in the next 10 years (mean 3.62) compared to the urban residents (mean 2.54). Agricultural respondents were also more strongly in agreement that this water source should be a well (mean 3.3) rather than a reservoir (mean 2.79). Urban respondents were about equally split between priority for a well vs. a reservoir (Figure 22).

Figure 22: Urban vs. Agricultural Respondents Perceptions about Future Water Needs
(1= strongly disagree; 5=strongly agree)



Conclusions

Landowners in the Lake Bloomington and Evergreen Lake watersheds play a critical role in the overall water quality in the two reservoirs that serve as the primary drinking water supply for nearly 80,000 residents of the City of Bloomington, Towanda, Hudson, and Bloomington townships. A total of 89 landowners completed the survey for an overall response rate of 50%, demonstrating a commitment to continuing to improve land management practices that will ensure clean and safe water supplies into the future.

In general, conservation practices remain a priority for landowners, with the most commonly used practice being grass waterways. A total of 39% of respondents use at least one conservation practice on 100% of their land, and 65% of respondents are using at least one conservation practice on 50% or more of their land.

Across the state and the broader Mississippi Basin, significant efforts are underway to encourage and facilitate the shift from fall to spring nitrogen application. Annual nitrate losses in subsurface drainage from corn-soybean rotation could be reduced by switching to spring nitrogen applications or by applying nitrogen in late fall with a nitrification inhibitor such as nitrapyrin (e.g., Randall and Vetsch, 2005). Respondents in this study remain a bit variable on the timing of their nitrogen application, but we do see a trend that is moving towards spring application, with 41% of respondents indicating that they apply 75-100% of their nitrogen in the spring, compared to 24% who indicated that they apply 75-100% of their nitrogen in the fall. This is a promising finding for the watersheds as a whole. However, the more common practice was to apply 50-74% of nitrogen in the fall, indicating that more work is needed to further encourage the shift to spring nitrogen application.

Cover crops is another conservation tool that is being strongly promoted within the watersheds, and throughout the state. Cover crops can provide numerous benefits that extend to improving water quality, including erosion control, improving soil structure, increasing organic matter, and fixing nitrogen, thus reducing the need for as much additional nitrogen application. In this area, there remains considerably more work to be done to improve the overall adoption of this practice. Survey data indicated that only 22% of respondents have adopted the use of cover crops. Among those producers who use this practice, the majority use cover crops on less than 200 acres, with the mean acreage in cover crops at 175 acres. The most commonly used cover crop in the two watersheds is oilseed or winter-kill varieties of tillage radish with oats.

Respondents were asked a series of questions to better understand what they perceive to be the largest barriers to the adoption of various conservation practices, including reducing fall nitrogen and the adoption of cover crops. The biggest obstacle to reducing fall nitrogen related to concerns for the ability to apply nitrogen in the spring due to wet weather and the ability to apply in the spring due to competing responsibilities. Barriers to adopting cover crops primarily related to economics and included a concern for loss of farming revenue, followed by application processes conflicting with spring planting or fall harvest and the need for additional herbicide. The least important barrier was concern over negative feedback from neighbors and other farmers. When asked about the most important incentives to increase adoption of these practices, financial and technical assistance were viewed as the most important incentives, whereas seeing the practice in use by others was viewed as least important.

When comparing the agricultural respondents to the residential respondents on views about water quality in general we see that both populations have very similar value and belief systems that are supportive of clean water and recognize their personal role in maintaining that water quality for the future. Both populations see the importance of recommended practices on farms, but urban residents are less likely to see the importance of yard practices on water quality. Farmers are less willing to support the protection of water quality if it slows economic development compared to urban residents. However, in general, there is strong synergy in values and beliefs between the two populations. When asked about sources of water pollution, we begin to see some divergence with the overall theme being that each group places slightly higher 'blame' on the opposite population. Farmers tend to view urban practices (lawn care, storm water management) as more of a problem for water quality, while urban residents tend to view farming practices such as the excessive use of fertilizers and pesticides as more of a problem. This is consistent with findings from previous qualitative studies in the two watersheds, but it also presents opportunities to further engage the two populations to better understand what is being done in both areas to protect our water quality. Finally, agricultural respondents are more concerned about the future of our water supplies compared to urban residents, and they more strongly favor a well rather than a reservoir as a possible solution to this increasing demand. This is not surprising, as any reservoir would likely take additional farmland out of production.

In conclusion, this study presents valuable data that demonstrate that landowners in the two watersheds are engaging in important conservation practices that will benefit the future health of our watersheds, and specifically the health and safety of our water supplies. However, more work remains to be done to continue to increase adoption of key practices such as cover crops, spring nitrogen application, and constructed wetlands, among others. As a result, data from this study will be further utilized in several ways to continue to support producers by:

•Demonstrating current efforts by local producers and landowners to reduce nutrient losses from farmland,
•Identifying management strategies and conservation programs that are of greatest interest to area producers and landowners,
•Documenting perceived barriers to implementing new management strategies and to participating in conservation programs, and
•Developing new outreach approaches, technical assistance and tools to catalyze voluntary implementation of practical and effective conservation strategies.

Literature cited

Randall, G.W. and J. A. Vetsch. 2005. Nitrate losses in subsurface drainage from a corn-soybean rotation as affected by fall and spring application of nitrogen and nitrapyrin. Journal of Environmental Quality 34:590-597. doi:10.2134/jeq2005.0590