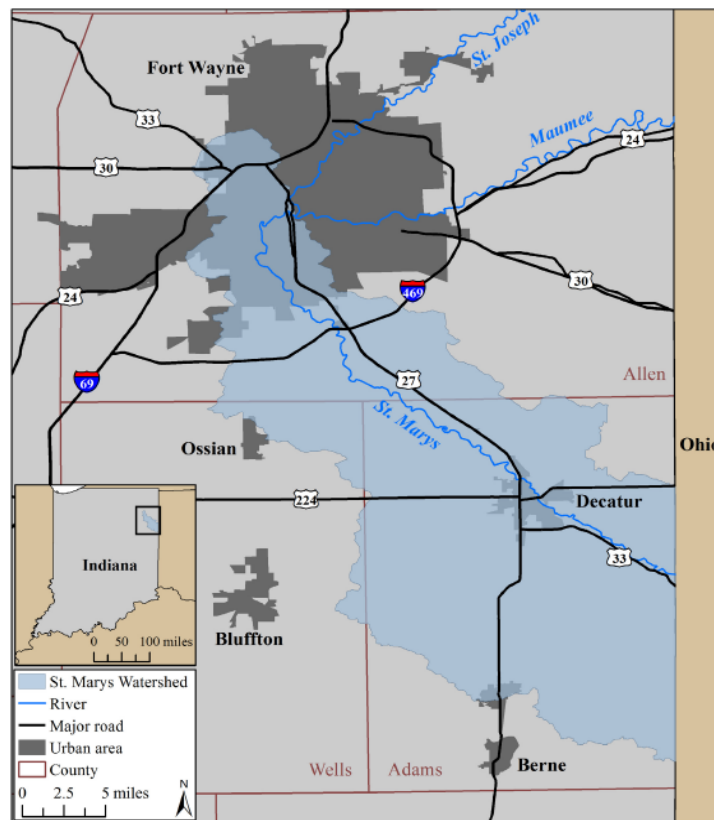




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St. Marys Watershed Farmer and Landowner 2018 Survey Descriptive Report



Prepared August 2018 by:

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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>

The map on the cover page shows the Indiana portion of the St. Marys watershed (highlighted in blue). The map includes city and county names, as well as major U.S. and interstate highways. This map was included in the survey for participant reference.

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1 Introduction

Indiana Department of Environmental Management (IDEM), with cost share from Agribusiness Council of Indiana, Indiana Dairy Producers, Indiana Farm Bureau, Indiana Pork, Indiana Soybean Alliance, Indiana State Department of Agriculture, Indiana State Poultry Association, U.S.D.A. Natural Resources Conservation Service, and The Nature Conservancy, awarded Purdue University a Nonpoint Source Management Program contract to 1) create a foundation for future monitoring and implementation efforts, 2) develop an outreach and education program in the St. Marys watershed, and 3) promote a greater sense of connectivity between existing watershed efforts with the long-term goal of leveraging watershed connectivity. To measure education impacts and determine if targeted education efforts affect implementation of best management practices (BMPs), social indicator surveys were planned in the St. Marys watershed in year one and year four of the project. By demonstrating changes in awareness, attitudes and behaviors of landowners and producers in the St. Marys watershed, the social indicator survey can show interim project success, as measurable changes in water quality can take years.

The St. Marys watershed is located in Northeastern Indiana and include portions of Allen, Wells and Adams Counties. This report presents the descriptive results of the year one (2018; baseline) social indicator questionnaire sent to landowners and producers in the St. Marys watershed about their views on local water resources (see appendix A for complete questionnaire). The overall objective of this survey is to inform development of an education and outreach program and provide baseline data for the evaluation of the education and outreach programming.

2 Methods

2.1 Questionnaire Development

The Questionnaire was developed based off of previous social indicator questionnaires from the Natural Resources Social Science Lab, Purdue University. A map was provided on page 2 of the questionnaire for reference to ensure respondents' property is within the defined boundaries of the St. Marys watershed. The questionnaire is comprised of seven sections including:

- Section I – Water Resources and Impairments; Three questions about water quality impairments in the St. Marys watershed, sources of pollution and consequences of poor water quality.
- Section II; Six questions about the drainage of the St. Marys River, demographics, location of property and acreage of owned or rented farmland.
- Section III – Sources of Advice and Relationships; Three questions about advice and relationships with different entities and determination of whether or not they are actively farming in the St. Marys watershed.
- Section IV – Water Quality; One question about on-farm impacts to water quality.
- Section V – Management Decision-Making; Two questions about overall management of their operation and motivations to implement a conservation practice.
- Section VI – Management Practices; 26 questions about cover crops, gypsum application, conservation tillage, conservation plans, nutrient management plans, and other land management practices.
- Section VII – About Your Farming Operation; Eight questions about farming operations and experience.

2.2 Data Collection

From March 2, 2018 to April 13, 2018, Purdue University conducted a five-wave social indicators survey in the St. Marys watershed, located in Northeast Indiana. Addresses were requested from the Farm Service Agency (FSA) for the entire state of Indiana then geocoded and mailed to randomly selected addresses within the watershed.

Wave 1 was an advance letter that introduced the study, provided participants a unique identifier (ID), and a website address to take the online version of the questionnaire (through online survey software Qualtrics) (Qualtrics, Provo, UT). The advance letter also explained that if the online questionnaire had not been completed within a week, a hardcopy version of the questionnaire would be mailed to them. Wave 2 was a hardcopy of the questionnaire with a stamp, addressed return envelope, sent to those who had not yet completed the online questionnaire. Wave 3 was a reminder postcard that included the website address to take the online questionnaire. Wave 4 was a second hardcopy of the questionnaire and return envelope. Wave 5, sent to those who had not yet responded to any previous waves, included a final hardcopy of the questionnaire, return envelope and a postcard indicating final contact (Table 1).

Table 1. Mail distribution

Wave	Date Mailed	Item Delivered
1	03/02/18	Advanced Letter
2	03/09/18	Questionnaire #1
3	03/21/18	Reminder postcard
4	03/30/18	Questionnaire #2
5	04/13/18	Questionnaire #3 and postcard

Due to an address cleaning error, the first three waves distributed (advance letter, first questionnaire, and reminder postcard) were sent to multiple individuals living at the same address. If multiple questionnaires from the same address were completed and returned, only the first questionnaire received from that address was counted as a response. In future waves, only one questionnaire was mailed to each address.

2.3 Analysis

All results presented in the following tables reference the question number (e.g., Q1) of the questionnaire (Appendix A). This questionnaire contained five general types of questions: closed (single response), closed (multiple response), Likert (i.e., bipolar), open (numeric), and open (text). The following analyses were conducted and presented for each question type:

- Closed (single response): Calculated percentage of respondents that selected each category.
- Closed (multiple response): Calculated percentage of respondents that selected each category. This results in a total percentage greater than 100% across categories. If respondent answers “don’t know” and also checks other answers, the “don’t know” is superseded by the other answer(s) that is/are checked. Similarly, if a respondent answers “I created my own plan without help from others.” and also checked other answers, the other answer(s) is/are superseded.
- Likert: Calculated percentage of respondents that selected each category. Means and standard deviation (sd) based on the bipolar scale (e.g., Strongly disagree = 1, Disagree = 2, Neither agree nor disagree = 3, Agree = 4, Strongly agree = 5) were calculated, excluding any non-bipolar options (e.g., “Don’t know”, “Not applicable”).
- Open (numeric): Mean, sd, median and range were calculated.
- Open (text): Applicable for only Q11; therefore, responses were coded based on categories presented in Q10, any responses that did not fit into those categories were grouped into new categories. One researcher coded the first half of responses and another coded the second. Researchers then switched and discussed conflicting codes. Final coding was agreed upon by both researchers.

All data were analyzed in SPSS (v. 24) or MS Excel.

2.4 Response Rate

A total of 986 questionnaires were mailed to unique addresses and 75 were returned as bad addresses (see Appendix B for bad address definition) for a total 911 valid addresses. There were 454 completed questionnaires, resulting in a response rate of 49.8%.

To calculate the response rate, total completed questionnaires is divided by the amount of eligible addresses (total questionnaires sent minus bad addresses) and then that number is multiplied by 100. A questionnaire is considered “complete” if at least one question was responded to. The number of responses for each question varies due to skip patterns incorporated into the questionnaire and respondents not answering all questions.

3 Results

3.1 Section I – Water Resources and Impairments

Table 2. St. Marys watershed impairments

Corresponds to Q1: “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 the St. Marys watershed? (indicated as the blue map area on page 2)?”

Impairment	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (NA)	n*	Mean (sd)*
		Frequency (%)						
a. Sediment/silt	434	7.1	22.6	31.3	13.1	25.8	322	2.7 (.876)
b. Nitrate/nitrogen	429	7.0	24.5	27.3	7.0	34.3	282	2.5 (.823)
c. Phosphorus	428	7.0	21.3	26.2	10.5	35	278	2.6 (.882)
d. Bacteria in the water (such as <i>E. coli</i>)	432	9.5	19.7	22.5	11.8	36.6	274	2.6 (.959)
e. Pesticides	428	9.8	29.9	18.5	4.9	36.9	270	2.3 (.822)

* Not calculated with “Don't know” responses.

Table 3. St. Marys watershed pollution sources

Corresponds to Q2: “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 the St. Marys watershed (indicated as the blue map area on page 2)?”

Source	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (NA)	n*	Mean (sd)*
		Frequency (%)						
a. Discharges from industry into streams and lakes	436	12.6	25.7	25.5	4.6	31.7	298	2.3 (.851)
b. Discharges from wastewater treatment plants	434	10.8	23.7	24.7	8.5	32.3	294	2.5 (.907)
c. Soil erosion from farm fields	436	6.2	33.5	35.8	8.9	15.6	368	2.6 (.779)
d. Soil erosion from shorelines and/or streambanks	434	9.2	29.3	29.0	10.1	22.4	337	2.5 (.866)
e. Lawn fertilizers and/or pesticides	437	8.9	25.6	28.8	12.1	24.5	330	2.6 (.896)
f. Commercial fertilizers or manure used for crop production	434	10.8	32.7	29.0	8.3	19.1	351	2.4 (.849)
g. Improperly maintained septic systems	435	11.7	27.6	25.1	12.2	23.4	333	2.5 (.937)
h. Littering/illegal dumping of trash	436	12.2	32.8	22.9	11.2	20.9	345	2.4 (.915)
i. Pesticides or herbicides used for crop production	435	12.4	40.0	19.8	5.5	22.3	338	2.2 (.803)
j. Animal feeding operations	431	14.4	33.4	22.0	6.3	23.9	328	2.3 (.860)
k. Urban stormwater runoff (e.g., highways, rooftops, parking lots)	438	10.3	20.8	32.2	14.6	22.1	341	2.7 (.931)
l. Removal of streambank vegetation	433	13.9	28.9	21.2	8.8	27.3	315	2.3 (.922)

* Not calculated with “Don't know” responses.

Table 4. Consequences of poor water quality

Corresponds to Q3: “Poor water quality can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in the St. Marys watershed (indicated as the blue map area on page 2)?”

Consequence	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (NA)	n*	Mean (sd)*
		Frequency (%)						
a. Contaminated fish	430	16.3	29.1	17.0	6.7	30.9	297	2.2 (.913)
b. Reduced beauty of streams	424	14.4	28.1	25.2	14.6	17.7	349	2.5 (.978)
c. Reduced opportunities for water recreation	427	14.5	27.6	21.8	12.9	23.2	328	2.4 (.981)
d. Reduced quality of water recreation activities	427	13.3	23.9	23.7	14.5	24.6	322	2.5 (.996)
e. Excessive aquatic plants or algae	429	11.7	27.3	23.1	10.5	27.5	311	2.5 (.928)
f. Fish kills	429	22.4	30.8	11.4	4.2	31.2	295	2.0 (.858)
g. Lower property values	423	27.9	26.7	14.7	2.8	27.9	305	1.9 (.860)
h. Human health	431	18.1	29.7	20.4	6.0	25.8	320	2.2 (.899)
i. Animal risk	429	23.5	29.6	16.8	4.2	25.9	318	2.0 (.879)

* Not calculated with “Don't know” responses.

3.2 Section II

Table 5. St. Marys watershed drainage

Corresponds to Q4: “Which water body does the St. Marys river drain into?”

Body of water	Frequency (%; N=411)
Lake Erie	85.6
Gulf of Mexico	3.6
Lake Michigan	5.1
Other	5.6

Table 6. Water body adjacent

Corresponds to Q5: “Does the property you own, manage or farm in the St. Marys watershed (indicated as the blue map area on page 2) touch a water body (stream, river, lake, or wetland)?”

Water body adjacent	Frequency (%; N=426)
Yes	64.6
No	35.4

Table 7. Gender

Corresponds to Q6: “What is your gender?”

Gender	Frequency (%; N=434)
Male	87.1
Female	12.9

Table 8. AgeCorresponds to Q7: “What year were you born? *Please enter numeric value*” (reported as age in years)

Age	Years (N=396)
Range	22-98
Mean	64.0
Median	63.0

Table 9. Education

Corresponds to Q8: “What is the highest level of education you have completed?”

Education Level	Frequency (%; N=414)
Some formal schooling	2.9
High school diploma/GED	43.2
Some college	13.5
2-year college	16.2
4-year college	15.7
Post-graduate degree	8.5

Table 10. Owned/rented acres of farmlandCorresponds to Q9: “Please estimate the acreage of your farmland in 2017. *Please enter a numeric value. If none, please enter a zero.*”

Farmland acres	N	Mean Acres (<i>sd</i>)	Acres Range
<i>Total acres</i>			
Total owned acres	426	151.2 (203.73)	0-1,800
Total acres rented from others	422	279.8 (504.77)	0-3,050
<i>St. Marys watershed acres</i>			
Total owned acres in the St. Marys watershed (indicated as the blue map area on page 2)?	393	183.5 (1,165.13)	0-23,000
Total acres rented from others in the St. Marys watershed (indicated as the blue map area on page 2)?	209	207.4 (365.56)	0-2,500

3.3 Section III – Sources of Advice and Relationships

Table 11. Relation with entities

Corresponds to Q10: “How would you describe your interaction with the following entities?”

Source of advice	N	No interaction (1)	Receive information (2)	Service provider (3)	Not familiar (NA)	n*	Mean (sd)*
		Frequency (%)					
a. Conservation entities/government agencies (e.g., Soil and Water Conservation District (SWCD), Natural Resources Conservation Service (NRCS), Indiana State Department of Agriculture (ISDA))	420	14.8	55.0	21.0	9.3	381	2.1 (.625)
b. Commodity groups (e.g., corn, soybeans, dairy)	423	33.6	45.2	9.2	12.1	372	1.7 (.641)
c. Purdue Extension	427	21.5	56.7	13.6	8.2	392	1.9 (.613)
d. Farm Bureau	422	31.5	40.3	19.7	8.5	386	1.9 (.738)
e. Retail agronomist/Crop advisor	422	41.0	28.9	18.0	12.1	371	1.7 (.738)
f. Independent agronomist/Crop advisor	416	53.1	21.9	10.6	14.4	356	1.5 (.706)
g. Other farmers/Landowners	423	13.7	60.3	17.3	8.7	386	2.0 (.582)

*Not calculated with “Not familiar” responses.

Table 12. Seeking advice

Corresponds to Q11: “Whose advice do you seek most in the list above?”

Source of advice	Frequency (n; N=346)
Other farmers/Landowners	82
Conservation entities/government agencies	73
Retail agronomist/Crop advisor	55
Purdue Extension	48
Unspecified agronomist/Crop advisor	25
Independent agronomist/Crop advisor	23
Farm Bureau	12
My Tenant	11
Commodity groups	7
All	4
Named individual	4
Not applicable to my operation	4
Family	3
Myself	3
None	13
Other	12

Table 13. Farming within St. Marys watershed

Corresponds to Q12: “Are you actively farming land in the St. Marys watershed (indicated as the blue map are on page 2)?”

Actively Farming	Frequency (%; N=434)
Yes	56.5
No	43.5

3.4 Section IV – Water Quality

Table 14. St. Marys watershed consequences of poor water quality

Corresponds to Q13: “Please indicate your level of disagreement or agreement with the statements below.”

Statement	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (sd)*
		Frequency (%)					
a. Using recommended management practices on farms improves water quality.	248	1.6	0.8	11.3	70.6	15.7	4.0 (.670)
b. My actions have an impact on water quality.	247	0.8	2.0	11.7	70.0	15.4	4.0 (.653)
c. I would be willing to change management practices to improve water quality.	248	0.4	3.2	39.9	48.4	8.1	3.6 (.701)
d. The quality of life in my community depends on good water quality in local streams, rivers, and lakes.	249	1.2	2.8	24.5	58.6	12.9	3.8 (.744)
e. I would be willing to change my management practices because I am concerned about the quality of water for my downstream neighbors.	249	0.4	2.8	41.4	48.2	7.2	3.6 (.685)
f. Agriculture in this area has permanently altered the ecosystem of the St. Marys River.	248	5.6	22.2	44.4	20.6	7.3	3.0 (.973)

3.5 Section V – Management Decision-making

Table 15. Decision-making

Corresponds to Q14: “When thinking about the overall management of your operation, how strongly do you disagree or agree with the following statements?”

Statement	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (sd)*
		Frequency (%)					
a. When I make decisions on my farm, I tend to see all kinds of possible consequences for each decision.	250	0.4	4.8	26.0	61.6	7.2	3.7 (.689)
b. By making plans and controlling my farm operations, I can accurately predict how successful my farm operation will be.	250	1.2	6.4	32.4	53.2	6.8	3.6 (.763)
c. When I have problems on my farm, it is usually because of something out of my control.	249	0.8	6.4	30.5	54.2	8.0	3.6 (.758)
d. When I have problems on my farm, I think about how I can change my operations to help reduce those problems in the future.	250	0.8	1.2	14.4	70.4	13.2	3.9 (.628)
e. I always look at the interconnections and mutual influences between all of the decisions that go into my farm management.	250	0.8	2.8	38.8	51.6	6.0	3.6 (.684)
f. I think continuously about how to improve my farm operations.	251	0.8	3.6	16.7	61.4	17.5	3.9 (.743)

Table 16. Implementing a conservation practice

Corresponds to Q15: “Please indicate your level of disagreement or agreement with the statements below.”

I would be motivated to implement a conservation practice	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (sd)*
		Frequency (%)					
a. If it improves soil health on the land I farm.	252	0.4	0.8	13.1	71.0	14.7	4.0 (.589)
b. If it decreases soil erosion on the land I farm.	251	0.4	0.8	12.0	68.5	18.3	4.0 (.609)
c. If it reduces my input costs.	252	1.2	0.8	12.3	65.5	20.2	4.3 (.682)
d. If it increases my crop yields.	252	1.2	0.4	9.5	64.3	24.6	4.1 (.674)
e. If I think it is the right thing to do.	252	0.4	0.4	11.5	70.2	17.5	4.0 (.584)
f. If it is compatible with my existing farm operations.	252	0.8	0.8	18.3	69.0	11.1	3.9 (.621)
g. If cost-share is available.	252	1.6	2.0	28.2	49.6	18.7	3.8 (.812)
h. If it reduces my risk potential drought.	250	1.2	0.8	18.4	64.8	14.8	3.9 (.683)
i. If it reduces my risk from a potentially very wet year.	252	1.6	0.8	16.7	65.1	15.9	3.9 (.705)
j. If it improves soil quality on my less productive land.	251	1.6	0.4	12.7	64.1	21.1	4.0 (.707)
k. If my crop insurance program wasn't providing all the risk management I need.	249	3.6	6.8	49.4	32.5	7.6	3.3 (.856)

3.6 Section VI – Management Practices

Table 17. Cover crop familiarity

Corresponds to Q16: “How familiar are you with this practice?”

Practice familiarity	Frequency (%; N=246)
Never heard of it	3.3
Somewhat familiar with it	37.0
Know how to use it; not using it	29.3
Currently using it	30.5

Table 18. Willingness to adopt cover crops

Corresponds to Q17. “Are you willing to try this practice?”

Willingness	Frequency (%; N=155)
Yes	21.9
Maybe	65.2
No	12.9

Table 19. Cover crop adoption barriers

Corresponds to Q18: “How much do the following factors limit your ability to implement cover crops?”

Limitation	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (NA)	n*	Mean (sd)*
		Frequency (%)						
a. Time or management required	235	17.0	22.6	38.3	10.2	11.9	207	2.5 (.934)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	235	47.2	19.1	16.2	2.1	15.3	199	1.7 (.868)
c. Desire to continue traditional farming practices/methods	234	44.9	29.5	15.0	1.3	9.4	212	1.7 (.793)
d. Disapproval from others	234	71.8	6.8	6.8	0.4	14.1	201	1.3 (.617)
e. Lack of equipment/technology	234	27.8	27.4	25.2	10.3	9.4	212	2.2 (1.00)
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	232	43.1	22.0	16.4	3.4	15.1	197	1.8 (.901)
g. Lack of information on economic benefits	232	35.3	24.1	17.7	7.8	15.1	197	2.0 (.997)
h. My landowner	226	71.7	9.7	4.9	0.9	12.8	197	1.3 (.603)

* Not calculated with “Don’t know” responses.

Table 20. Effects of cover crops

Corresponds to Q19: "Please indicate your level of disagreement or agreement with the statements below."

Statement	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (<i>sd</i>)
		Frequency (%)					
a. In a corn and soybean rotation , cover crops work well when combined with no-till .	234	17.0	22.6	38.3	10.2	11.9	3.4 (.716)
b. In a corn and soybean rotation , cover crops work well when combined with a livestock operation .	232	47.2	19.1	16.2	2.1	15.3	3.3 (.628)
c. Cover crops can reduce the need for pesticides.	236	44.9	29.5	15.0	1.3	9.4	3.0 (.868)
d. Cover crops can reduce weeds.	236	71.8	6.8	6.8	0.4	14.1	3.5 (.826)

Table 21. Gypsum application familiarity

Corresponds to Q20: "How familiar are you with this practice?"

Practice familiarity	Frequency (%; N=246)
Never heard of it	19.9
Somewhat familiar with it	31.7
Know how to use it; not using it	18.3
Currently using it	30.1

Table 22. Willingness to apply gypsum

Corresponds to Q21: "Are you willing to try this practice?"

Willingness	Frequency (%; N=121)
Yes	27.3
Maybe	62.0
No	10.7

Table 23. Gypsum application adoption barriers

Corresponds to Q22: “How much do the following factors limit your ability to apply gypsum?”

Factor	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (NA)	n*	Mean (sd)*
		Frequency (%)						
a. Time or management required	193	43.5	24.9	17.6	3.6	10.4	173	1.8 (.897)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	193	67.4	10.9	11.4	0.5	9.8	174	1.4 (.727)
c. Desire to continue traditional farming practices/methods	191	70.7	12.6	6.3	0.5	9.9	172	1.3 (.621)
d. Disapproval from others	190	80.5	3.2	3.7	0.0	12.6	166	1.1 (.438)
e. Lack of equipment/technology	192	46.9	23.4	15.1	6.8	7.8	177	1.8 (.966)
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	191	52.9	18.3	9.4	3.1	16.2	160	1.6 (1.56)
g. Lack of information on economic benefits	194	47.9	22.7	13.9	3.6	11.9	171	1.7 (.882)
h. My landowner	189	79.4	6.9	4.2	0.5	9.0	172	1.2 (.530)

* Not calculated with “Don’t know” responses.

Table 24. Reasons to use gypsum

Corresponds to Q23: “Why are you using gypsum in your field? Check all that apply.”

Rationale	Frequency (%; N=71)
Reduce magnesium	50.7
Add sulfur	71.8
Add calcium	64.8
Don't know	14.1

Table 25. Conservation tillage familiarity

Corresponds to Q24: “How familiar are you with this practice?”

Practice familiarity	Frequency (%; N=243)
Never heard of it	7.0
Somewhat familiar with it	25.1
Know how to use it; not using it	15.2
Currently using it	52.7

Table 26. Willingness to adopt conservation tillage

Corresponds to Q25: “Are you willing to try this practice?”

Willingness	Frequency (%; N=91)
Yes	25.3
Maybe	64.8
No	9.9

Table 27. Conservation tillage adoption barriers

Corresponds to Q26: “How much do the following factors limit your ability to implement conservation tillage?”

Factor	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (NA)	n*	Mean (sd)*
		Frequency (%)						
a. Time or management required	215	61.4	18.6	13.0	0.5	6.5	201	1.5 (.749)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	212	59.4	21.7	9.4	2.8	6.6	198	1.5 (.798)
c. Desire to continue traditional farming practices/methods	214	58.4	20.6	9.8	2.3	8.9	195	1.5 (.789)
d. Disapproval from others	213	79.3	8.0	2.2	0	9.9	192	1.2 (.438)
e. Lack of equipment/technology	211	50.2	18.5	13.7	9.5	8.1	194	1.8 (1.038)
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	214	64.0	15.0	10.7	1.9	8.4	196	1.5 (.780)
g. Lack of information on economic benefits	214	58.9	15.4	13.6	3.3	8.9	195	1.6 (.872)
h. My landowner	213	79.3	6.1	2.8	0.9	10.8	190	1.2 (.514)

Table 28. Conservation plan usage

Corresponds to Q27: “Do you have a conservation plan?”

Conservation plan usage	Frequency (%; N=241)
Yes	26.6
No	73.4

Table 29. Conservation plan development and use

Corresponds to Q28: “Please indicate your level of disagreement or agreement with the following statements.”

Statement	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (sd)
		Frequency (%)					
a. Developing my conservation plan was easy.	67	7.5	10.4	40.3	37.3	4.5	3.2 (.962)
b. I had enough help to develop my conservation plan.	66	4.5	1.5	40.9	45.5	7.6	3.5 (.846)
c. My District Conservationist helps me determine conservation practices by looking at my conservation plan.	65	3.1	13.8	44.6	35.4	3.1	3.2 (.838)
d. I look at my conservation plan to determine which new practice or program to implement.	67	3.0	9.0	47.8	37.3	3.0	3.3 (.794)
e. My conservation plan addresses all of the resource concerns (soil erosion, manure storage, soil compaction, water quality, etc.) on my farm.	66	1.5	9.1	40.9	47.0	1.5	3.4 (.739)
f. My conservation plan addresses all of the resource concerns (soil erosion, manure storage, soil compaction, water quality, etc.) on my watershed.	66	1.5	4.5	47.0	43.9	3.0	3.4 (.703)

Table 30. Soil testing

Corresponds to Q29: “How regularly do you conduct soil testing?”

Rate of testing	Frequency (%; N=245)
Never	8.2
Every year	15.5
Every 2-3 years	52.2
Every 4 years or longer	24.1

Table 31. Nutrient application

Corresponds to Q30: “Do you apply nutrients based on the results on the results of your current soil testing?”

Applies nutrients	Frequency (%; N=245)
Yes	86.1
No	9.4
Don't know	4.5

Table 32. Nutrient application factors

Corresponds to Q31: “Which of the following do you consider in the application of nutrients and soil amendments? Check all that apply”

Application Factors	Frequency (%; N=236)
Placement	78.8
Amount	86.9
Time	61.0
Source	45.3

Table 33. Manure storage space

Corresponds to Q31: “Which of the following do you consider in the application of nutrients and soil amendments? Check all that apply”

Adequate Storage	Frequency (%; N=238)
Yes	29.0
No	5.0
Not applicable because I do not have livestock	66.0

Table 34. Manure storage timeframe

Corresponds to Q33: “How many months of manure storage do you have?”

Storage timeframe	Frequency (%; N=81*)
No storage	13.6
1-3 months	23.5
4-6 months	32.1
More than 6 months	30.9

*This question may have a low response due to incorrect skip pattern

Table 35. Nutrient management plan familiarity

Corresponds to Q34: “How familiar are you with this practice?”

Practice familiarity	Frequency (%; N=119*)
Never heard of it	32.8
Somewhat familiar with it	27.7
Know how to use it; not using it	11.8
Currently using it	27.7

*This question may have a low response due to incorrect skip pattern

Table 36. Willingness to adopt nutrient management plan

Corresponds to Q35: “Are you willing to try this practice?”

Willingness	Frequency (%; N=42*)
Yes	31.0
Maybe	59.5
No	9.5

*This question may have a low response due to incorrect skip pattern

Table 37. Nutrient management plan adoption barriers

Corresponds to Q36: “How much do the following factors limit your ability to implement a nutrient management plan?”

Factor	N*	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (NA)	n**	Mean (sd)**
		Frequency (%)						
a. Time or management required	80	47.5	27.5	15.0	2.5	7.5	74	1.7 (.840)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	80	53.8	26.3	10.0	1.3	8.8	73	1.6 (.746)
c. Desire to continue traditional farming practices/methods	81	70.4	12.3	8.6	1.2	7.4	75	1.4 (.710)
d. Disapproval from others	79	77.2	8.9	2.5	0.0	11.4	70	1.1 (.439)
e. Lack of equipment/technology	80	51.2	22.5	15	0.0	11.3	71	1.6 (.767)
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	80	57.5	15	13.8	1.3	12.5	70	1.5 (.812)
g. Lack of information on economic benefits	81	59.3	12.3	12.3	2.5	13.6	70	1.5 (.847)
h. My landowner	79	77.2	6.3	5.1	0.0	11.4	70	1.2 (.519)

*This question may have a low response due to incorrect skip pattern

** Not calculated with “Don’t know” responses.

Table 38. Development of nutrient management plan

Corresponds to Q37: “Which of the following entities were integral to the development your nutrient management plan? Check all that apply.”

Entity	Frequency (%; N=33*)
I created my own plan without help from others.	3.0
Soil and Water Conservation District (SWCD) or Natural Resources Conservation Service (NRCS)	42.4
Tri-state fertilizer recommendations	24.2
Retail agronomist/Crop advisor	42.4
Independent agronomist/Crop advisor	51.5
Purdue Extension	15.2

*This question may have a low response due to incorrect skip pattern

Table 39. Nutrient management plan components

Corresponds to Q38: “What is included in your nutrient management plan?
Check all that apply”

Component	Frequency (%; N=38*)
Commercial nutrients	71.1
Livestock manure	84.2
Septic waste	0.0
Municipal sludge	0.0
Industrial sludge	0.0
Don't know	5.3
Other (please specify):	0.0

*This question may have a low response due to incorrect skip pattern

Table 40. Revising your nutrient management plan

Corresponds to 39: “How often do you revise your nutrient management plan?”

Revision rate	Frequency (%; N=37*)
Never	2.7
Every year	40.5
Every 2-3 years	35.1
Every 4 years or longer	21.6

*Due to an incorrect skip pattern, this question has a low response.

Table 41. Applied recommendation of nutrient management plan

Corresponds to Q40: “What percentage of the recommendations in your nutrient management plan do you follow? *Please enter a numeric value.*”

Percent of nutrient management plan followed	Frequency (%; N=33*)
Range	30-100 (70)
Mean (<i>sd</i>)	88.0(17.01)
Median	95

*Due to an incorrect skip pattern, this question has a low response.

Table 42. Familiarity with other land management practices

Corresponds to Q41: “How familiar are you with the following practices?”

Practice	N	Never heard of it (1)	Somewhat familiar with it (2)	Know how to use it; not using it (3)	Currently use it (4)	Not relevant for my operation (5)	n*	Mean (sd)*
		Frequency (%)						
a. Filter strips or other buffers	240	3.8	26.7	14.2	43.3	12.1	211	3.1 (.980)
b. Two-stage ditch (modifies a conventional ditch to incorporate a low-flow and a high-flow channel, stage 1 and 2 respectively, that increases the ditch’s drainage capacity, leads to greater stability, and reduces nutrient loads.)	239	32.6	27.2	17.2	2.5	20.5	190	1.9 (.860)
c. Controlled drainage (uses control structures on drainage pipe to hold water back to adjustable levels during the year and has been shown to reduce drainage water volume and amount of nitrate in drainage water by 25 to 40%. Controlled drainage may also make more water available to crops.)	239	20.9	38.5	17.2	2.5	20.9	189	2.0 (.782)
d. Cover crop seeder (used to plant cover crops.)	238	5.0	39.1	24.4	20.2	11.3	211	2.7 (.890)
e. Vertical till/VT unit (surface or shallow tillage that helps growers manage crop residue, control or minimize potential erosion and prepare a clean, level seedbed.)	240	9.2	31.7	25.4	20.4	13.3	208	2.7 (.955)
f. Variable rate controllers (used to vary the rate of crop inputs.)	241	12.0	34.0	17.4	27.0	9.5	218	2.7 (1.046)

* Not calculated with “Don’t know” responses.

3.7 Section VII – About Your Farming Operation

Table 43. Length of farm operation

Corresponds to Q42: “How many years have you been farming? *Please enter a numeric value.*”

Years farming	Frequency (years; N=238)
Range	0-72
Mean (<i>sd</i>)	34.9 (16.55)
Median	40

Table 44. Hours of work on someone else’s farm

Corresponds to Q43: “How many days did you work at least 4 hours per day off your farm operation for pay in the past year? (Include work on someone else’s farm for pay).”

Days worked off farm	Frequency (%; N=238)
None	39.9
1 - 49 days	7.6
50 - 99 days	4.6
100 - 199 days	10.5
200 days or more	37.4

Table 45. Farmed acres

Corresponds to Q44: “In 2017, how many acres of each of the following did you manage in the portion of the St. Marys watershed (indicated as the blue map area on page 2)? *Please enter a numeric value. If none, please enter a zero.*”

Farmed acres	N	Mean Acres (<i>sd</i>)	Acre Range
44.1 Corn acres	224	143.2 (221.58)	0-1,800
a. Corn acres with no-till, strip-till or ridge till	175	37.1 (106.85)	0-800
b. Corn acres with cover crops	172	11.8 (37.14)	0-350
44.2 Soybean acres	216	94.6 (498.50)	0-6,450
a. Soybean acres with no-till, strip-till or ridge till	190	140.8 (242.69)	0-1,800
b. Soybean acres with cover crops	184	29.4 (98.48)	0-900
44.3 Other acres (please specify)*	138	35.6 (106.76)	0-1,000
44.4 Total conservation acres set aside (e.g. Conservation Reserve Program, Wetland Reserve Program)	208	5.8 (20.33)	0-200

* Other includes: Woods/trees, wheat, alfalfa, hay, oats, produce and pasture

Table 46. Livestock owned

Corresponds to Q45: “How many of the following animals are part of your farming operation in the portion of the St. Marys watershed (indicated as the blue map area on page 2)? Please enter a numeric value. If none, please enter a zero.”

Livestock	N	Number of individuals Mean (sd)	Number of individuals Range
Dairy cattle (including heifers and young stock)	191	22.8 (181.81)	0-2,000
Beef cattle (including young stock)	207	9.1 (42.35)	0-500
Hogs (including contract hog barns)	188	235.7 (1,308.03)	0-10,000
Poultry	186	876.4 (9,975.50)	0-134,000
Horses	184	0.1 (.75)	0-8
Other livestock (please specify)*	6	NA	NA

*Other livestock include: sheep and goats. Mean (sd) and range are NA because mixed type of “others” identified. (Respondents included cats as livestock, but were not incorporated into this analysis).

Table 47. Livestock access to water

Corresponds to Q46: “Do your livestock access any water body (stream, river, lake, or wetland) in the St. Marys watershed (indicated as the blue map area on page 2)?”

Access to water	Frequency (%; N=63)
Yes	7.9
No	92.1

Table 48. Crop advisor and agronomist relations

Corresponds to Q47: “Do you currently use a crop advisor or agronomist?”

Crop advisor and agronomist relationship	Frequency (%; N=225)
No, I have never used a crop advisor or agronomist.	33.3
No, I do not currently use a crop advisor or agronomist, but have used one in the past.	21.8
Yes, I currently use a crop advisor.	44.9

Table 49. Conservation practice testing

Corresponds to Q48: “Would you be willing to do side-by-side testing of conservation practices on a small acreage of your farm?”

Willingness	Frequency (%; N=228)
Yes	13.2
Maybe	48.2
No	38.6

Table 50. Farm operation outlook

Corresponds to Q49: “Five years from now, which statement will best describe your farm operation?”

Outlook	Frequency (%; N=230)
It will be about the same size as it is today	44.8
It will be larger	19.6
It will be smaller	3.9
I don't know	31.7

Appendix A – 2018 St. Marys Watershed Social Indicator Questionnaire

Your Views on Local Water Resources - St. Marys Watershed

Dear agricultural producer and/or landowner,

Purdue University is conducting this survey in coordination with local partners to understand soil and water quality issues in the St. Marys Watershed. Your insights are particularly important in helping us understand and facilitate technical and financial assistance for local conservation efforts.

There are two ways in which you can complete our survey:

1. The most convenient way is for you to enter the following website address into your web browser and provide your responses securely online:

<https://tinyurl.com/stmarysindiana>

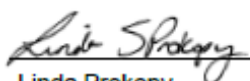
If you choose to complete the survey online you will need to enter the following code: _____. This will indicate that you completed the survey and we will stop sending reminders.

2. We have also included this paper version with a postage-paid return envelope if you prefer to respond by mail.

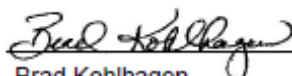
We ask that this survey be completed by the person in your home who makes most of the agricultural management decisions and is at least 18 years old. Your participation in this survey is voluntary. The information you provide will be kept confidential. It will be linked to the code provided above and not to your name.

Unless otherwise instructed, please check the selection that best describes your situation or opinion for the agricultural operation located within the portion of the St. Marys watershed indicated on the map on page 2, highlighted in blue. The survey should take approximately 20 minutes to complete.

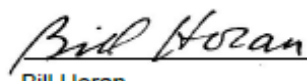
For more information regarding the survey, please contact Linda Prokopy at lprokopy@purdue.edu or at (765) 494-0825. *Thank you in advance for your help!*



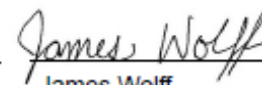
Linda Prokopy
Purdue University



Brad Kohlhausen
Purdue Extension
Adams County



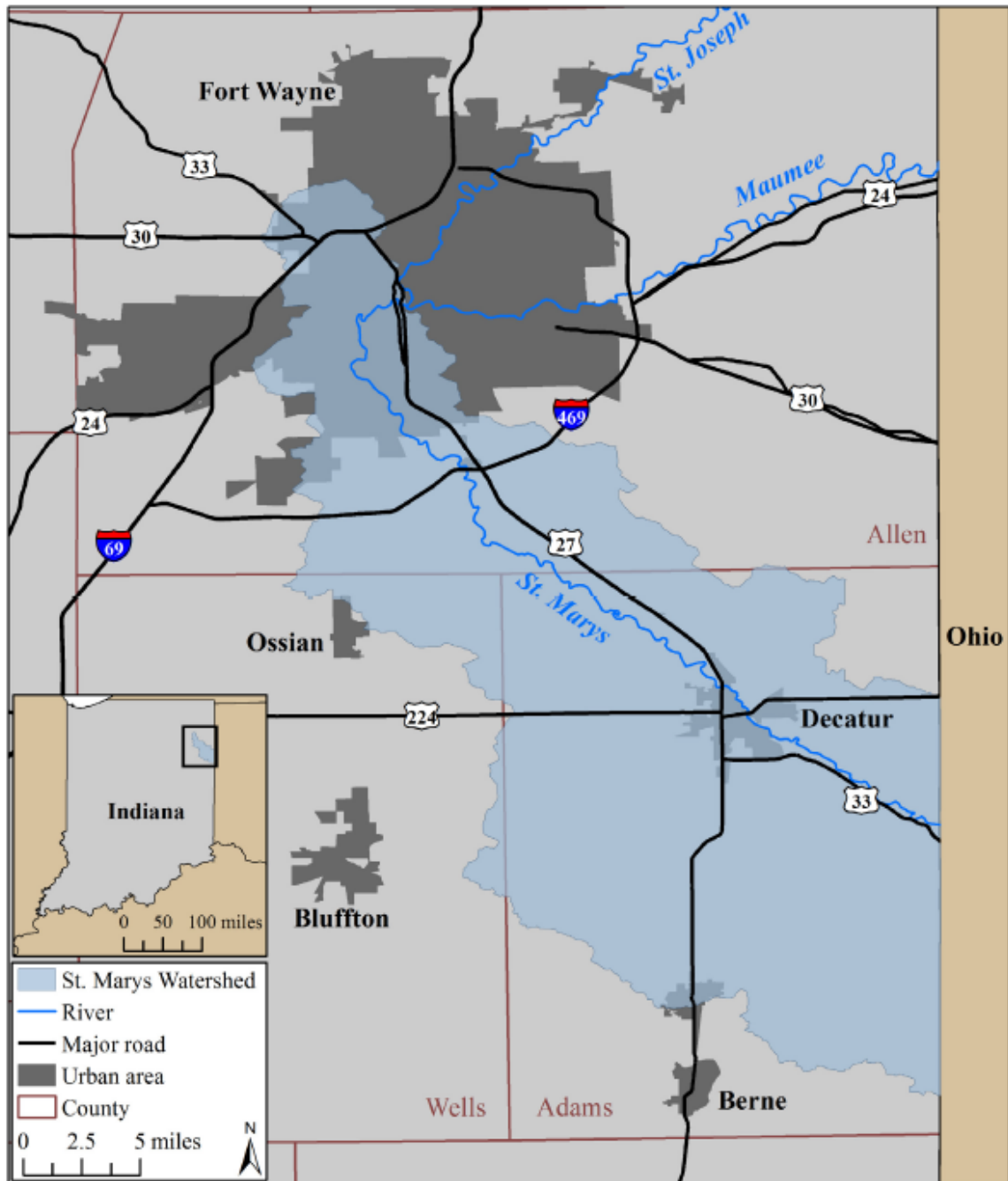
Bill Horan
Purdue Extension
Wells County



James Wolff
Purdue Extension
Allen County



St. Marys Watershed
Your Views on Local Water Resources



This map shows the Indiana portion of the St. Marys watershed (highlighted in blue). The map includes city and county names and major U.S. and interstate highways for your reference.

St. Marys Watershed
Your Views on Local Water Resources

SECTION I - Water Resources and 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 the St. Marys watershed (indicated as the blue map area on page 2)?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Sediment/silt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Nitrate/nitrogen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Phosphorus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Bacteria in the water (such as <i>E. coli</i>)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Pesticides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 the St. Marys watershed (indicated as the blue map area on page 2)?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Discharges from industry into streams and lakes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Discharges from wastewater treatment plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Soil erosion from farm fields	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Soil erosion from shorelines and/or streambanks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Lawn fertilizers and/or pesticides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Commercial fertilizers or manure used for crop production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Improperly maintained septic systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Littering/illegal dumping of trash	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Pesticides or herbicides used for crop production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Animal feeding operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Urban stormwater runoff (e.g., highways, rooftops, parking lots)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Removal of streambank vegetation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**St. Marys Watershed
Your Views on Local Water Resources**

3. Poor water quality can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in the St. Marys watershed (indicated as the blue map area on page 2)?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Contaminated fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Reduced beauty of streams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Reduced opportunities for water recreation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Reduced quality of water recreation activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Excessive aquatic plants or algae	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Fish kills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Lower property values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Human health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Animal risk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION II

4. Which water body does the St. Marys River drain into?

- Lake Erie Lake Michigan
 Gulf of Mexico Other

5. Does the property you own, manage or farm in the St. Marys watershed (indicated as the blue map area on page 2) touch a water body (stream, river, lake, or wetland)?

- Yes
 No

6. What is your gender?

- Male
 Female

7. What year were you born? *Please enter a numeric value.*

8. What is the highest level of education you have completed?

- Some formal schooling 2-year college
 High school diploma/GED 4-year college
 Some college Post-graduate degree

Your Views on Local Water Resources

9. Please estimate the acreage of your farmland in 2017. *Please enter a numeric value. If none, please enter a zero.*

	Owned acres	Acres rented from others
a. Total acreage	<input type="text"/>	<input type="text"/>
b. Total acreage in the St. Marys watershed (indicated as the blue map area on page 2)	<input type="text"/>	<input type="text"/>


SECTION III - Sources of Advice and Relationships


10. How would you describe your interaction with the following entities?

	No interaction	Receive information	Service provider	Not familiar
a. Conservation entities/government agencies (e.g., Soil and Water Conservation District (SWCD), Natural Resources Conservation Service (NRCS), Indiana State Department of Agriculture (ISDA))	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Commodity groups (e.g., corn, soybeans, dairy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Purdue Extension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Farm Bureau	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Retail agronomist/Crop advisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Independent agronomist/Crop advisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Other farmers/Landowners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Whose advice do you seek most in the list above?

12. Are you actively farming land in the St. Marys watershed (indicated as the blue map area on page 2)?

Yes  Please continue to question 13, page 6.

No  Please stop here, do not complete the following sections, and return the survey in the enclosed stamped envelope. If you have additional comments, please add them on page 16. Thank you.

St. Marys Watershed
Your Views on Local Water Resources

SECTION IV - Water Quality

13. Please indicate your level of disagreement or agreement with the statements below.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. Using recommended management practices on farms improves water quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. My actions have an impact on water quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I would be willing to change management practices to improve water quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. The quality of life in my community depends on good water quality in local streams, rivers, and lakes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I would be willing to change my management practices because I am concerned about the quality of water for my downstream neighbors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Agriculture in this area has permanently altered the ecosystem of the St. Marys River.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION V - Management Decision-Making

In this section, we are interested in how you think about your farm operations, including how you make land management decisions and think about unexpected problems. We are also interested in understanding what motivates you to consider adopting conservation practices.

14. When thinking about the overall management of your operation, how strongly do you disagree or agree with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. When I make decisions on my farm, I tend to see all kinds of possible consequences for each decision.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. By making plans and controlling my farm operations, I can accurately predict how successful my farm operation will be.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. When I have problems on my farm, it is usually because of something out of my control.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. When I have problems on my farm, I think about how I can change my operations to help reduce those problems in the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I always look at the interconnections and mutual influences between all of the decisions that go into my farm management.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. I think continuously about how to improve my farm operations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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15. Please indicate your level of disagreement or agreement with the statements below.

I would be motivated to implement a conservation practice:	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. If it improves soil health on the land I farm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. If it decreases soil erosion on the land I farm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. If it reduces my input costs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. If it increases my crop yields.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. If I think it is the right thing to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. If it is compatible with my existing farm operations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. If cost-share is available.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. If it reduces my risk from potential drought.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. If it reduces my risk from a potentially very wet year.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. If it improves soil quality on my less productive land.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. If my crop insurance program wasn't providing all the risk management I need.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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SECTION VI - Management Practices

This section contains a set of questions that refer to specific best management practices.
 For each question, please select the answer choice that best represents your experience or opinion.

Cover Crops: Cover crops include grasses, legumes, and other broadleaf plants established for winter cover, increased soil organic matter, and other conservation purposes.

16. How familiar are you with this practice?

- Never heard of it *(skip to question 20, page 9)*
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it *(skip to question 18, below)*

17. Are you willing to try this practice?

- Yes
- Maybe
- No

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

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Time or management required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Desire to continue traditional farming practices/methods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Disapproval from others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Lack of equipment/technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Lack of information on economic benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. My landowner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Please indicate your level of disagreement or agreement with the statements below.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. In a corn and soybean rotation, cover crops work well when combined with no-till.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. In a corn and soybean rotation, cover crops work well when combined with a livestock operation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Cover crops can reduce the need for pesticides.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Cover crops can reduce weeds.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Gypsum Application: Gypsum (calcium sulfate dehydrate-derived products) application is a soil amendment made to change the physical and/or chemical properties of soil.

20. How familiar are you with this practice?

- Never heard of it *(skip to question 24, page 10)*
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it *(skip to question 22, below)*

21. Are you willing to try this practice?

- Yes
- Maybe
- No

22. How much do the following factors limit your ability to apply gypsum?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Time or management required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Desire to continue traditional farming practices/methods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Disapproval from others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Lack of equipment/technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Lack of information on economic benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. My landowner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



If you currently apply gypsum, please continue to question 23 below.



If you do not apply gypsum, please skip to question 24, page 10.

23. Why are you using gypsum in your field? *Check all that apply.*

- Reduce magnesium
- Add sulfur
- Add calcium
- Don't know

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Conservation Tillage: Conservation tillage manages the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while limiting soil disturbing activities (e.g., no-till, strip-till, or ridge-till).

24. How familiar are you with this practice?

- Never heard of it *(skip to question 27, below)*
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it *(skip to question 26, below)*

25. Are you willing to try this practice?

- Yes
- Maybe
- No

26. How much do the following factors limit your ability to implement conservation tillage?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Time or management required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Desire to continue traditional farming practices/methods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Disapproval from others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Lack of equipment/technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Lack of information on economic benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. My landowner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Conservation Plan: A conservation plan is a customized document that outlines the resource concerns and solutions for the natural resources on your farm. This plan is a written record of your management decisions as well as the conservation practices and systems you plan to use to maintain your farm.

27. Do you have a conservation plan?

- Yes
- No *(skip to question 29, page 11)*

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28. Please indicate your level of disagreement or agreement with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. Developing my conservation plan was easy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I had enough help to develop my conservation plan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. My District Conservationist helps me determine conservation practices by looking at my conservation plan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. I look at my conservation plan to determine which new practice or program to implement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. My conservation plan addresses all of the resource concerns (soil erosion, manure storage, soil compaction, water quality, etc.) on my farm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. My conservation plan addresses all of the resource concerns (soil erosion, manure storage, soil compaction, water quality, etc.) of my watershed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. How regularly do you conduct soil testing?

- Never Every year Every 2-3 years Every 4 years or longer

30. Do you apply nutrients based on the results of your current soil testing?

- Yes
 No
 Don't know

31. Which of the following do you consider in the application of nutrients and soil amendments?

Check all that apply.

- Placement Time
 Amount Source

32. Do you feel you have enough storage space for manure so that you can apply when needed?

- Yes
 No
 Not applicable because I do not have livestock. *(skip to question 41, page 13)*

33. How many months of manure storage do you have?

- No storage 1-3 months 4-6 months More than 6 months

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Nutrient Management Plan: A nutrient management plan (e.g., Comprehensive Nutrient Management Plan, Manure Management Plan, or Fertilizer Action Plan) is a customized document that describes a farm's production practices and outlines strategies for managing nutrient losses to the air and water resources.

34. How familiar are you with this practice?

- Never heard of it (*skip to question 41, page 13*)
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it (*skip to question 36, below*)

35. Are you willing to try this practice?

- Yes
- Maybe
- No

36. How much do the following factors limit your ability to implement a nutrient management plan?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Time or management required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Desire to continue traditional farming practices/methods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Disapproval from others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Lack of equipment/technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Lack of information on economic benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. My landowner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



If you currently have a nutrient management plan, please continue to question 37 below.



If you do not have a nutrient management plan, please skip to question 41, page 13.

37. Which of the following entities were integral to the development your nutrient management plan? *Check all that apply.*

- I created my own plan without help from others.
- Retail agronomist/Crop advisor
- Soil and Water Conservation District (SWCD) or Natural Resources Conservation Service (NRCS)
- Independent agronomist/Crop advisor
- Tri-state fertilizer recommendations
- Purdue Extension

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38. What is included in your nutrient management plan? *Check all that apply.*

- Commercial nutrients
- Livestock manure
- Septic waste
- Municipal sludge
- Industrial sludge
- Don't know
- Other (please specify): _____

39. How often do you revise your nutrient management plan?

- Never Every year Every 2-3 years Every 4 years or longer

40. What percentage of the recommendations in your nutrient management plan do you follow?

Please enter a numeric value.

percent

41. How familiar are you with the following practices?

	Not relevant for my operation	Never heard of it	Somewhat familiar with it	Know how to use it; not using it	Currently use it
a. Filter strips or other buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Two-stage ditch (modifies a conventional ditch to incorporate a low-flow and a high-flow channel, stage 1 and 2 respectively, that increases the ditch's drainage capacity, leads to greater stability, and reduces nutrient loads.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Controlled drainage (uses control structures on drainage pipe to hold water back to adjustable levels during the year and has been shown to reduce drainage water volume and amount of nitrate in drainage water by 25 to 40%. Controlled drainage may also make more water available to crops.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Cover crop seeder (used to plant cover crops.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Vertical till/VT unit (surface or shallow tillage that helps growers manage crop residue, control or minimize potential erosion and prepare a clean, level seedbed.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Variable rate controllers (used to vary the rate of crop inputs.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION VII - About Your Farming Operation

42. How many years have you been farming? *Please enter a numeric value.*

years

43. How many days did you work at least 4 hours per day off your farm operation for pay in the past year? (Include work on someone else's farm for pay)

- None
- 1 - 49 days
- 50 - 99 days
- 100 - 199 days
- 200 days or more

44. In 2017, how many acres of each of the following did you manage in the portion of the St. Marys watershed (indicated as the blue map area on page 2)? *Please enter a numeric value. If none, please enter a zero.*

- 44.1. Corn acres
 - a. How many corn acres were no-till, strip-till, or ridge till? acres
 - b. How many corn acres were in cover crops? acres
- 44.2. Soybean acres
 - a. How many soybean acres were no-till, strip-till, or ridge till? acres
 - b. How many soybean acres were in cover crops? acres
- 44.3. Other (please specify): acres
- 44.4. Total conservation acres set aside (e.g., Conservation Reserve Program, Wetland Reserve Program)..... acres

45. How many of the following animals are part of your farming operation in the portion of the St. Marys watershed (indicated as the blue map area on page 2)? *Please enter a numeric value. If none, please enter a zero.*

- Dairy cattle (including heifers and young stock)
- Beef cattle (including young stock)
- Hogs (including contract hog barns)
- Poultry
- Horses
- Other livestock (please specify):



If you have livestock, please continue to question 46, page 15.



If you do not have livestock, please skip to question 47, page 15.

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46. Do your livestock access any water body (stream, river, lake, or wetland) in the St. Marys watershed (indicated as the blue map area on page 2)?

- Yes
- No

47. Do you currently use a crop advisor or agronomist?

- No, I have never used a crop advisor or agronomist.
- No, I do not currently use a crop advisor or agronomist, but have used one in the past.
- Yes, I currently use a crop advisor.

Who? (please specify):

48. Would you be willing to do side-by-side testing of conservation practices on a small acreage of your farm?

- Yes
- Maybe
- No


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

- It will be about the same size as it is today.
- It will be larger.
- It will be smaller.
- I don't know.

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Thank you

Please use the space below for any additional comments about this survey or water resources in your community.



Appendix B – Data Quality and Cleaning

Tracking and Data Entry

As questionnaires were returned through mail, they were processed daily. This included stamping the questionnaire with the date received, tracking receipt, and storing the hardcopy questionnaires in a fireproof cabinet. Questionnaire responses were received in several different ways: online, hardcopy, phone calls, and/or email.

If a questionnaire was completed via hardcopy, phone call, or email; then the data were entered into the online survey software (Qualtrics). The following general rules were applied as the questionnaires were entered into Qualtrics:

- 1.) all responses were entered as they appear on the hardcopy questionnaire,
- 2.) if a respondent left an item blank on the hardcopy questionnaire, the response was left blank,
- 3.) if a respondent had a double answer (responded twice to a single answer question), neither of their responses were included in the database,
- 4.) if a respondent had illegible handwriting, all legible text would be recorded and “[ILLEGIBLE]” was put in place of the illegible text, and
- 5.) if skip patterns were not followed, responses were still recorded for all answered questions.

Quality Assurance/Quality Control

After data entry was completed, a quality assurance/quality control (QA/QC) process was conducted. The QA/QC method verifies that the data entered for questionnaires match the questionnaire responses. Three fields; unique ID, date received, and response type were checked for 100% accuracy. After 100% accuracy was confirmed, 10% of the hardcopy questionnaires were randomly chosen and checked for data entry accuracy. Every data field (i.e., question) of the 10% questionnaire subset was reviewed. If the data entered did not match the questionnaire response, the response was corrected and the error was tracked by data field. Once the QA/QC process was finished, an analysis of the data entry errors was conducted to identify if there were any systematic data entry errors (defined as any single question having an error rate over 3%). No further QA/QC was necessary as there were no systematic errors identified.

Data Cleaning

After QA/QC process was completed, the hardcopy and online data were combined to clean the data. The following issues were addressed in data cleaning.

- Duplicate unique ID’s were resolved so that the questionnaire with the earliest date received or questionnaire with the most answered questions was selected as valid data, resulting in only one response per unique ID.
- Data type issues where the respondent’s answer was translated to fit the format of the questionnaire (i.e., a respondent may answer “about 5” which is then corrected to read “5”). If an answer was not translatable it was not included into the data set.

Skip Pattern

Some respondents ignored the skip pattern and answered questions that they were not applicable for. Several rules were followed during data analysis so that the data would be valid, even if skip patterns were not followed (see table below).

Question	Rules
Q12	Those who responded “Yes” or skipped Q12 were analyzed for the rest of the questionnaire.
	Those who responded “No” were only analyzed for Q1-Q12.
Q16	Those who responded “Somewhat familiar with it”, “Know how to use it; not using it” or skipped Q16, but answered subsequent questions were analyzed for Q17-Q19.
	Those who responded “Currently use it” were analyzed for Q18 and Q19.
Q20	Those who responded “Somewhat familiar with it” or “Know how to use it; not using it” were analyzed for Q21 and Q22.
	Those who responded “Currently use it” were analyzed for Q22 and Q23.
	Those who skipped Q20, but answered subsequent questions were analyzed for Q21-Q23.
Q24	Those who responded “Somewhat familiar with it”, “Know how to use it; not using it” or skipped Q24, but answered subsequent questions were analyzed for Q25 and Q26.
	Those who responded “Currently use it” were analyzed for Q26.
Q27	Those who responded “Yes” or skipped Q27 were analyzed for Q28.
Q32	Due to an incorrect skip pattern (see Q32 on A-11), there is a low response rate to nutrient management questions. A potential 122 respondents skipped questions that they were applicable for because of this complication. If respondents did not follow the skip pattern as written, those responses were analyzed for nutrient management plan section.
Q34	Those who responded “Somewhat familiar with it” or “Know how to use it, not using it” were analyzed for Q35 and Q36.
	Those who skipped Q34, but answered subsequent questions were analyzed for Q35-Q40.
	Those who responded “Currently use it” were analyzed for Q36-Q40.