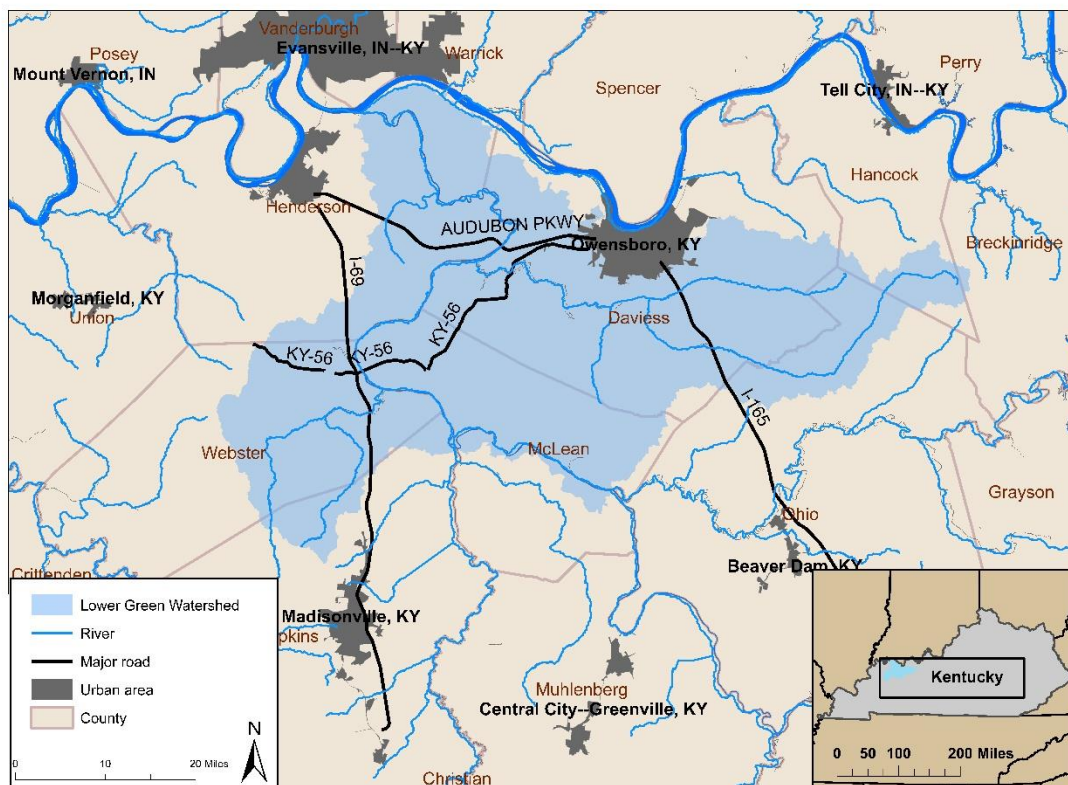


Understanding Barriers and Incentives Around Farm Conservation Practices in the Lower Green Watershed

Descriptive Report



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

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1 Introduction

The Nature Conservancy funded Purdue University's Natural Resource Social Science Lab to study and better understand some of the barriers and incentives surrounding farm conservation practices in the Lower Green watershed in Kentucky. The Natural Resource Social Science Lab conducted a social indicators survey in the Lower Green watershed to identify barriers to increasing the adoption of a broad spectrum of in-field and edge-of-field conservation practices within the watershed. Through this survey, the desired outcome was to develop a base of knowledge around the factors which impact a producer or landowner's decision to adopt or increase their adoption of conservation practices in this region. We anticipate that these findings will inform public and private entities about the design and delivery of conservation programs targeting agricultural stakeholders within this watershed.

2 Methods

2.1 Questionnaire Development

The survey questionnaire was developed based upon current peer-reviewed literature and collaborator discussions. Standard social indicators questions were included, along with additional questions developed with project partners related to ecosystem services and other emerging topics of interest. The survey questions were divided into 10 distinct sections:

- Section I – Water Resources and Impairments; Three questions about landowner/producer perceptions of water pollutants and conditions in the Lower Green watershed.
- Section II – Information About You and Your Farm; Five questions asking participants about basic demographic information and descriptions of their farmland.
- Section III – Water Quality; One question on perceptions of water quality issues.
- Section IV – Sources of Information; One question on the level of trust participants have in conservation information sources.
- Section V – Program Participation and Operational Concerns; Five questions on water quality plans and conservation assistance programs.
- Section VI – Edge of Field Management Practices; 13 questions on edge of field management practices in the Lower Green watershed.
- Section VII – Infield Management Practices; 17 questions about infield management practices in the Lower Green watershed.
- Section VIII – Diversifying Your Farming Operation; Three questions on extended/diverse crop rotations and integrating livestock into cropping systems.
- Section IX – About Your Farming Operation; Six questions on the makeup of participant’s farms.
- Section X – Green River National Wildlife Refuge; Two Questions on landowners’ perceptions towards the local Green River National Wildlife Refuge.

2.2 Data Collection

From June 17th, 2022 to October 19th, 2022, Purdue University conducted a five-wave questionnaire effort to farmers and agricultural producers in the Lower Green watershed. Using the partnership with the Nature Conservancy, the NRSS Lab identified and purchased an initial 1200 addresses of relevant landowners in the region from Farm Market ID.

Wave 1 of the survey was an advanced letter sent out on 06/17/2022 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 sent out on 07/05/2022 with a stamp and addressed return envelope, sent to those who had not yet completed the online questionnaire. Wave 3 was a reminder postcard sent out on 07/27/2022 that included the website address to take the online questionnaire. Wave 4 was a second hardcopy of the questionnaire and return envelope sent out on 08/12/2022. 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 final postcard reminder, all sent out on 09/02/2022. The survey was closed for responses on 10/19/2022.

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.

- 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 only the final text prompt after Q56, not included due to response size and variation.

All data were analyzed in SPSS (v. 28), or MS Excel.

2.4 Response Rate

A total of 1200 questionnaires were mailed to unique addresses and 64 were returned as bad addresses (see Appendix B for bad addresses definition) for a total of 1136 valid addresses. There were 307 questionnaires that were returned with responses, resulting in a response rate of 27%.

To calculate the response rate, total completed questionnaires is divided by the number 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

Section I – Water Resources and Impairments

Table 1. Water pollutants and conditions in Lower Green watershed

Corresponds to Q1: “In your opinion, how much of a problem are the following water pollutants and conditions in the Lower Green watershed?”

Participants generally perceived all of these water pollutants to be slight problems in Lower Green, with sediment/silt indicated as the biggest problem on the list. Participants also had a fairly high amount of uncertainty (20-30%) about whether or not these pollutants/water conditions were problems.

Water pollutant/condition	N	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know	Mean (sd)*
		(1)	(2)	(3)	(4)	(9)	
		Frequency (%)					
a. Sediment/silt	295	18.8	23.4	26.4	8.6	20.1	2.32 (0.965)
b. Nitrate/nitrogen	294	23.4	22.8	18.8	4.6	27.4	2.07 (0.934)
c. Phosphorus	292	25.4	23.1	15.5	2.0	30.4	1.91 (0.858)
d. Bacteria in the water (such as <i>E. coli</i>)	296	22.1	23.4	13.9	7.9	30.4	2.11 (0.999)
e. Pesticides	294	27.1	21.1	16.2	8.3	24.4	2.08 (1.022)

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

Table 2. Sources of water quality pollution in Lower Green watershed

Corresponds to Q2: “In your opinion, how much of a problem are the following sources in the Lower Green watershed?”

Once again, survey participants in general perceived these water quality issues to be slight to moderate problems in the Lower Green watershed. Littering/illegal dumping of trash was seen as the biggest problem in this region, while animal feeding operations were seen as the least concerning water pollution source. There were a relatively high number of participants for many of these pollution issues that either did not know if they were problems or did not perceive them to be problems.

Pollution source	N	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know	Mean (sd)*
		(1)	(2)	(3)	(4)	(9)	
Frequency (%)							
a. Discharges from industry into streams and lakes	293	24.8	25.8	17.5	7.9	21.8	2.11 (0.989)
b. Discharges from wastewater treatment plants	294	28.4	25.7	14.9	4.0	24.1	1.92 (0.899)
c. Soil erosion from farm fields	294	11.9	35.6	27.4	12.2	9.9	2.46 (0.897)
d. Soil erosion from shorelines and/or streambanks	292	16.2	23.1	28.4	11.9	16.5	2.45 (0.978)
e. Lawn fertilizers and/or pesticides	294	28.1	27.4	14.5	7.6	19.5	2.02 (0.972)
f. Commercial fertilizers used for crop production	293	23.4	30.0	20.5	5.9	16.8	2.11 (0.915)
g. Manure or litter used for crop production	293	29.7	27.1	16.8	4.3	18.8	1.94 (0.905)
h. Improperly maintained septic systems	293	25.4	25.1	17.8	5.0	23.4	2.03 (0.929)
i. Littering/illegal dumping of trash	295	10.2	28.1	28.1	18.2	12.5	2.64 (0.952)
j. Pesticides or herbicides used for crop production	292	26.1	29.7	18.8	4.3	17.5	2.02 (0.889)
k. Animal feeding operations	291	32.0	28.1	9.2	3.6	23.1	1.79 (0.850)
l. Urban stormwater runoff	290	20.5	29.7	19.1	9.6	16.8	2.23 (0.970)
m. Removal of streambank vegetation	291	24.4	27.4	15.5	9.2	19.5	2.13 (0.996)
n. Discharges from active or reclaimed mine lands	294	25.4	25.1	15.2	5.9	24.4	2.02 (0.950)

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

Table 3. Consequences for communities in Lower Green watershed

Corresponds to Q3: “In your opinion, how much of a problem are the following issues in the Lower Green watershed?”

Some community consequences of poor water quality, like lowering of property values and risk to animals were mostly seen as not being problems in Lower Green, while others like stream beauty and drinking water were seen as being only slight problems. Once again, participants indicated relatively high levels of uncertainty about these issues.

Community consequence	N	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know	Mean (sd)*
		(1)	(2)	(3)	(4)	(9)	
Frequency (%)							
a. Contaminated fish/fish kills	292	36.0	21.1	10.9	2.6	25.4	1.72 (0.859)
b. Reduced beauty of streams	291	30.4	26.1	17.2	8.3	13.9	2.04 (0.993)
c. Reduced opportunities for fishing/other water recreation activities	293	35.6	25.7	13.9	3.3	17.8	1.81 (0.872)
d. Excessive aquatic plants or algae	289	26.7	26.7	15.2	4.3	22.1	1.96 (0.901)
e. Lower property values	289	44.6	16.5	6.9	3.6	23.4	1.58 (0.863)
f. Drinking water	290	32.3	21.1	14.5	8.3	19.1	1.98 (1.023)
g. Animal risk	293	39.3	23.1	7.6	4.0	22.4	1.68 (0.863)

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

Section II – Information About You and Your Farmland

Table 4. Property in the Lower Green watershed

Corresponds to Q4: “Does the property you own, manage, or farm in the Lower Green watershed touch a water body (stream, lake, or wetland)?”

Water body adjacent	Frequency (%; N=286)
Yes	69.2
No	30.8

Table 5. Estimated farmland acreage

Corresponds to Q5: “Please estimate the acreage of your farmland in 2021.”

The average survey participant had a total farmland ownership of 418.5 acres, with 338.7 of those acres existing within the Lower Green watershed. A significant number of farmers rented farmland from others, with an average of 520.7 acres rented out total and 397.7 rented within Lower Green.

Farmland acres	N	Acres Mean (sd)	Acres Range
<i>Total acres</i>			
Total owned acres	287	418.5 (636.4)	0-5,000
Acres rented to others	177	171.2 (293.5)	0-2,184
Acres rented from others	131	520.7 (1,229.3)	0-10,000
<i>Lower Green watershed acres</i>			
Total owned acres in the Lower Green watershed	256	338.7 (511.9)	0-3,000
Total acres rented to others in the Lower Green watershed	133	153.9 (281.1)	0-2,009
Total acres rented from others in the Lower Green watershed	108	397.7 (945.8)	0-8,000
<i>Tillable Lower Green watershed acres</i>			
Total tillable owned acres in the Lower Green watershed	260	285.0 (469.1)	0-3,000
Total tillable acres rented to others in the Lower Green watershed	145	145.0 (249.2)	0-1,750
Total tillable acres rented from others in the Lower Green watershed	104	419.4 (954.0)	0-8,000

Table 6. Education

Corresponds to Q6: “What is the highest level of education you have completed?”

Education Level	Frequency (%; N=293)
Some formal schooling	2.0
High school diploma/GED	27.3
Some college	13.7
2-year college	9.2
4-year college	24.9
Post-graduate degree	22.9

Table 7. Age

Corresponds to Q7: “What year were you born?”

Years	N	Mean	Range
Year	294	67.0	1927-1996

Table 8. Gender

Corresponds to Q8: “What is your gender?”

Gender	Frequency (%; N=295)
Male	78.3
Female	21.7

Section III – Water Quality

Table 9. Agreement or disagreement with statements on water quality

Corresponds to Q9: “Please indicate your level of disagreement or agreement with the statements below.”

Overall survey participants had high levels of agreement for all of these water quality prompts. Participants indicated that management practices do have an impact on water quality, but the lowest mean scores in this section relate to whether participants are willing to change their practices to improve water conditions.

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.	296	2.0	1.4	13.2	59.5	24.0	4.02 (0.781)
b. My actions have an impact on water quality.	295	3.1	3.1	10.8	60.3	22.7	3.97 (0.856)
c. I would be willing to change management practices to improve water quality.	293	3.1	3.8	35.8	45.4	11.9	3.59 (0.861)
d. The quality of life in my community depends on good water quality in local streams, rivers, and lakes.	294	1.7	3.7	14.3	53.7	26.5	4.00 (0.845)
e. I would be willing to change my management practices because I am concerned about the quality of water for my downstream neighbors.	294	2.7	6.1	38.4	39.1	13.6	3.55 (0.899)

Section IV – Sources of Information

Table 10. Sources of information on conservation practices

Corresponds to Q10: “People get information about conservation practices from a number of different sources. To what extent do you trust those listed below as a source of information about conservation practices?”

There was a high amount of variation in regards to whether survey participants trust the conservation information sources listed. Mean scores indicate that along with participants’ peer group, agricultural public entities such as the Farm Service Agency, Conservation districts, NRCS, and Kentucky Department of Agriculture were the most trusted sources of conservation information. Environmental organizations (Sierra Club and Audubon being listed) and sportsmen groups had significantly lower trust scores.

Source	N	Not at all	Slightly	Moderately	Very much	Not familiar	Mean (sd)*	
		(1)	(2)	(3)	(4)	(9)		
		Frequency (%)						
a. Farm Service Agency	295	3.1	7.1	33.2	51.5	5.1	3.40 (0.765)	
b. Conservation Districts	293	3.8	5.8	34.8	43.3	12.3	3.34 (0.785)	
c. Natural Resources Conservation Service	293	4.4	6.8	31.1	42.7	15.0	3.32 (0.833)	
d. Kentucky Division of Forestry	294	6.8	16.3	34.7	29.9	12.2	3.00 (0.917)	
e. Kentucky Division of Water	293	10.6	14.3	31.7	30.0	13.3	2.94 (1.000)	
f. Kentucky Department of Agriculture	293	4.4	9.6	37.5	40.6	7.8	3.24 (0.826)	
g. Kentucky Department of Fish and Wildlife Resources	292	9.9	12.7	34.2	33.2	9.9	3.01 (0.977)	
h. Extension agent	294	4.4	6.5	32.3	48.3	8.5	3.36 (0.815)	
i. Environmental groups (e.g., Sierra Club, Audubon Society)	292	39.4	21.9	15.8	7.9	15.1	1.91 (1.008)	
j. Sportsmen groups (e.g., Ducks Unlimited, Quail Forever, National Wild Turkey Federation)	294	22.4	25.2	26.5	10.2	15.6	2.29 (0.992)	
k. Kentucky Farm Bureau	293	9.9	19.1	32.4	31.4	7.2	2.92 (0.984)	
l. AgriBusiness Association of Kentucky	290	13.8	15.9	25.5	14.5	30.3	2.58 (1.030)	
m. Commodity groups	292	13.7	18.5	31.5	14.7	21.6	2.60 (0.984)	
n. Crop advisors	292	11.0	15.8	30.8	23.6	18.8	2.83 (1.000)	
o. Fertilizer/seed representatives	296	18.9	24.7	27.7	15.2	13.5	2.45 (1.020)	
p. Other landowners/friends/farmers	295	3.1	15.9	42.0	34.2	4.7	3.13 (0.800)	

*not calculated with “Not familiar” responses

Section V – Program Participation and Operational Concerns

Table 11. Kentucky Agriculture Water Quality Plan

Corresponds to Q11: “Do you have a Kentucky Agriculture Water Quality Plan?”

Ownership of a plan	Frequency (%; n=284)
Yes	35.6
No	39.4
Don’t Know	25.0

Table 12. Updates to Kentucky Agriculture Water Quality Plan

Corresponds to Q12: “Have you updated your Kentucky Agriculture Water Quality Plan in the last 5 years?”

Updates to plan	Frequency (%;N=121)
Yes	41.3
No	58.7

Table 13. Participation in conservation assistance programs

Corresponds to Q13: “What conservation assistance programs do you currently participate in?”

Program	Frequency (%; N=275)
Conservation Reserve Program	37.1
Wetland Reserve Program	7.6
Environmental Quality Incentives Program	16.7
Conservation Stewardship Program	4.4
State Agency Assistance Program	5.8
Other	6.9
None	47.3

Note: a respondent can choose multiple programs and the sum of frequency (%) is greater than 100%.

Table 14. Limiting factors in conservation assistance program participation

Corresponds to Q14: “How much do the following factors limit your ability/willingness to participate in the above conservation assistance programs?”

Participants showed a lack of knowledge regarding conservation assistance programs and how specific factors might limit their ability to participate. For those who were familiar, excessive restrictions and requirements was given as the biggest problem hindering participation in conservation assistance programs.

Factors	N	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know	Mean (sd)*
		(1)	(2)	(3)	(4)	(9)	
Frequency (%)							
a. Insufficient payments	278	19.8	15.8	24.1	10.4	29.9	2.36 (1.048)
b. Complicated application process	280	14.6	16.8	22.1	16.8	29.6	2.58 (1.069)
c. Eligibility	281	20.6	11.7	22.8	9.3	35.6	2.32 (1.073)
d. Excessive restrictions/requirements	277	11.9	12.6	24.9	19.5	31.0	2.75 (1.050)

Table 15. Farming operation or cropland concerns

Corresponds to Q15: “Please indicate your level of disagreement or agreement with the following statements. *Regarding my farming operation or cropland, I am concerned about...*”

Survey participants demonstrated a relatively high amount of concern for all 10 of the cropland issues they were prompted about. High input costs, erosion, and long-term profit were given as the greatest areas of concern for farmers, while frequent flooding and time constraints were the least concerning in Lower Green.

Concern	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (sd)
		Frequency (%)					
a. Erosion	282	1.8	4.3	12.4	53.5	28.0	4.02 (0.858)
b. High input costs	280	2.1	0.7	18.2	40.7	38.2	4.12 (0.880)
c. Long-term profit	277	1.4	2.2	20.6	46.2	29.6	4.00 (0.849)
d. Short-term profit	278	2.5	3.2	28.8	42.1	23.4	3.81 (0.918)
e. Generational change	277	3.2	1.8	35.4	37.9	21.7	3.73 (0.930)
f. Environmental regulation	279	2.5	4.3	26.9	37.6	28.7	3.86 (0.968)
g. Land/rental prices	276	2.9	4.0	33.0	38.4	21.7	3.72 (0.945)
h. Frequent flooding	280	6.1	9.6	36.4	29.6	18.2	3.44 (1.083)
i. Labor availability/cost	280	5.0	2.1	38.9	36.1	17.9	3.60 (0.972)
j. Time constraints	278	4.7	4.0	49.3	29.5	12.6	3.41 (0.926)
k. Other	28	3.6	0.0	71.4	7.1	17.9	3.36 (0.911)

Section VI – Edge of Field Management Practices

Table 16. Familiarity with filter strips and other buffers

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

Filter strip familiarity	Frequency (%; N=277)
Never heard of it	19.1
Somewhat familiar with it	24.9
Know how to use it; not using it	17.0
Currently using it	39.0

Table 17. Willingness to try filter strips and other buffers

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

Willingness	Frequency (%; N=159)
Yes	27.0
Maybe	51.6
No	21.4

Table 18. Limiting factors in implementation of filter strips and other buffers

Corresponds to Q18: “How much do the following factors limit your ability/willingness to implement filter strips or other buffers?”

Just under 20% of participants had no knowledge or familiarity with filter strips and buffers. From those who have heard of filter strips and other buffers, no limitations were given as being moderate or severe problems for implementation. The greatest limiting factors were the time and management required, followed by economic viability and the physical features of one’s property.

Limitation	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don’t know (9)	Mean (sd)*
		Frequency (%)					
a. Time or management required	239	29.3	20.9	27.6	7.5	14.6	2.16 (1.000)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	241	32.8	21.2	27.8	4.1	14.1	2.04 (0.949)
c. Desire to continue traditional farming practices/methods	240	48.8	18.3	17.1	2.9	12.9	1.70 (0.898)
d. Disapproval from others	240	63.3	12.1	4.6	2.9	17.1	1.36 (0.745)
e. Lack of equipment/technology	239	47.3	19.2	15.9	4.6	13.0	1.75 (0.936)
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	238	50.8	17.2	10.9	2.9	18.1	1.58 (0.845)
g. Economic viability	238	32.8	23.1	19.3	8.8	16.0	2.05 (1.021)
h. My landowner	218	64.7	9.6	3.7	4.6	17.4	1.37 (0.812)
i. My tenant	227	61.7	8.8	8.8	2.6	18.1	1.42 (0.810)
j. Long-term commitment to practice	239	43.1	19.7	16.3	3.8	17.2	1.77 (0.922)

Table 19. Familiarity with a two-stage ditch

Corresponds to Q19: “How familiar are you with this practice?”

Two stage ditch familiarity	Frequency (%; N=283)
Never heard of it	51.2
Somewhat familiar with it	29.3
Know how to use it; not using it	6.0
Currently using it	13.4

Table 20. Willingness to try a two stage ditch

Corresponds to Q20: “Are you willing to try this practice?”

Willingness	Frequency (%; N=158)
Yes	17.7
Maybe	58.9
No	23.4

Table 21. Limiting factors in implementation of a two stage ditch

Corresponds to Q21: “How much do the following factors limit your ability/willingness to implement a two stage ditch?”

Over 50% of survey participants indicated they had no knowledge or familiarity of a two stage ditch. For the participants who were familiar, no limitations were scored as being moderate or severe problems. The largest limiting factors were the same as filter strips and buffers: time/management, physical features of the property, and economic viability. Some factors, such as disapproval from others, my tenant, and my landowner, were strongly scored as being not a problem in Lower Green.

Limitation	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (9)	Mean (sd)*
		Frequency (%)					
a. Time or management required	186	15.6	21.5	19.9	10.8	32.3	2.38 (1.011)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	182	15.4	23.1	19.8	12.1	29.7	2.41 (1.015)
c. Desire to continue traditional farming practices/methods	183	42.1	17.5	13.1	3.8	23.5	1.72 (0.922)
d. Disapproval from others	185	60.0	9.7	5.9	2.2	22.2	1.36 (0.744)
e. Lack of equipment/technology	183	31.1	21.9	13.7	8.7	24.6	2.00 (1.032)
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	183	39.3	19.1	10.9	3.8	26.8	1.72 (0.906)
g. Economic viability	181	23.8	20.4	19.3	7.7	28.7	2.16 (1.011)
h. My landowner	170	62.4	7.6	4.1	5.3	20.6	1.40 (0.866)
i. My tenant	173	59.5	6.4	5.8	1.7	26.6	1.31 (0.720)
j. Long-term commitment to practice	179	38.0	16.2	14.0	5.6	26.3	1.83 (0.992)

Table 22. Familiarity with grassed waterways

Corresponds to Q22: “How familiar are you with this practice?”

Grassed waterways familiarity	Frequency (%; N=263)
Never heard of it	16.0
Somewhat familiar with it	24.3
Know how to use it; not using it	12.9
Currently using it	46.8

Table 23. Willingness to try grassed waterways

Corresponds to Q23: “Are you willing to try this practice?”

Willingness	Frequency (%; N=130)
Yes	41.5
Maybe	43.8
No	14.6

Table 24. Limiting factors in implementation of grassed waterways

Corresponds to Q24: “How much do the following factors limit your ability/willingness to implement a grassed waterway?”

Most participants had a higher level of knowledge and familiarity with grassed waterways, but overall no limitations averaged higher than a mean score of 2, meaning that most participants indicated that none of these limitations were problems.

Limitation	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (9)	Mean (sd)*
		Frequency (%)					
a. Time or management required	244	38.9	20.1	20.1	7.8	13.1	1.96 (1.020)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	243	43.2	21.8	11.5	9.9	13.6	1.86 (1.038)
c. Desire to continue traditional farming practices/methods	241	52.7	17.8	12.9	3.3	13.3	1.62 (0.875)
d. Disapproval from others	242	72.7	4.5	3.3	2.9	16.5	1.24 (0.686)
e. Lack of equipment/technology	242	54.5	12.8	11.6	6.2	14.9	1.64 (0.971)
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	242	58.3	14.0	8.3	2.9	16.5	1.47 (0.811)
g. Economic viability	244	40.6	18.0	20.5	5.3	15.6	1.89 (0.984)
h. My landowner	220	72.7	5.0	4.5	2.7	15.0	1.26 (0.704)
i. My tenant	229	69.0	5.2	5.7	3.5	16.6	1.32 (0.781)
j. Long-term commitment to practice	241	53.5	13.7	11.6	5.4	15.8	1.63 (0.947)

Table 25. Familiarity with wetland easements

Corresponds to Q25: “How familiar are you with this practice?”

Wetland easements familiarity	Frequency (%; N=283)
Never heard of it	43.1
Somewhat familiar with it	38.9
Know how to use it; not using it	14.5
Currently using it	3.5

Table 26. Willingness to try a wetland easement

Corresponds to Q26: “Are you willing to try this practice?”

Willingness	Frequency (%; N=178)
Yes	13.5
Maybe	45.5
No	41.0

Table 27. Limiting factors in implementation of a wetland easement

Corresponds to Q27: “How much do the following factors limit your ability/willingness to implement a wetland easement?”

Over 40 percent of respondents had no knowledge or familiarity with wetland easements. For those who did have familiarity, time/management, physical features of the property, and economic viability once again were scored as the greatest limitations.

Limitation	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (9)	Mean (sd)*
		Frequency (%)					
a. Time or management required	199	28.6	16.1	21.1	10.1	24.1	2.17 (1.080)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	197	26.9	15.2	19.3	13.2	25.4	2.25 (1.128)
c. Desire to continue traditional farming practices/methods	200	36.0	13.5	18.5	12.5	19.5	2.09 (1.139)
d. Disapproval from others	198	57.1	8.1	3.5	6.6	24.7	1.46 (0.934)
e. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	196	40.8	14.8	11.2	6.1	27.0	1.76 (1.000)
f. Economic viability	195	27.2	12.8	19.0	14.4	26.7	2.28 (1.159)
g. My landowner	177	55.9	6.8	5.6	8.5	23.2	1.57 (1.031)
h. My tenant	181	51.4	9.4	7.7	6.1	25.4	1.58 (0.973)
i. Long-term commitment to practice	191	34.6	12.0	16.8	14.1	22.5	2.14 (1.176)

Table 28. Active Lower Green farming

Corresponds to Q28: “Are you actively farming in the Lower Green watershed?”

Almost a third of survey respondents are not actively farming in Lower Green. This could indicate a high level of non-operating landowners as part of the sample of farmers.

Actively Farming	Frequency (%; N=287)
Yes	67.6
No	32.4

Section VII – Infield Management Practices

Cover Crops

Table 29. Familiarity with cover crops

Corresponds to Q29: “How familiar are you with this practice?”

Cover crops familiarity	Frequency (%; N=212)
Never heard of it	8.0
Somewhat familiar with it	23.6
Know how to use it; not using it	32.1
Currently using it	36.3

Table 30. Willingness to try cover crops

Corresponds to Q30: “Are you willing to try this practice?”

Willingness	Frequency (%; N=135)
Yes	31.1
Maybe	45.2
No	23.7

Table 31. Limiting factors in implementation of cover crops

Corresponds to Q31: “How much do the following factors limit your ability/willingness to implement cover crops?”

Most farmers were familiar and knowledgeable about utilizing cover crops, with over a third of respondents stating that they are currently using cover crop management. Most limitations were scored as not being problems for implementing cover crops, but unlike previous management practices the greatest limitations were indicated as being time/management, labor involved, and weather-related uncertainties.

Limitation	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (9)	Mean (sd)*
		Frequency (%)					
a. Time or management required	186	29.0	19.4	30.1	11.3	10.2	2.26 (1.048)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	185	51.4	18.4	11.9	7.6	10.8	1.73 (0.990)
c. Desire to continue current/traditional farming methods	186	50.5	18.8	17.2	4.8	8.6	1.74 (0.944)
d. Disapproval from others	189	74.6	7.4	3.2	2.1	12.7	1.23 (0.631)
e. Lack of equipment/technology	188	48.9	13.8	19.1	8.0	10.1	1.85 (1.047)
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	188	58.0	16.0	9.0	4.8	12.2	1.55 (0.886)
g. Lack of information on economic benefits	189	45.0	18.0	16.4	7.9	12.7	1.85 (1.026)
h. My landowner	170	74.7	5.3	4.7	2.4	12.9	1.25 (0.679)
i. My tenant	179	64.8	6.7	6.1	6.1	16.2	1.45 (0.916)
j. Labor involved	188	33.5	14.9	23.9	18.1	9.6	2.29 (1.165)
k. Technical knowledge of practice implementation	182	51.1	13.2	15.9	6.0	13.7	1.73 (0.996)
l. Weather related uncertainties	186	29.0	18.3	26.9	14.0	11.8	2.29 (1.091)

Table 32. Prioritizing fields or acreage in cover crops

Corresponds to Q32: “If you plant cover crops, to what extent do you use the following when prioritizing fields or acreage to plant in cover crops?”

For those who are familiar or using cover crops, the most significant priority in planting cover crops is the erosion potential followed by the cash crop type to be planted in the following spring.

Factor	N	Not at all (1)	Slightly (2)	Moderately (3)	Very (4)	Extremely (5)	Mean (<i>sd</i>)
		Frequency (%)					
a. Erosion potential of specific acreage or specific fields	150	18.7	10.0	22.7	28.7	20.0	3.21 (1.379)
b. Current cash crop type to be harvested or just harvested	145	24.1	18.6	29.7	20.0	7.6	2.68 (1.251)
c. Cash crop type to be planted following spring	146	25.3	13.7	21.9	27.4	11.6	2.86 (1.373)
d. Weed pressure	146	28.8	17.1	32.2	11.6	10.3	2.58 (1.296)
e. Other	28	50.0	3.6	14.3	10.7	21.4	2.50 (1.689)

Table 33. Familiarity with conservation tillage

Corresponds to Q33: “How familiar are you with this practice?”

Conservation tillage familiarity	Frequency (%; N=211)
Never heard of it	13.3
Somewhat familiar with it	19.4
Know how to use it; not using it	9.0
Currently using it	58.3

Table 34. Willingness to try conservation tillage

Corresponds to Q34: “Are you willing to try this practice?”

Willingness	Frequency (%; N=82)
Yes	39.0
Maybe	39.0
No	22.0

Table 35. Limiting factors in implementing conservation tillage

Corresponds to Q35: “How much do the following factors limit your ability/willingness to implement conservation tillage?”

Most farmers were familiar with conservation tillage and there were no given limitations that were scored by respondents as being more than slight problems.

Limitation	N	Not a problem (1)	Slight problem (2)	Moderate problem (3)	Severe problem (4)	Don't know (9)	Mean (sd)*
		Frequency (%)					
a. Time or management required	174	59.8	15.5	13.2	3.4	8.0	1.57 (0.873)
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	175	58.3	18.9	9.7	4.0	9.1	1.55 (0.854)
c. Desire to continue current/traditional farming methods	177	63.8	12.4	8.5	6.2	9.0	1.53 (0.922)
d. Disapproval from others	176	80.7	4.0	2.8	1.7	10.8	1.17 (0.564)
e. Lack of equipment/technology	176	61.4	11.9	9.7	8.0	9.1	1.61 (0.991)
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	175	66.9	12.0	7.4	3.4	10.3	1.41 (0.801)
g. Lack of information on economic benefits	174	60.9	13.2	12.1	3.4	10.3	1.53 (0.868)
h. My landowner	161	81.4	3.1	2.5	2.5	10.6	1.17 (0.607)
i. My tenant	167	74.3	4.8	4.2	2.4	14.4	1.24 (0.671)
j. Technical knowledge of practice implementation	172	63.4	12.2	8.1	4.7	11.6	1.48 (0.869)
k. My property is prone to drainage issues/flooding	174	42.5	19.0	20.1	13.2	5.2	2.04 (1.106)

Table 36. Tillage before planting corn

Corresponds to Q36: “What type of tillage do you currently use before planting corn on the majority of your acres?”

Type of tillage	Frequency (%; N=184)
No-till	47.3
Strip-till	2.2
Conventional tillage less than 2 inch depth (One light pass akin to vertical tillage)	32.6
Conventional tillage less than 2 inch depth (Two light passes per season)	14.7
Conventional tillage greater than 2 inch depth and/or more than two passes per season	3.3

Table 37. Tillage before planting soybeans

Corresponds to Q37: “What type of tillage do you currently use before planting soybeans on the majority of your acres?”

Type of tillage	Frequency (%; N=186)
No-till	57.0
Strip-till	1.1
Conventional tillage less than 2 inch depth (One light pass akin to vertical tillage)	29.0
Conventional tillage less than 2 inch depth (Two light passes per season)	9.7
Conventional tillage greater than 2 inch depth and/or more than two passes per season	3.2

Table 38. Ownership of nutrient management plan

Corresponds to Q38: “Do you have a nutrient management plan?”

Ownership of plan	Frequency (%; N=198)
Yes	58.6
No	41.4

Table 39. Regularity of soil testing

Corresponds to Q39: “How regularly do you conduct soil testing?”

Frequency of testing	Frequency (%; N=206)
Never	2.4
Every year	28.6
Every 2-3 years	43.2
Every 4 years or longer	8.7
Don't know	17.0

Table 40. Nutrient application

Corresponds to Q40: “Do you apply nutrients based on the results of your current soil testing?”

Applies nutrients	Frequency (%; N=202)
Yes	79.7
No	3.5
Don't know	16.8

Table 41. Variable rate technology

Corresponds to Q41: “Do you use variable rate technology to apply nutrients?”

Applies nutrients	Frequency (%; N=202)
Yes	46.5
No	24.8
Don't know	28.7

Table 42. Considerations in nutrient management

Corresponds to Q42: “Which of the following do you consider in the application of nutrients and soil amendments?”

Application factors	Frequency (%; N=182)
Source	52.2
Amount	78.0
Placement	58.2
Timing	67.0
None of these	9.3

Note: a respondent can choose multiple factors and the sum of frequency (%) is greater than 100%.

Table 43. Determination of fertilizer rate

Corresponds to Q43: “Please indicate your level of disagreement or agreement with the following statements.”

<i>I determine my fertilizer rate based on...</i>	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (sd)
		Frequency (%)					
a. ...obtaining the maximum net profit.	189	3.7	3.7	25.9	43.4	23.3	3.79 (0.966)
b. ...obtaining the maximum yield.	192	5.2	5.2	22.4	46.9	20.3	3.72 (1.015)
c. Other	25	0.0	0.0	72.0	12.0	16.0	3.44 (0.768)

Table 44. Sources for fertility recommendations

Corresponds to Q44: “Who do you look to for information on fertility recommendations?”

Source	Frequency (%; N=193)
University Extension	39.9
Retail Crop Advisor	43.5
Independent Crop Advisor	40.9
Other	15.5

Note: a respondent can choose multiple factors and the sum of frequency (%) is greater than 100%.

Table 45. Limitations to adoption of variable rate technologies

Corresponds to Q45: “What limits your adoption of variable rate technologies?”

Limiting factors	Frequency (%; N=154)
Lack of equipment	47.4
Desire to continue current methods	18.2
Lack of proof on economic benefits	27.3
Physical features of my property	14.9
Other	21.4

Note: a respondent can choose multiple factors and the sum of frequency (%) is greater than 100%.

Section VIII – Diversifying Your Farming Operation

Table 46. Opinion on extended rotations

Corresponds to Q46: “Please provide your opinion on the following statements regarding extended rotations.”

Overall respondents were mixed regarding extended/diverse crop rotations. There was a very slight level of agreement that extended/diverse rotations can be as profitable as corn and soybean, that the decline of mixed grain and livestock has made production of small grains/forages less viable, and that respondents would be likely to use more extended/diverse rotations if there were more robust small markets. There was slight disagreement about the culture of Kentucky agriculture being unsupportive towards diverse field crops, and more broad general agreement about extended/diverse rotations improving soil health.

Statement	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (<i>sd</i>)
		Frequency (%)					
a. Extended/diverse rotations that include crops besides corn and soybeans can be as profitable as corn-corn or corn-soybean rotations.	198	6.1	16.7	43.4	28.3	5.6	3.11 (0.953)
b. Extended/diverse rotations can improve soil health.	193	2.6	1.6	29.5	54.9	11.4	3.71 (0.790)
c. If there were more robust small grains/forage markets in my area, I would be more likely to use/expand use of extended/diverse rotations.	196	3.6	3.6	48.0	40.8	4.1	3.38 (0.779)
d. Agribusiness companies are not interested in crop rotations that reduce reliance on purchased inputs.	196	5.6	9.2	52.6	25.5	7.1	3.19 (0.908)
e. The culture of Kentucky agriculture is not supportive of field crops other than corn and soybeans.	196	7.7	19.9	46.9	22.4	3.1	2.93 (0.923)
f. The decline of mixed grain and livestock farming has made production of small grains/forages less viable.	197	3.6	8.1	50.8	34.5	3.0	3.25 (0.793)

Table 47. Factors in encouraging adoption of extended rotations

Corresponds to Q47: “How important are the following factors in encouraging farmers to adopt extended rotations?”

When looking into the factors that might encourage future adoption of extended rotations, the development of robust markets, strong documentation of economic/longer-term profitability, and facilitation of links with specialty crop buyers were given as moderately important factors (mean scores between 3.28-3.39) for adoption.

Factor	N	Not important	Slightly important	Moderately important	Very important	Don't know	Mean (sd)*
		(1)	(2)	(3)	(4)	(9)	
Frequency (%)							
a. Cost share to offset short-term costs	196	3.6	12.2	29.6	35.7	18.9	3.20 (0.855)
b. Technical assistance from local ag retailers	197	7.6	15.2	34.0	24.4	18.8	2.93 (0.929)
c. Strong documentation of economic/longer-term profitability	194	3.1	8.8	29.4	39.2	19.6	3.30 (0.815)
d. Research-based evidence of soil health benefits	198	2.0	10.1	34.3	37.4	16.2	3.28 (0.768)
e. Development of robust markets	196	2.0	6.6	19.9	51.5	19.9	3.51 (0.756)
f. Facilitation of linkages with specialty crop buyers	192	2.1	8.3	25.0	43.2	21.4	3.39 (0.783)
g. Workshops, field days, and trainings on production practices	196	5.6	11.2	38.8	27.0	17.3	3.06 (0.858)
h. Revenue protection crop insurance	198	4.5	10.6	30.3	36.9	17.7	3.21 (0.871)
i. Commodity group support	195	5.6	14.4	32.3	24.6	23.1	2.99 (0.897)

Table 48. Opinion on integration of livestock

Corresponds to Q48: “Please provide your opinion on the following statements regarding integrating livestock into cropping systems.”

Although results are fairly mixed with most neither agreeing or disagreeing, on average respondents were not open to the idea of integrating livestock into cropping systems, even though they slightly disagreed with the idea that Kentucky agriculture’s culture was not supportive of this integration. Respondents slightly agreed on average that in order for this integration to happen and be successful, more research is needed and economic benefits must be clear.

Statement	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (sd)
		Frequency (%)					
a. I am open to the practice of integrating livestock into cropping systems.	188	15.4	16.5	43.6	18.1	6.4	2.84 (1.094)
b. The culture of Kentucky agriculture is not supportive of integrating livestock into cropping systems.	184	7.6	16.8	59.2	13.0	3.3	2.88 (0.850)
c. To successfully integrate livestock into cropping systems, economic benefits must exceed any increase in farm management efforts.	186	1.6	4.8	40.3	39.2	14.0	3.59 (0.848)
d. More research-based evidence is needed around the overall benefits of integrating livestock into cropping systems.	185	2.2	3.2	47.6	36.8	10.3	3.50 (0.808)

Section IX – About Your Farming Operation

Table 49. Managed acres

Corresponds to Q49: “In 2020, how many acres of each of the following did you manage in the portion of the Lower Green watershed?”

Managed acres	N	Acres Mean (sd)	Acre Range
49.1. Corn acres	158	296.00 (636.31)	0-6,000
a. Corn acres with no-till, strip-till or ridge till	162	207.75 (392.83)	0-3,000
b. Corn acres with cover crops	143	41.81 (134.30)	0-1,000
49.2. Soybean acres	147	303.14 (608.14)	0-5,000
a. Soybean acres with no-till, strip-till or ridge till	161	266.03 (568.24)	0-5,000
b. Soybean acres with cover crops	145	47.05 (136.52)	0-1,000
49.3. Small grains (wheat, oats, sorghum, etc.)	148	11.81 (39.40)	0-300
49.4. Canning crops	144	1.27 (10.64)	0-100
49.5. Pasture and/or hay production	156	25.48 (69.72)	0-600
49.6. Clover/alfalfa	146	1.49 (6.65)	0-50
49.7. Forest/woodland	148	43.04 (81.74)	0-500
49.8. Non-row crops for energy (e.g., switchgrass for ethanol)	144	0.00 (0.00)	0-0
49.9. Solar panels	145	0.00 (0.00)	0-0
49.10. Other	71	1.25 (6.70)	0-55
49.11. Total conservation acres set aside (e.g., Conservation Reserve Program, Wetland Reserve Program)	149	31.38 (140.41)	0-1,400

Table 50. Tile drainage

Corresponds to Q50: “What percentage of your acreage has tile drainage?”

Acreage	Percentage of tile drainage (%; N=187)
Range	0-100
Mean (<i>sd</i>)	46.14 (31.54)

Table 51. Years spent farming

Corresponds to Q51: “How many years have you been farming?”

Years farming	Years (N=188)
Range	0-200
Mean (<i>sd</i>)	35.6 (21.02)

Table 52. Days working off your farm operationCorresponds to Q52: “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=193)
None	60.1
1 - 49 days	6.2
50 - 99 days	4.1
100 - 199 days	2.1
200 days or more	27.5

Table 53. Gross farm income

Corresponds to Q53: “In 2021, what was your gross farm income before taxes?”

Gross farm income	Frequency (%; N=191)
Less than \$10,000	14.7
\$10,000 to \$24,999	4.7
\$25,000 to \$49,999	17.8
\$50,000 to \$99,999	12.0
\$100,000 to \$249,999	12.0
\$250,000 to \$499,999	16.2
\$500,000 to \$999,999	10.5
\$1,000,000 or more	5.2
Choose not to answer	6.8

Table 54. Livestock owned

Corresponds to Q54: “How many of the following animals are part of your farming operation in the portion of the Lower Green watershed?”

Livestock	N	Mean (sd)	Range
Dairy cattle (including heifers and young stock)	164	0.00 (0.00)	0-0
Beef cattle (including young stock)	176	15.84 (42.57)	0-300
Hogs (including contract hog barns)	165	0.77 (7.98)	0-100
Poultry	168	9,673.43 (101,187.69)	0-1,300,000
Horses	168	0.33 (1.61)	0-15
Other livestock (please specify)	98	1.57 (12.26)	0-120

Section X – Green River National Wildlife Refuge

Table 55. Support for the Green River National Wildlife Refuge

Corresponds to Q55: “Please indicate your level of disagreement or agreement with the following statements.”

Participants generally were slightly supportive overall of the existence of the Green River National Wildlife Refuge. They mostly supported its existence due to the nature it protects, although there was some very minor disagreement around supporting the refuge due to the tourism industry.

<i>I support the existence of the Green River National Wildlife Refuge due to...</i>	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (sd)
		Frequency (%)					
a. ...the tourism industry.	262	13.7	10.3	46.6	24.0	5.3	2.97 (1.05)
b. ...recreational benefits.	265	10.9	7.5	38.1	34.3	9.1	3.23 (1.08)
c. ...the nature it protects.	269	7.1	4.1	27.5	40.5	20.8	3.64 (1.08)
d. Other	38	5.3	5.3	73.7	10.5	5.3	3.05 (0.77)

Table 56. Concerns about the Green River National Wildlife Refuge

Corresponds to Q56: “Please indicate your level of disagreement or agreement with the following statements.”

Overall, survey respondents on average had slight levels of agreement regarding their concerns about the existence of the Green River National Wildlife Refuge. While the most frequent response was indicating that respondents neither agreed nor disagreed to the prompts, mean scores show that there was slight concerns about the refuge relating to disrespectful tourists, hunting regulations, nuisance wildlife impacts on agricultural land, and especially government overreach.

<i>I have concerns about the existence of the Green River National Wildlife Refuge due to...</i>	N	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Mean (sd)
		Frequency (%)					
a. ...lack of property tax revenue.	262	9.9	11.5	58.8	15.6	4.2	2.93 (0.91)
b. ...disrespectful tourists.	265	4.2	8.7	48.7	27.5	11.3	3.33 (0.93)
c. ...hunting regulations.	263	5.7	10.3	55.5	22.1	6.5	3.13 (0.89)
d. ...government overreach.	265	5.7	4.9	43.8	24.2	21.5	3.51 (1.06)
e. ...impacts of nuisance wildlife on agricultural land	265	6.4	9.8	42.6	24.5	16.6	3.35 (1.07)
f. ...harm to the local economy	263	8.4	12.2	55.9	16.0	7.6	3.01 (0.96)
g. Other	39	5.1	5.1	71.8	7.7	10.3	3.13 (0.86)

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Appendix A

Your Views on Conservation and Agriculture in the Lower Green Watershed

Dear agricultural producer/landowner,

Purdue University is partnering with The Nature Conservancy and other local stakeholders to conduct this survey to understand your views on conservation and agriculture in the Lower Green 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/LowerGreen>

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 a postage-paid return envelope if you prefer to respond by mail.

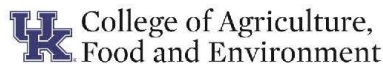
We ask that this survey be completed by the person in your home who **makes most of the agricultural management decisions** and is at least 18 years old. Your participation in this survey is voluntary. The information you provide will be kept confidential. It will be linked to the code provided above 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 Lower Green watershed indicated on the map on page 2, highlighted in blue**. The survey should take approximately 25-30 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!*

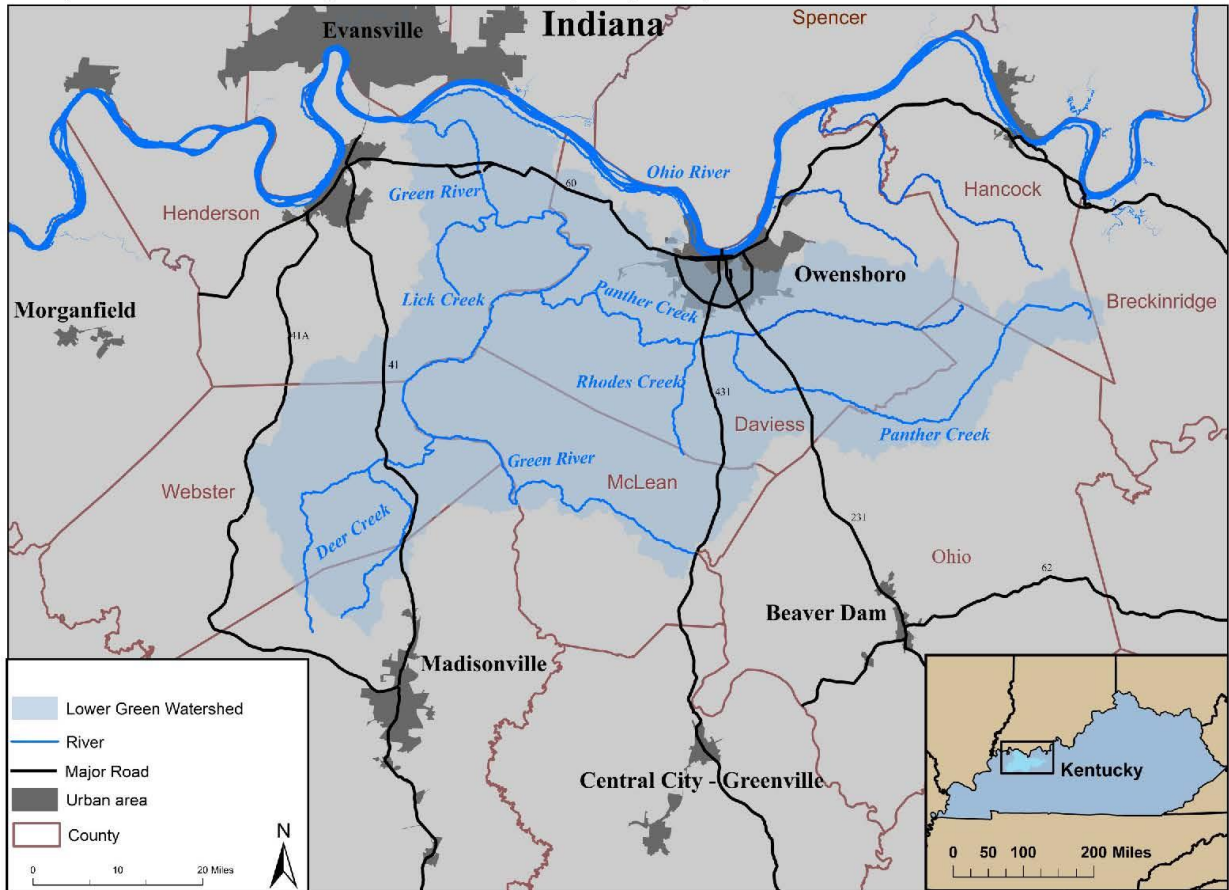

Dr. Linda Prokopy
Purdue University


Zach Luttrell
The Nature Conservancy



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The map below shows the Lower Green watershed (highlighted in blue). The map includes city and county names as well as major interstates and highways for your reference.



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 pollutants and conditions in the Lower Green 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="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Nitrate/nitrogen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Phosphorus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Bacteria in the water (such as <i>E. coli</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Pesticides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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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 Lower Green 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="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Discharges from wastewater treatment plants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Soil erosion from farm fields	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Soil erosion from shorelines and/or streambanks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Lawn fertilizers and/or pesticides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Commercial fertilizers used for crop production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Manure or litter used for crop production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Improperly maintained septic systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Littering/illegal dumping of trash	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Pesticides or herbicides used for crop production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Animal feeding operations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Urban stormwater runoff (e.g., highways, rooftops, parking lots)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Removal of streambank vegetation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. Discharges from active or reclaimed mine lands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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 Lower Green 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/fish kills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Reduced beauty of streams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Reduced opportunities for fishing and other water recreation activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Excessive aquatic plants or algae	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Lower property values	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Drinking water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Animal risk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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SECTION II - Information About You and Your Farmland

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

Yes No

5. Please estimate the acreage of your farmland in 2021. *Please enter a numeric value. If none, enter zero.*

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

6. 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

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

8. What is your gender?

SECTION III - Water Quality

9. 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="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. My actions have an impact on water quality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. I would be willing to change management practices to improve water quality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. The quality of life in my community depends on good water quality in local streams, rivers, and lakes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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SECTION IV - Sources of Information

10. People get information about conservation practices from a number of different sources. To what extent do you trust those listed below as a source of information about conservation practices?

	Not at all	Slightly	Moderately	Very much	Not familiar
a. Farm Service Agency (FSA)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Conservation Districts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Natural Resources Conservation Service (NRCS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Kentucky Division of Forestry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Kentucky Division of Water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Kentucky Department of Agriculture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Kentucky Department of Fish and Wildlife Resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Extension agent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Environmental groups (e.g., Sierra Club, Audubon Society)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Sportsmen groups (e.g., Ducks Unlimited, Quail Forever, National Wild Turkey Federation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Kentucky Farm Bureau	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. AgriBusiness Association of Kentucky	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Commodity groups (crop or livestock)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. Crop advisors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o. Fertilizer/seed representatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p. Other landowners/friends/farmers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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SECTION V - Program Participation and Operational Concerns

11. Do you have a Kentucky Agriculture Water Quality Plan?

- Yes No (*skip to question 13, below*) Don't know (*skip to question 13, below*)

12. Have you updated your Kentucky Agriculture Water Quality Plan in the last 5 years?

- Yes No

13. What conservation assistance programs do you currently participate in? *Check all that apply.*

- Conservation Reserve Program (CRP) State Agency Assistance Program
 Wetland Reserve Program (WRP) Other (please specify):
 Environmental Quality Incentives Program (EQIP)
 Conservation Stewardship Program (CSP) None

14. How much do the following factors limit your ability/willingness to participate in the above conservation assistance programs?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Insufficient payments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Complicated application process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Eligibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Excessive restrictions/requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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

Regarding my farming operation or cropland, I am concerned about...

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. Erosion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. High input costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Long-term profit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Short-term profit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Generational change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Environmental regulation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Land/rental prices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Frequent flooding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Labor availability/cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Time constraints	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Other (please specify): <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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SECTION VI - Edge of Field 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.

Filter Strips and Other Buffers: Provides a transition zone between the production area and a water feature. Vegetation growing in the buffer slows surface runoff, filters out pollutants, and reduces bank erosion.

16. How familiar are you with this practice?

- Never heard of it (*skip to question 19, below*)
- 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/willingness to implement filter strips or other buffers?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Time or management required	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Desire to continue current/traditional farming methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Disapproval from others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Lack of equipment/technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Economic viability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. My landowner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. My tenant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Long-term commitment to practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Two stage ditch: A drainage ditch with added floodplain benches that slow water flow and promote sediment and nutrient retention and bank stability.

19. How familiar are you with this practice?

- Never heard of it (*skip to question 22, page 8*)
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it (*skip to question 21, page 8*)

20. Are you willing to try this practice?

- Yes
- Maybe
- No

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21. How much do the following factors limit your ability/willingness to implement a two stage ditch?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Time or management required	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Desire to continue current/traditional farming methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Disapproval from others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Lack of equipment/technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Economic viability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. My landowner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. My tenant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Long-term commitment to practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Grassed Waterways: An erosion control practice that provides a stabilized flow path for water through a farm field.

22. How familiar are you with this practice?

- Never heard of it (*skip to question 25, page 9*)
 Know how to use it; not using it
 Somewhat familiar with it
 Currently use it (*skip to question 24, below*)

23. Are you willing to try this practice?

- Yes
 Maybe
 No

24. How much do the following factors limit your ability/willingness to implement a grassed waterway?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Time or management required	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Desire to continue current/traditional farming methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Disapproval from others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Lack of equipment/technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Economic viability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. My landowner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. My tenant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Long-term commitment to practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Wetland Easement: A long-term or permanent easement that pays highly competitive rates to take frequently flooded ground out of production while allowing the landowner to retain ownership and use for purposes of recreation and earning other income such as hunting leases.

25. How familiar are you with this practice?

- Never heard of it *(skip to question 28, below)*
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it *(skip to question 27, below)*

26. Are you willing to try this practice?

- Yes
- Maybe
- No

27. How much do the following factors limit your ability/willingness to implement a wetland easement?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Time or management required	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Desire to continue current/traditional farming methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Disapproval from others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Insufficient proof of erosion protection, soil health benefit, and/or water quality benefit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Economic viability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. My landowner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. My tenant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Long-term commitment to practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28. Are you actively farming land in the Lower Green watershed (indicated as the blue map area on page 2)?

- Yes *(continue to question 29 in Section VII, page 10)*
- No *(skip to question 55 in Section X, page 16)*

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SECTION VII - Infield 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.

29. How familiar are you with this practice?

- Never heard of it (*skip to question 33, page 11*)
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it (*skip to question 31, below*)

30. Are you willing to try this practice?

- Yes
- Maybe
- No

31. How much do the following factors limit your ability/willingness to implement cover crops?

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

32. If you plant cover crops, to what extent do you use the following when prioritizing fields or acreage to plant in cover crops?

	Not at all	Slightly	Moderately	Very	Extremely
a. Erosion potential of specific acreage or specific fields	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Current cash crop type to be harvested or just harvested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Cash crop type to be planted following spring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Weed pressure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Other (please specify): <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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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. **Mulch till is not included**).

33. How familiar are you with this practice?

- Never heard of it *(skip to question 36, below)*
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it *(skip to question 35, below)*

34. Are you willing to try this practice?

- Yes
- Maybe
- No

35. How much do the following factors limit your ability/willingness to implement conservation tillage?

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

36. What type of tillage do you currently use before planting corn on the majority of your acres?

- No-till (zero tillage passes throughout the entire year)
- Strip-till
- Conventional tillage less than 2 inch depth (One light pass akin to vertical tillage)
- Conventional tillage less than 2 inch depth (Two light passes per season)
- Conventional tillage greater than 2 inch depth and/or more than two passes per season

37. What type of tillage do you currently use before planting soybeans on the majority of your acres?

- No-till (zero tillage passes throughout the entire year)
- Strip-till
- Conventional tillage less than 2 inch depth (One light pass akin to vertical tillage)
- Conventional tillage less than 2 inch depth (Two light passes per season)
- Conventional tillage greater than 2 inch depth and/or more than two passes per season

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Nutrient Management: Nutrient management is the process of managing the amount, source, timing, and method of chemical fertilizer, manure, or other nutrient application with the goal of optimizing farm productivity while minimizing nutrient losses that could create environmental problems.

38. Do you have a nutrient management plan?

Yes No

39. How regularly do you conduct soil testing?

Never Every 2-3 years Don't know
 Every year Every 4 years or longer

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

Yes No Don't know

41. Do you use variable rate technology to apply nutrients?

Yes No Don't know

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

Check all that apply.

Source Amount Placement Timing None of these

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

I determine my fertilizer rate based on...

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. ...obtaining the maximum net profit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. ...obtaining the maximum yield.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Other (please specify): <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

44. Who do you look to for information on fertility recommendations? *Check all that apply.*

University Extension Independent Crop Advisor
 Retail Crop Advisor Other (please specify):

45. What limits your adoption of variable rate technologies? *Check all that apply.*

Lack of equipment Physical features of my property
 Desire to continue current methods Other (please specify):

Lack of proof on economic benefits

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SECTION VIII - Diversifying Your Farming Operation

Agricultural research has been examining how **extended/diverse rotations** that integrate small grains (i.e., oats, wheat, cereal rye), forages (i.e., alfalfa, cover crops), and livestock into corn and soybeans cropping systems can impact yields, input costs, and other aspects of cropping systems. Please answer the following questions regarding your opinion on **extended/diverse rotations** and integrating livestock into cropping systems.

46. Please provide your opinion on the following statements regarding extended rotations.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. Extended/diverse rotations that include crops besides corn and soybeans can be as profitable as corn-corn or corn-soybean rotations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Extended/diverse rotations can improve soil health.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. If there were more robust small grains/forage markets in my area, I would be more likely to use/expand use of extended/diverse rotations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Agribusiness companies are not interested in crop rotations that reduce reliance on purchased inputs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. The culture of Kentucky agriculture is not supportive of field crops other than corn and soybeans.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. The decline of mixed grain and livestock farming has made production of small grains/forages less viable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

47. How important are the following factors in encouraging farmers to adopt extended rotations?

	Not important	Slightly important	Moderately important	Very important	Don't know
a. Cost share to offset short-term costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Technical assistance from local ag retailers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Strong documentation of economic/longer-term profitability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Research-based evidence of soil health benefits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Development of robust markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Facilitation of linkages with specialty crop buyers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Workshops, field days, and trainings on production practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Revenue protection crop insurance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Commodity group support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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48. Please provide your opinion on the following statements regarding integrating livestock into cropping systems.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. I am open to the practice of integrating livestock into cropping systems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The culture of Kentucky agriculture is not supportive of integrating livestock into cropping systems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. To successfully integrate livestock into cropping systems, economic benefits must exceed any increase in farm management efforts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. More research-based evidence is needed around the overall benefits of integrating livestock into cropping systems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SECTION IX - About Your Farming Operation

49. In 2020, how many acres of each of the following did you manage in the portion of the Lower Green watershed (indicated as the blue map area on page 2)?

Please enter a numeric value. If none, please enter a zero.

- 49.1. 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
- 49.2. 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
- 49.3. Small grains (wheat, oats, sorghum, etc.) acres
- 49.4. Canning crops acres
- 49.5. Pasture and/or hay production acres
- 49.6. Clover/alfalfa acres
- 49.7. Forest/woodland acres
- 49.8. Non-row crops for energy (e.g., switchgrass for ethanol) acres
- 49.9. Solar panels acres
- 49.10. Other (please specify): acres
- 49.11. Total conservation acres set aside (e.g., Conservation Reserve Program, Wetland Reserve Program) acres

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50. What percentage of your acreage has tile drainage? *Please enter a numeric value.*

%

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

Years

52. 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 100 - 199 days
 1 - 49 days 200 days or more
 50 - 99 days

53. In 2021, what was your gross farm income before taxes?

- Less than \$10,000 \$250,000 to \$499,999
 \$10,000 to \$24,999 \$500,000 to \$999,999
 \$25,000 to \$49,999 \$1,000,000 or more
 \$50,000 to \$99,999 Choose not to answer
 \$100,000 to \$249,999

54. How many of the following animals are part of your farming operation in the portion of the Lower Green 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):

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SECTION X - Green River National Wildlife Refuge

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

I support the existence of the Green River National Wildlife Refuge due to...

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. ...the tourism industry.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. ...recreational benefits.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. ...the nature it protects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Other (please specify): <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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

I have concerns about the existence of the Green River National Wildlife Refuge due to...

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. ...lack of property tax revenue.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. ...disrespectful tourists.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. ...hunting regulations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. ...government overreach.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. ...impacts of nuisance wildlife on agricultural land.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. ...harm to the local economy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Other (please specify): <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you

Please share any thoughts, comments, or suggestions on this survey or on improving agriculture and conservation 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 2%). 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.
- Surveys were identified as “Refusal” if survey respondents refused to complete the survey.