Pioneer Sarah Creek Watershed
KAP Study Report

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Executive Summary

FINDINGS

1. A knowledge, attitudes and practices (KAP) study was conducted in 2013 by the University of Minnesota for the Pioneer Sarah Creek Watershed Management Commission (PSCWMC). While the relatively small sample cannot be considered representative of all property owners in the watershed, study findings highlight audience knowledge, constraints, information needs, attitudes and current practices. It also highlights suggestions and recommendations for civic engagement, education and outreach.

2. **Use of local lakes by respondents is mainly centered on Lakes Sarah and Independence. There is very little use of local streams**. There is high awareness of local water resources, and most respondents know that they live in the Pioneer Sarah Creek watershed. There is also a perception that water quality has deteriorated in local lakes, although many noted that water clarity has improved.

3. Respondents clearly value water resources and wish to see them protected and improved. **Fully 92% of non-agricultural respondents ranked the importance of surface water as either most important or very important. However, none of the agricultural respondents ranked surface water as most important, and only 40% of farmers thought it was very important.**

4. **Non-agricultural respondents feel that phosphorus and fertilizers are the main water pollutants**, with many also checking nitrates, stormwater, septic waste, insecticides and herbicides as important. **Farmers felt that herbicides and fertilizers are the key pollutants**, but also checked phosphorus, stormwater and septic waste. In general, non-ag respondents more frequently checked a wider range of pollutants than did farmers.

5. **There is a very high awareness of the connection between people's actions and water quality in local lakes for both groups**. 93% of non-ag respondents and 85% of farmers are aware of this connection. Only 4.5% of non-ag respondents and 8% of agricultural producers checked "Don't know". Only two non-ag respondents and one farmer stated that there is no connection.

6. **A large number of respondents self-reported that they are already using clean water practices**. The most frequently reported practices were lawn care, managing horse manure, winter maintenance with safe de-icing practices, and shoreline management. There was strong interest expressed by respondents for more information and assistance on all of the BMPs. Greatest interest was expressed for rain barrels, rain gardens, native shoreline buffers and shoreline management. Two individuals expressed interest in managing horse manure.

7. **In general, non-agricultural respondents had much higher levels of assigning responsibility for water quality in all categories. Responses for agricultural producers were markedly lower than the non-ag group by at least a twenty percent margin**. A majority of respondents acknowledged personal responsibility for all respondent classes. However, agricultural producers in general were less accepting of personal responsibility. **An**

overwhelming majority of all respondents felt that individuals degrading a public water body have the responsibility for clean-up.

8. ***A strong majority of respondents felt that the highest priority of the PSCWSC should be "to protect all water resources."*** Next highest ranked was "To bring water quality in local lakes up to state standards". There was much less concern with local streams and rivers. Only twelve of ninety respondents felt that the top priority of the PSCWMC should be to save tax dollars. Three of those twelve (13%) were very vocal about their beliefs, and repeatedly made strong comments to that effect. This was counterweighed by a very significant majority (88%) who want PSCWMC to develop education and outreach/action programs (see next point).

9. ***For both respondent groups, there is clearly very strong support and unmet demand for education and outreach programs on water quality issues.*** 88% feel that the PSCWMC should inform and educate the public on water quality issues. 73% feel that PSCWMC should provide incentives such as grants to individual property owners to add rain gardens, rain barrels and native vegetation to their property. 72% feel that PSCWMC should consider projects such as rain gardens and pervious pavement to clean up lakes and streams. A slight majority (58%) felt that PSCWMC should enact and enforce clean water laws, and fifty percent felt that the Commission should be able to tax to clean up impairments and implement clean water projects. Among agricultural producers, all respondents (100%) felt that the PSCWMC should inform and educate the public on water quality issues. Sixty-five percent felt that the Commission should provide incentives to property owners for clean water activities.

10. **A majority of respondents expressed willingness to adopt a BMP**. The most common response was to change a lawn care practice (73%); followed by learning about safe use of de-icing chemicals (54%); re-directing downspouts (53%) and planting a rain garden (53%). Half of all respondents are willing to attend a workshop on lakeshore practices. The small number of horse owners who responded to the survey are willing to adopt managed grazing or management of horse manure. **These numbers suggest that there is very good potential to improve water quality outcomes through education about BMPs, and through the introduction of targeted action and incentive programs for property owners**.

11. **With regard to barriers to adoption, a strong majority (71%) of non-agricultural respondents feel that they are already doing the "right" thing**, which may make them less inclined to change their practices. The majority of respondents have few or no barriers to changing their current practices. For three producers, the greatest barriers are "Concern about government regulation or intrusion" and "Don't know about it."

12. **In terms of fostering BMP adoption, financial incentives and cost shares appear to be important to some respondents. Also important is a sense of leaving a legacy for future generations, which should factor into PSCWMC messaging.** Obtaining technical information is also important, especially for producers.

13. **Non-agricultural respondents expressed a clear preference (74%) for lake associations as a source of information, followed by the MNDNR (51%).** The preferred source of water quality information for farmers is the MNDNR (47%), followed by county officials

(33%) and UM Extension (33%). **There is considerable scope to expand the role of PSCWMC as a source of information for both groups**. The preferred media for non-ag respondents are email (48%), the PSCWMC website (43%), and mailings (40%).

14. **Most respondents, especially in the non-agricultural group, indicated an interest in participating in various civic engagement activities**. All of the multiple choice options generated some positive response. There was highest interest in a neighborhood clean up of a local lake or stream, followed by attending a clean water workshop, and commenting on a watershed management plan. More than a quarter (28%) are interested in attending a PSCWMC meeting. Of specific interest for the PSCWMC, nine people (14%) are interested in joining a Pioneer Sarah Creek Citizen Advisory Committee (CAC). **These findings are very significant for future civic engagement activities, and for the future involvement of local watershed residents. Agricultural producers seemed less interested in civic engagement on watershed issues**.

15. Agricultural respondents were asked a number of questions related to their agronomic practices. Since the producer sample size is small, results should not be considered representative of the larger population.

CONCLUSIONS AND RECOMMENDATIONS

1. **PSCWMC should consider developing educational programming centered on the information needs and priorities expressed by the survey respondents**. There is clearly strong interest and apparent need for educational information and technical training. PSCWMC should consider partnering with lake associations in communicating with shoreline property owners, which is a preferred and trusted source of information.

2**. PSCWMC should consider a civic engagement effort that provides opportunities for individuals and families to become involved in clean water activities**. There is wide support for a variety of activities ranging from clean-ups to more direct involvement in watershed planning.

3. **PSCWMC should consider offering an incentive program for watershed residents including financial incentives and cost-shares to support the adoption of BMPs.** While most respondents will likely adopt without a financial incentive, cost is a concern for many and may be the factor that prompts adoption.

Acronyms

BMP	Best management practice
CATA	Check all that apply
CE	Civic engagement
COOR	Check only one response
KAP	Knowledge, attitudes and practices
MNDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
n	Number
PSCWMC	Pioneer Sarah Creek Watershed Management Commission
Q	Question
TMDL	Total maximum daily load
WRAPP	Watershed Restoration and Protection Project

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Thanks also to the local residents and professionals that took part in a gap exercise, which framed the questions posed in the study. These included Judie Anderson (JASS), Barbara Zadeh (lakeshore property and horse owner); Jim Kujawa (HCDES); Betsy Weiland (U of MN Extension educator); Eric Kielb (Medina resident and fishing guide); Diane Spector (Wenck Associates); Joe Baker (Lake Sarah Lake Association member); Rich Brasch (TRPD); Barb Peichel (project manager for WRAPP); Lynn Kolze (MPCA civic engagement specialist); and Darrell Jansen (Medina resident). Finally, the participation of ninety individual respondents in taking part in this study is gratefully acknowledged.

Introduction

A *knowledge, attitudes and practices (KAP) study* was conducted by the University of Minnesota in 2013 on behalf of the Pioneer Sarah Creek Watershed Management Commission (PSCWMC). The purpose of the study was to explore the motivations, interests, concerns and constraints for local audiences within the watershed. The survey is characterized as a formative study that will provide baseline (pre-project) information. The results will contribute to the development of a civic engagement strategy for watershed residents.

This study followed the KAP study protocol outlined in Eckman (2013). The process began with a small group of stakeholders, comprised of PSCWMC staff and local residents. A gap exercise identified what was not known about the population of interest, but should be learned in order to encourage people to participate in watershed decisions, and to develop educational materials and messages. The gap exercise participants identified a number of questions that became the basis for questionnaire construction. A first draft questionnaire was prepared and circulated back to the group for comments and revisions. Some questions used in a manure management KAP study in Rock County were selected by staff and the gap exercise group for inclusion in the PSCWMC KAP study.

The questionnaire draft was then reviewed by peers and colleagues, and revised to be sure that it was neutral in tone and did not suggest that farmers or livestock owners are to blame for water quality issues. The draft questionnaire was then pre-tested. The survey was administered through an on-line Survey Monkey link.

Respondents were informed that taking the survey was voluntary and were assured of strict confidentiality.

Sampling Frame

The survey sampled 519 property owners, including 288 lakes property owners and 231 owners of large parcels. Of special interest were property owners who were thought to keep livestock within the PSCWMC boundaries, and who may be contributing nutrients and bacteria to the Pioneer Sarah Creek TMDL. The sample population was obtained from a database created by PSCWMC staff based on the location of known agricultural and lakeshore properties. A spreadsheet was created listing the property owner and addresses of those known to keep livestock or otherwise influence water quality in the concerned water bodies. This was the core sampling group targeted by the KAP study.

The sample is considered to be purposive and non-random. Ninety respondents completed the survey on-line, for a 17% response rate of the entire population. Respondents included fifteen farmers and 75 non-agricultural residents. The survey link was also made available on the PSCWMC website. While this response rate is considered low, it is comparable to an undated survey conducted by Betsy Wieland (UM

Extension) of livestock owners in Medina (21 questionnaires out of 85 were returned for a 25% response rate).

Survey Administration

All survey administration was carried out by JASS, the watershed administrator. In collaboration with JASS, three options were developed for respondents to access the survey. First, a web-link was posted on the PSWMC website for the general public. Second, a targeted mailing was sent by watershed staff to all property owners on the sampling list, with an announcement of the on-line survey. A follow-up postcard was then sent to those individuals that had not yet taken the survey. All respondents took the survey on-line through a link to Survey Monkey. A few respondents contacted the PSCWMC office to request a hard copy of the questionnaire, which was mailed to them, returned, and data entered manually. Two respondents contacted the U of M by phone, and responded to the questionnaire directly through a telephone interview. Survey Monkey was also used for secure on-line data storage.

Results and Findings

It is important to note the limitations of this particularly survey. As with the earlier Wieland survey, the response rate was low, especially for agricultural producers. The low response rate is attributed at least in part to local distrust in government, which was borne out by numerous comments made by respondents during the survey, and by phone calls received during the survey. Results therefore should not be considered representative of the larger population, especially for the agricultural producers. The data do, however, provide useful insights into the views of watershed residents.

Raw data will be presented separately for two groups (the non-agricultural respondents and agricultural producers) in this report. The non-agricultural respondents were those identified by JASS as having larger parcels and/or shoreland property.

Values with the highest frequencies will be highlighted in yellow in each of the tables below.

Question 1: Use of local streams and lakes

The first question asked respondents whether they visit any lakes or streams within a five mile radius of their home. This was a check-all-that apply question. Responses of non-agricultural respondents are given in Table 1 below, and by agricultural producers in Table 2.

Table 1: Use of local lakes and streams by non-ag respondents

	Fishing	Boating/canoeing	Swimming	Viewing wildlife	Don't visit	Total Responses
Lake Independence	**32.76%** 19	**18.97%** 11	**32.76%** 19	**25.86%** 15	**34.48%** 20	84
Lake Sarah	**67.65%** 46	**67.65%** 46	**52.94%** 36	**58.82%** 40	**13.24%** 9	177
Lake Rebecca	**19.23%** 10	**9.62%** 5	**13.46%** 7	**25%** 13	**50%** 26	61
Pioneer Creek	**0%** 0	**0%** 0	**0%** 0	**23.40%** 11	**76.60%** 36	47
Sarah Creek	**0%** 0	**0%** 0	**0%** 0	**22.22%** 10	**77.78%** 35	45
Deer Creek	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**100%** 45	45
Robina Creek	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**100%** 45	45
Spurzem Creek	**0%** 0	**0%** 0	**0%** 0	**6.82%** 3	**93.18%** 41	44

Table 2: Use of local lakes and streams by ag respondents

	Fishing	Boating/canoeing	Swimming	Viewing wildlife	Don't visit	Total Respondents
Lake Independence	41.67% 5	25% 3	16.67% 2	50% 6	8.33% 1	12
Lake Sarah	57.14% 8	7.14% 1	7.14% 1	7.14% 1	35.71% 5	14
Lake Rebecca	27.27% 3	27.27% 3	18.18% 2	45.45% 5	27.27% 3	11
Pioneer Creek	0% 0	9.09% 1	0% 0	45.45% 5	54.55% 6	11
Sarah Creek	0% 0	0% 0	0% 0	10% 1	90% 9	10
Deer Creek	0% 0	0% 0	0% 0	20% 2	80% 8	10
Robina Creek	0% 0	0% 0	0% 0	40% 4	60% 6	10
Spurzem Creek	0% 0	0% 0	0% 0	10% 1	90% 9	10

Results show that as expected, recreational use of local lakes is concentrated on Lake Independence, Lake Sarah and Lake Rebecca for all activities. Deer Creek and Robina Creek are not used at all, although a few respondent report using Spurzem Creek for viewing wildlife. No one reported using any of the creeks for angling.

Question 2: Awareness of local watershed

Question 2 tested the awareness of respondents about their local watershed.

Table 3: Awareness of watershed district by non-ag respondents
Check only one response

Answer Choices	Responses	
Pioneer Sarah Creek Watershed	90.67%	68
Middle Mississippi Watershed Management District	0%	0
Crow River Watershed	0%	0
Don't know	9.33%	7
Total		**75**

Table 4: Awareness of watershed district by ag respondents
Check only one response

Answer Choices	Responses
Pioneer Sarah Creek Watershed	**80%** 12
Middle Mississippi Watershed Management District	**6.67%** 1
Crow River Watershed	**0%** 0
Don't know	**13.33%** 2
Total	**15**

Significant majorities of all respondents answered this question correctly, indicating generally high awareness of the Pioneer-Sarah watershed. None of the non-ag respondents answered incorrectly, although 9% (n = 7) didn't know. Agricultural respondents were somewhat less aware of the Pioneer-Sarah Creek Watershed (80%) than non-agricultural respondents (91%).

Question 3: Importance of surface water

Respondents were asked about the importance of surface water in your community's lakes and streams, in comparison with other issues facing the community. In general, non-ag respondents ranked the importance of surface water higher than did producers.

Table 5: Importance of surface water (non-ag respondents)
Check only one response

Answer Choices	Responses
Most important	**34.67%** 26
Very important	**57.33%** 43
Somewhat important	**5.33%** 4
Not important at all	**1.33%** 1
Don't know	**1.33%** 1
Total	**75**

Of non-ag respondents, fully 92% ranked the importance of surface water as either most important or very important. None of the ag respondents considered surface water as most important, and only 40% of farmers thought it was very important.

Table 6: Importance of surface water (ag respondents)
Check only one response

Answer Choices	Responses
Most important	**0%** 0
Very important	**40%** **6**
Somewhat important	**53.33%** 8
Not important at all	**6.67%** 1
Don't know	**0%** 0
Total	**15**

Question 4: What does the term water quality mean to you?

Respondents were asked about the meaning of the term “water quality.” This was a multiple-choice question. Non-ag respondents expressed slightly higher understanding of water quality than did agricultural producers. Non-ag respondents were more likely to check the “All of the above” (*e.g.* the correct answers) than producers.

Table 7: Understanding of water quality (non-ag respondents)
Check all that apply

Answer Choices	Responses
The water in lakes and streams is fish-able and swim-able	**46.67%** 35
Water in lakes and streams is clear (can see a long way down)	**26.67%** 20
It is good habitat for wildlife	**37.33%** 28
Absence of pollutants and harmful micro-organisms	**42.67%** 32
Water is odorless	**24%** 18
All of the above	**68%** 51
Don't know	**0%** 0
Total Respondents: 75	

Table 8: Understanding of water quality: Ag respondents

Answer Choices	Responses
The water in lakes and streams is fish-able and swim-able	**40%** 6
Water in lakes and streams is clear (can see a long way down)	**20%** 3
It is good habitat for wildlife	**40%** 6
Absence of pollutants and harmful micro-organisms	**40%** 6
Water is odorless	**20%** 3
All of the above	**46.67%** 7
Don't know	**6.67%** 1
Total Respondents: 15	

Question 5: What changes have you witnessed regarding the overall water quality in local lakes and streams in the past ten years?

Table 9:
Awareness of change in local lakes and streams – Non-ag respondents
Check all that apply

Answer Choices	Responses
Little if any change	**15.07%** 11
Water quality has improved	**15.07%** 11
Water quality has deteriorated	**57.53%** 42
Don't know	**12.33%** 9
Total	**73**

Table 10:
Awareness of change in local lakes and streams – Ag respondents
Check all that apply

Answer Choices	Responses
Little if any change	**33.33%** 5
Water quality has improved	**20%** 3
Water quality has deteriorated	**46.67%** 7
Don't know	**0%** 0
Total	**15**

For both groups, there is a perception that water quality has deteriorated in the past decade. Farmers were somewhat more optimistic than non-ag respondents, with 20% stating that water quality has improved, and 33% reporting that there has been little if any change. Only 12% of non-ag respondents were uncertain.

There were some comments made by respondents in response to this question. Non-ag respondents noted the following:

> *"I've noticed Lake Minnetonka is clearer. My understanding is the milfoil and zebra mussels. I am hoping that Pioneer Creek filter is the real reason. I would like to know more."*
>
> *"Last year's large treatment for Sarah was a big improvement."*
>
> *"In some aspects water quality has improved and in some areas it has not."*

Question 6: What specific pollutants might be impacting your local lakes?

Table 11: Awareness of impairments in local lakes – nonag respondents
Check all that apply

Answer Choices	Responses
Phosphorus	**85.71%** 60
Nitrates	**62.86%** 44
Sediment and debris from stormwater	**67.14%** 47
Bacteria and nutrients from leaking septic systems	**45.71%** 32
Insecticides	**42.86%** 30
Herbicides	**45.71%** 32
Fertilizers	**71.43%** 50
Garbage and trash	**22.86%** 16
Urban pollutants	**22.86%** 16
Don't know	**8.57%** 6
Total Respondents: 70	

Table 12: Awareness of impairments in local lakes – Ag producers
Check all that apply

Answer Choices	Responses
Phosphorus	**46.67%** 7
Nitrates	**33.33%** 5
Sediment and debris from stormwater	**40%** 6
Bacteria and nutrients from leaking septic systems	**46.67%** 7
Insecticides	**33.33%** 5
Herbicides	**53.33%** 8
Fertilizers	**53.33%** 8
Garbage and trash	**20%** 3
Urban pollutants	**26.67%** 4
Don't know	**33.33%** 5
Total Respondents: 15	

Responses differed for the two groups. Non-ag respondents feel that phosphorus and fertilizers are the main pollutants, with many also checking nitrates, stormwater, septic waste, insecticides and herbicides as important. Farmers felt that herbicides and fertilizers are the key pollutants, but also checked phosphorus, stormwater and septic waste. In general, non-ag respondents more frequently checked a wider range of pollutants than did farmers.

Several respondents wrote in comments for this question. Non-agricultural respondents noted the following:

"All are possible, whether or not they do, I couldn't say"

"Probably all of the above and then some"

"Baker Park"

"Most of the above can contribute the (sic) water quality"

"Don't know about the three not checked. They may also apply."

"Eurasian Milfoil"

"Manure"

"Run-off from farms on lake"

"Minnetrista added a culvert that lowered the overall lake levels"

One agricultural producer wrote:

"*Milfoil, curly leaf pond weed*"

Question 7: When stormwater runs off your property, where does it go?

Table 13: Stormwater awareness – nonag respondents
Check all that apply

Answer Choices	Responses
A stormwater detention pond	**13.33%** 10
A rain garden	**13.33%** 10
A storm drain in the street	**9.33%** 7
Lake Independence	**8%** 6
Lake Sarah	**62.67%** 47
Lake Rebecca	**0%** 0
A local creek	**9.33%** 7
A wetland	**34.67%** 26
The Mississippi River	**1.33%** 1
Other	8%
Don't know	4%

Table 14: Stormwater awareness – ag respondents
Check all that apply

Answer Choices	Responses
A stormwater detention pond	**0%** 0
A rain garden	**0%** 0
A storm drain in the street	**0%** 0
Lake Independence	**0%** 0
Lake Sarah	**6.67%** 1
Lake Rebecca	**0%** 0
A local creek	**33.33%** 5
A wetland	**40%** 6
The Mississippi River	**0%** 0
Other:	20%
Don't know	0%

Responses for this question seem to reflect local topography depending upon where people live in the watershed. Both groups appear to have an awareness of the disposition of stormwater when it leaves their properties. In general, non-ag

respondents had higher awareness of the disposition of stormwater than did agricultural producers.

Question 8: Do you think there is a connection between people's land use practices and water quality in local lakes?

Table 15: Awareness of watershed connections – non-ag respondents
Check only one reply

Answer Choices	Responses
Yes	**93.24%** 69
No	**2.70%** 2
Don't know	**4.05%** 3
Total	**74**

Table 16: Awareness of watershed connections – ag respondents
Check only one reply

Answer Choices	Responses
Yes	**84.62%** 11
No	**7.69%** 1
Don't know	**7.69%** 1
Total	**13**

There is a very high awareness of the connection between people's actions and water quality in local lakes for both groups. 93% of non-ag respondents and 85% of farmers are aware of this connection. Only 4.5% of non-ag respondents and 8% of agricultural producers were unsure (don't know). Only two non-ag respondents and one farmer stated that there is no connection.

A non-ag respondent made the following comment:

"Yes but typically only if they live on the lake"

Agricultural respondents noted the following comments:

"Lawns!"

"This is not a yes or no question; there is correlation; depends on situation"

Question 9: Are you aware of any of the following programs that aim to improve water quality?

Table 17: Awareness of water quality programs – non ag respondents
Check all that apply

	Am aware of it	I'm not aware of it	Am interested in more information	Total
West Metro Alliance workshop series	11.67% 7	83.33% 50	5% 3	60
Clean Water Minnesota Media Campaign	25.42% 15	72.88% 43	1.69% 1	59
Clean Water Legacy Act	60.32% 38	38.10% 24	1.59% 1	63
Environment Minnesota	7.14% 4	89.29% 50	3.57% 2	56
Lake Independence TMDL improvement effort	65.08% 41	34.92% 22	0% 0	63
Lake Sarah TMDL improvement effort	76.06% 54	23.94% 17	0% 0	71
Don't know	0% 0	75% 3	25% 1	4

Table 18: Awareness of water quality programs – ag respondents
Check all that apply

	Am aware of it	Am not aware of it	Am interested in more information	Total
West Metro Alliance workshop series	7.69% 1	92.31% 12	0% 0	13
Clean Water Minnesota Media Campaign	38.46% 5	61.54% 8	0% 0	13
Clean Water Legacy Act	38.46% 5	61.54% 8	0% 0	13
Environment Minnesota	23.08% 3	76.92% 10	0% 0	13
Lake Independence TMDL improvement effort	53.85% 7	46.15% 6	0% 0	13
Lake Sarah TMDL improvement effort	57.14% 8	42.86% 6	0% 0	14
Don't know	0% 0	100% 2	0% 0	2

Non-ag respondents expressed awareness of a range of programs, but most frequently mentioned the Clean Water Legacy Act, the Lake Independence TMDL and Lake Sarah TMDL. A few respondents indicated an interest in more information about the West Metro Watershed Alliance workshop series, the Clean Water Minnesota Media Campaign, Clean Water Legacy Act and Environment Minnesota. Non of the producer respondents indicated an interest in information for any of these programs.

Farmers had a similar range but most frequently noted the Lake Independence and Lake Sarah TMDLs.

Question 10: Are there are clean water practices that you would like information about?

Table 19: Interest in WQ information – nonag respondents
Check all that apply

	Already use	Am interested in more information	Total
Lawn care	84.31% 43	15.69% 8	51
Winter maintenance (safe de-icing practices)	80.56% 29	19.44% 7	36
Rain garden	60.87% 14	39.13% 9	23
Rain barrel	56.00% 14	44% 11	25
Shoreline management	73.68% 28	26.32% 10	38
Native shoreline buffers	66.67% 22	33.33% 11	33
Managing horse manure	80% 8	20% 2	10

A large number of respondents self-reported that they are already using clean water practices. The most frequently reported practices for this multiple choice question were Lawn care (84%, n = 43); Managing horse manure (80%, n=2); Winter maintenance with safe de-icing practices (801%, n = 43); and Shoreline management (74%, n = 28). There was interest expressed by several respondents for more information on all of these BMPs. Greatest interest was expressed for rain barrels, rain gardens, native

shoreline buffers and shoreline management. Two individuals expressed interest in managing horse manure. Several respondents noted the following comments for this question:

> *I have an erosion control that sends rainwater underground from my barn to a disbursing area behind the barn to control water through manure pile*
>
> *I am aware of the practices..thank you*
>
> *None*

This question was not posed to agricultural respondents.

Question 11: Who is responsible for water quality?

Table 20: Responsibility for water quality – nonag respondents
Check all that apply

Answer Choices	Responses
Crop farmers	92.96% 66
Livestock farmers	91.55% 65
Horse owners	91.55% 65
Lakeshore owners	90.14% 64
State and local officials	85.92% 61
Individual homeowners	91.55% 65
Watershed district commissioners	87.32% 62
Myself	88.73% 63
Total Respondents: 71	

Responses to this question indicate very high acknowledgement of responsibility for clean water for all classes of respondents. There was only a five percent difference between all respondent classes. This suggests that most individuals would respond positively to conservation messages that reinforce and build upon personal responsibility for water quality.

Non-ag respondents also made the following comments:

> *"All land owners should be aware of the run off from their property and how it affects the water."*
>
> *"Cities where run off comes from"*

"All of the above" (two comments)

Table 21: Responsibility for water quality – ag respondents
Check all that apply

Answer Choices	Responses
Crop farmers	**58.33%** 7
Livestock farmers	**66.67%** 8
Horse owners	**58.33%** 7
Lakeshore owners	**66.67%** 8
State and local officials	**58.33%** 7
Individual homeowners	**66.67%** 8
Watershed district commissioners	**58.33%** 7
Myself	**58.33%** 7
Total Respondents: 12	

Agricultural respondents made the following comments for this question:

"Everyone contributes something"

"Everyone"

"All of the above"

"I think this is a poorly worded question; do you mean who has authority?"

In general, non-ag respondents had higher levels of assigning responsibility for water quality to all categories. Responses for agricultural producers were markedly lower than the non-ag group by at least a twenty percent margin. A majority of respondents acknowledged responsibility for all respondent classes. However, ag producers in general were less accepting of responsibility. It is important to note that this agricultural respondent group was a very small sample size (n = 12) and is not representative of the larger population.

Question 12: How much would you be willing to pay to clean up local lakes and streams?

Table 22: Willingness to pay for WQ clean-up – non ag respondents

Answer Choices	Responses
Nothing	20.34% 12
$2.00	6.78% 4
$4.00	6.78% 4
$6.00	6.78% 4
$8.00	5.08% 3
$10.00	25.42% 15
$12.00	1.69% 1
$14.00	27.12% 16
Total	**59**

In general, most non-ag respondents expressed a willingness to pay for water quality. Twenty-seven percent (n = 16) were willing to pay the highest amount listed ($14.00/month), and twenty-five percent (n = 15) were willing to pay $10.00/month. However, twenty percent (n = 12) were unwilling to pay any amount.

A number of non-ag respondents made comments:

"$100.00"

"Depends on how it will be used"

"Need plan before replying to this"

"I already own wetland property in the district"

"I am aware of the need. I would need to know that it is making a difference before I would be willing to invest"

"None I pay property taxes already for lakeshore"

"I already pay for this through my taxes. Do your job. People that live off the lake and use the lake should pay more. I already pay a shoreland tax that is higher than those not on the lake in the watershed."

"Get the money from the Legacy bill."
"25.00"

"Taxes should more than cover this--lakeshore is xx higher than non-lakeshore"

"Don't we already pay over $14.00/mo?"

Table 23: Willingness to pay for WQ clean-up – ag respondents

Answer Choices	Responses
Nothing	**53.85%** 7
$2.00	**15.38%** 2
$4.00	**7.69%** 1
$6.00	**7.69%** 1
$8.00	**0%** 0
$10.00	**15.38%** 2
$12.00	**0%** 0
$14.00	**0%** 0
Total	**13**

Agricultural producers were much less willing to pay for water quality improvements. A majory (fifty-four percent) were unwilling to pay any amount. Only fifteen percent (n = 2) were willing to pay two dollars/month, and another two percent (n = 2) were willing to pay ten dollars/month. Agricultural respondents also provided the following comments for this question:

"*Taxes in MN and Hennepin County are too high"*

"Depends on to who and where the money goes"

"You would just waste it on some worthless project"

Question 13: If someone's practices degrade a public water body downstream, does that person have the responsibility to clean up and decrease that impact?

Table 24: Responsibility for clean-up – non ag respondents

Answer Choices	Responses
Yes, they should be responsible	88.41% 61
No, they should not be responsible	1.45% 1
If you answered no, who should be held responsible and cover the costs? (Use comment box below)	0% 0
Don't know	10.14% 7
Total	**69**

An overwhelming majority of respondents (88%) felt that individuals degrading a public water body have the responsibility for clean-up. Only one person felt that they should not be responsible, and that respondent did not name who should be. Ten percent (n = 7) were unsure.

Non-ag respondents also made the following comments:

"Yes, within reason. It is super expensive to be as green as the watershed management commission might recommend."

"Depends on the awareness"

"Question how much it is the farmers fault, blame the DNR MORE THAN ANYONE ELSE. Since Lake Sarah has been opened up with DNR partnership the lake has gone from a fairly clear lake to A VEGETATION PLANT. Have not eaten fish from Sarah for 15 years. YET WE CONTINUE TO PAY HIGH TAXES AND GET NOTHING FOR OUR MONEY"

"If they knowingly, blatently and willingly broke the law, then yes. Otherwise it is a grey area."

"It's a public resource--all should be involved"

"Practices that were acceptable years ago may not be today and may be the cause of water quality issues. I think that there needs to be a collaborative approach. For starters the practices must be stopped, or fines levied for lack of compliance. Who is responsible is for cleanup is a much more difficult question to answer and one that should be open to public debate and possible subject matter experts."

Table 25: Responsibility for clean-up – ag respondents

Answer Choices	Responses
Yes, they should be responsible	**81.82%** 9
No, they should not be responsible	**0%** 0
If you answered no, who should be held responsible and cover the costs? (Use comment box below)	**0%** 0
Don't know	**18.18%** 2
Total	**11**

The majority of ag respondents (82%) also answered that individuals should be responsible for cleaning up a public water body. Only two respondents were unsure. Agricultural respondents also provided the following comments:

> *"Who is making the decision of degrading? How do you define the responsible property/person?"*
>
> *"Depends on the situation; poorly worded biased question"*
>
> *"Depends on the situation"*

Question 14: What should the Pioneer Sarah Creek Watershed Management Commission's prioirities be?

Respondents were asked to rank their choices for this multiple choice question.

Table 26: PSCWMC prioirities – non-ag respondents

Ranking	1	2	3	4	5	6	7	Total	Average Ranking
To protect all water resources	39.73% 29	23.29% 17	20.55% 15	2.74% 2	5.48% 4	6.85% 5	1.37% 1	73	5.63
To save tax dollars	13.70% 10	6.85% 5	5.48% 4	17.81% 13	6.85% 5	36.99% 27	12.33% 9	73	3.42
To bring water quality in local l akes up to state standards	35.62% 26	26.03% 19	16.44% 12	12.33% 9	8.22% 6	1.37% 1	0% 0	73	5.64
To bring water quality in local streams and rivers up to state standards	5.48% 4	24.66% 18	34.25% 25	15.07% 11	12.33% 9	8.22% 6	0% 0	73	4.71
To educate the public about clean water	4.11% 3	9.59% 7	13.70% 10	32.88% 24	32.88% 24	6.85% 5	0% 0	73	3.99
To provide programs and outreach on clean water standards and practices	0% 0	8.22% 6	9.59% 7	17.81% 13	34.25% 25	27.40% 20	2.74% 2	73	3.29
Don't know	1.37% 1	1.37% 1	0% 0	1.37% 1	0% 0	12.33% 9	83.56% 61	73	1.32

Among non-ag respondents, the highest ranked response was "to protect all water resources" (40%). Next highest ranked was "To bring water quality in local lakes up to state standards (36%). There was much less concern with local streams and rivers (5%) and to educate the public about clean water (4%). Of note, this finding is strongly contradicted by responses in Q29 below. Only 14% of respondents felt that a priority of the PSCWMC should be to save tax dollars. It should be noted that many respondents commented that they did not like to have to chose between these priorities, and many did not rank the options and left the options blank.

Among ag respondents (Table 28 below), the most commonly selected priority was "To protect all water resources" (33%). The next ranked choice was "To educate the public about clean water practices (27%). As with the non-ag respondents, there were numerous comments about having to rank the choices. Only two farmers felt that the PSCWMC's priority should be to save tax dollars.

Table 27: PSCWMC prioirities – ag respondents

Ranking	1	2	3	4	5	6	7	Total	Average Ranking
To protect all water resources	33.33% 5	20% 3	13.33% 2	13.33% 2	0% 0	6.67% 1	13.33% 2	15	5.00
To save tax dollars	13.33% 2	20% 3	0% 0	13.33% 2	20% 3	20% 3	13.33% 2	15	3.80
To bring water quality in local l akes up to state standards	6.67% 1	26.67% 4	33.33% 5	6.67% 1	13.33% 2	13.33% 2	0% 0	15	4.67
To bring water quality in local streams and rivers up to state standards	6.67% 1	6.67% 1	13.33% 2	33.33% 5	20% 3	20% 3	0% 0	15	3.87
To educate the public about cl ean water practices	26.67% 4	6.67% 1	26.67% 4	6.67% 1	33.33% 5	0% 0	0% 0	15	4.87
To provide programs and outreach on clean water standards and practi	6.67% 1	20% 3	13.33% 2	13.33% 2	13.33% 2	33.33% 5	0% 0	15	3.93
Don't know	6.67% 1	0% 0	0% 0	13.33% 2	0% 0	6.67% 1	73.33% 11	15	1.87

Agricultural respondents also provided the following comments for this question:

"No taxing authority"

"NONE OF THE ABOVE!"

"You should not make laws or levy taxes"

Question 15: For each of the following activities, please indicate if you think the Pioneer Sarah Creek Watershed Management Commission should be involved. Check all that apply

Table 28: Should PSCWMC be involved in these activities? Non-ag respondents

Answer Choices	Responses
Inform and educate the public on water quality issues	**87.84%** 65
Enact and enforce laws regulating how properties can be built or modified to minimize impacts on lakes and streams	**58.11%** 43
Consider projects such as rain gardens and pervious pavement to clean up lakes and streams	**71.62%** 53
Provide incentives such as grants to individual property owners to add rain gardens, rain barrels and native vegetation to their property	**72.97%** 54
Be able to tax to clean up impairments and implement clean water projects	**50%** 37
Don't know	**2.70%** 2
Total Respondents: 74	

For non-ag respondents, all of the possible responses showed at least a 50% agreement rate. The most frequently checked response (88%) was that the PSCWMC should inform and educate the public on water quality issues. The next highest ranked responses were to “Provide incentives such as grants to individual property owners to add rain gardens, rain barrels and native vegetation to their property” (73%) ; and to “Consider projects such as rain gardens and pervious pavement to clean up lakes and streams” (72%). A slight majority (58%) felt that PSCWMC should enact and enforce clean water laws, and fifty percent felt that the Commission should be able to tax to clean up impairments and implement clean water projects.

This question also stimulated a number of comments from non-ag respondents:

> “Offer home owner consultation on their properties”
>
> “Get grants for whole lake treatments”
>
> “We are already taxed more in Independence than 98% of the cities in Minnesota per capita. No more taxes or I will have to move out.”
>
> “Build sediment basins to decrease rapid runoff”
>
> “Use Legacy money”

"NO additional taxes"

As previously noted, not many respondents commented about taxes. However, a small number of respondents complained often and vociferously.

Table 29: Should PSCWMC be involved in these activities? Ag respondents

Answer Choices	Responses
Inform and educate the public on water quality issues	100% 14
Enact and enforce laws regulating how properties can be built or modified to minimize impacts on lakes and stream	28.57% 4
Consider projects such as rain gardens and pervious pavement to clean up lakes and streams	50% 7
Provide incentives such as grants to individual property owners to add rain gardens, rain barrels and native vegetation to their property	64.29% 9
Be able to tax to clean up impairments and implement clean water projects	28.57% 4
Don't know	0% 0
Total Respondents: 14	

Among agricultural producers, all respondents (100%) felt that the PSCWMC should inform and educate the public on water quality issues. Sixty-five percent felt that the Commission should provide incentives to property owners for clean water activities.

For both respondent groups, there is clearly very strong support for education and outreach programs on water quality issues.

Question 16: What clean water practices are you willing to consider? Check all that apply.

Table 30: Willingness to adopt BMPs – nonag respondents

Answer Choices	Responses
Change a lawn maintenance practice	**72.86%** 51
Learn about safe use of de-icing chemicals for sidewalks and driveways	**54.29%** 38
Redirect your downspouts away from hard surfaces such as driveways and sidewalks	**52.86%** 37
Plant a rain garden to collect runoff and filter stormwater	**52.86%** 37
Install a rain barrel	**41.43%** 29
Attend a workshop on lakeshore practices	**50%** 35
Clean up pet waste and trash	45.71% (n=32)
Plant native vegetation on my shoreline	41.43% (n=29)
Managed grazing for my horses	7.14% (n = 5)
Managing horse manure	8.57% (n=6)
Checking or updating my septic system	32.86% (n= 23)
None:	5.7% (n=4)
Don't know:	4.29% (n= 3)

A majority of respondents expressed willingness to adopt a BMP. The most common response was to change a lawn care practice (73%); followed by learning about safe use of de-icing chemicals (54%); re-directing downspouts (53%) and planting a rain garden (53%). Half of all respondents are willing to attend a workshop on lakeshore practices. The small number of horse owners who responded to the survey are willing to adopt managed grazing or management of horse manure.

Comments from non-ag respondents for this question include the following:

"I already manage horse manure and rotational grazing"

"Convert from Septic System to sewer when available"

"Already practice all that apply"

"I already do most of this on my own. Don't own large animals"

"Most people are doing all these things"

"I am aware of these practices, and do those that apply to me and my property"

"The items not checked either don't apply or have already been implemented"

"I have already done most of the above. When storms hit, a rain garden would be washed out by the water flow down the hill and from surrounding hard cover. I have no need of rain barrels as I use lake water for irrigation of plants and lawn. I am not interested in planting vegetation on my shoreline."

These results indicate strong potential to develop outreach and educational programs that support water quality improvements, and is one of the most significant findings of this study.

This question was not asked of agricultural producers.

Question 17: What prevents you from trying something to improve water quality? Check all that apply.

Table 31: Constraints and barriers – nonag respondents

Answer Choices	Responses
Cost	**30%** 21
I don't have the knowledge or information	**28.57%** 20
I would need more technical information	**12.86%** 9
Don't know about it	**14.29%** 10
Don't have the time	**7.14%** 5
Concerned about government regulation or intrusion	**22.86%** 16
It's not a priority	**1.43%** 1
I believe that I am doing a good job already	**71.43%** 50
Neighbor doesn't want me to	**0%** 0
Don't know	**0%** 0
Total Respondents: 70	

Results show that a strong majority (71%) of respondents feel that they are already doing the “right” thing, which may make them less inclined to change their practices. A distant second (at 30%) was “Cost”; followed by “I don’t have the knowledge or information” (29%); and “Concerned about government regulation or intrusion” (23%); “Don’t know about it (14%); “I would need more technical information” (13%); and “Don’t have the time (7%). Only one person said that it was not a priority. Non-ag respondents added the following comments for this question:

“I have a large parcel, much different than a simple city lot”

“Have more individual control and less by DNR”

“Sewer not yet available to me”

“Nothing”

“Am currently doing a fair job”

“I do it – my neighbors dump fertilizer and other junk on their grass too often – should be allowed to do this within 300 yards of the lake or on streets that flow into the storm sewers”

A similar question was asked of agricultural producers, but with different possible choices appropriate for agricultural producers. Responses are reproduced in Table 32 below.

Table 32: Constraints and barriers – ag respondents

Answer Choices	Responses
Cost	**8.33%**
Potential for reduced profit	**0%**
Equipment availability	**16.67%**
I don't have the knowledge or information	**0%**
I would need more technical information	**0%**
Don't know about it	**25%**
Don't have the time	**16.67%**
Concerned about government regulation or intrusion	**25%**

For producers, the greatest barriers are “Concern about government regulation or intrusion” (25%), and “Don’t know about it (25%).” The next greatest barriers were “Equipment availability” (17%) and “Don’t have the time (17%). The only other barrier reported was “Cost” (8%).

Question 18: What would help you to adopt a clean water practice? Check all that apply

Table 33: Opportunities for non-ag respondents

Answer Choices	Responses
Financial incentive	52.86% 37
Cost-share	55.71% 39
Knowing that I'm leaving a legacy or stewardship for my family and future generations	42.86% 30
Training or technical "how-to" information	40% 28
Seeing it tried on a neighbor's property	14.29% 10
Access to equipment	38.57% 27
Show me the numbers (understanding the cost-benefit of the practice)	47.14% 33
Don't know	7.14% 5
None of the above	2.86% 2
Total Respondents: 70	

Results show that non-ag respondents are likely to respond to several options that would facilitate the adoption of a BMP. Options that offer financial support or relief rank highest, including “Cost share” (56%); “Financial incentive” (53%); and “Show me the numbers” (47%). Legacy or stewardship concerns (43%) came in next, followed by “Training or technical information” (40%). A combination of these options might be well-accepted by respondents. Non-ag respondents added the following comments:

“You are assuming that I don’t”

“I have already done several county/watershed improvements on my land”

“Group participation.”

“Already doing what I can”

“I already do it – let me report on my neighbor who abuses lawn chemical – cuts his grass twice a week and uses the water from the alke to water the grass as soon as it gets cut”

“Seeing improvement”

Table 34: Opportunities for ag respondents

Answer Choices	Responses
Financial incentive	**16.67%** 2
Cost-share	**33.33%** 4
Leaving a legacy or stewardship for my family and future generations	**25%** 3
Training or technical "how-to" information	**25%** 3
Environmental education	**25%** 3
A family activity	**8.33%** 1
No "red tape"	**25%** 3
Seeing it tried on a neighbor's property	**0%** 0
Access to equipment	8.3% 1
Show me the numbers (understanding the cost-benefit or the practice)	16.67% 2
All of the above	0
None of the above	25% 3

Financial considerations seem less important to agricultural producers. Only one-third reported that a cost-share would help them to adopt, and only 17% were interested in a financial incentive or “Show me the numbers”. Twenty-five percent of respondents were equally interested in “Leaving a legacy or stewardship,” “Training or technical information;” “Environmental education,” and “No red tape.”

Question 19: Where do you go for information about water quality? Check all that apply

Table 34: Source preferences for WQ information – nonag respondents

Answer Choices	Responses
County officials	**8.70%** 6
Minnesota Department of Natural Resources	**50.72%** 35
Minnesota Pollution Control Agency	**30.43%** 21
Neighbor or another farmer	**8.70%** 6
Lake association	**73.91%** 51
City newsletter	**14.49%** 10
Pioneer Sarah Watershed Management Commission	**23.19%** 16
U of MN Extension	**14.49%** 10
I don't seek information about water quality	**11.59%** 8
Total Respondents: 69	

Non-ag respondents expressed a clear preference (74%) for lake associations as a source of information, followed by the MNDNR (51%). MPCA ranked third at 31%, followed by PSCWMC (23%), a city newsletter and UM Extension (14% each), and county officials (9%). Twelve percent stated that they did not seek information about water quality. Respondents also added the following comments:

"*I have some education in the field"*

"Wenck Associates"

"Newspaper and radio"

"I understand that phosphorus and sediments increase algae. Lake Sarah quality has greatly improved with curly leaf treatment this yea. My biggest concern now is to keep zebra mussel and jumping carp out of our lakes!!!!"

Table 35: Source preferences for WQ information – ag respondents

Answer Choices	Responses
County officials	**33.33%** 5
Crop consultant	**6.67%** 1
Local coop or fertilizer dealer	**6.67%** 1
Minnesota Department of Natural Resources	**46.67%** 7
Minnesota Pollution Control Agency	**26.67%** 4
NRCS/Farm Bureau/USDA	**20%** 3
City newsletter	**26.67%** 4
Neighbor or another farmer	**6.67%** 1
Pioneer Sarah Watershed Management Commission	**26.67%** 4
U of MN Extension	**33.33%** 5
I don't seek WQ information	26.67%

The preferred source of water quality information for farmers is the MDNR (47%), followed by county officials (33%) and UM Extension (33%). The next highest ranked sources were a city newsletter, PSCWMC, and MPCA, all at 27%.

Question 20: How do you prefer to receive information about water quality from the Pioneer Sarah Creek Watershed Management Commission? Check all that apply

Table 36: Information preferences – non- ag respondents

Answer Choices	Responses
City newsletter	**28.77%** 21
Local newspaper	**23.29%** 17
Mailings	**36.99%** 27
Internet (Pioneer Sarah Watershed Management Commission website)	**42.47%** 31
Email message	**47.95%** 35
Facebook	**5.48%** 4
Cable TV	**2.74%** 2
Brochure	**16.44%** 12
Phone call	4.11%
Workshop	15.7%
Not interested	1.37%

The preferred media for non-ag respondents are email messages (48%), the PSCWMC website (43%), and mailings (40%). Non-ag respondents also gave the following comments:

"No facebook!"

"Through LSIA"

Table 37: Information preferences – ag respondents

Answer Choices	Responses
City newsletter	**60%** 9
Local newspaper	**33.33%** 5
Mailings	**33.33%** 5
Internet (Pioneer Sarah Watershed Management Commission website)	**40%** 6
Email message	**26.67%** 4
Facebook	**0%** 0
Cable TV	**0%** 0
Brochure	**13.33%** 2

Phone call	0%
Workshop	6.7%
Not interested	6.7%

Agricultural producers expressed preference for a city newsletter (60%); followed by the PSCWMC website (40%); local newspapers and mailings (33% each); and email (27%). For both groups, the PSCWMC website appears to be an important source of information.

Question 21: Would you be interested in taking part in any of the following community-based clean water activities? Check all that apply

Table 38: Interest in CE activities – non-ag respondents

Answer Choices	Responses
Comment on a watershed management plan	**31.25%** 20
Join in a neighborhood clean-up of a local lake or stream	**42.19%** 27
Attend a clean water workshop	**34.38%** 22
Take part in a "Community Clean-up for Water Quality" event (raking leaves from storm drains)	**18.75%** 12
Organize my neighbors to help solve a particular water quality issue	**17.19%** 11
Adopt a storm drain	**7.81%** 5
Attend Pioneer Sarah Watershed Management Commission meetings	**28.13%** 18
Join the Pioneer Sarah citizen advisory committee (CAC)	**14.06%** 9
None of the above	**28.13%** 18
Total Respondents: 64	

All of the options generated some positive response. There was highest interest in a neighborhood clean up of a local lake or stream (42%). Thirty-four percent expressed interest in attending a clean water workshop, and thirty-one percent are willing to comment on a watershed management plan. More than a quarter (28%) are interested in attending a PSCWMC meeting. Of specific interest for the PSCWMC, nine people (14%) are interested in joining a Pioneer Sarah Creek Citizen Advisory Committee (CAC). These findings are very significant for future civic engagement activities, and for the future involvement of local watershed residents. Non-ag respondents also gave the following written comments:

"I will think about a workshop"

"Physically unable to do a lot of manual work"

"Already a LSIA volunteer"

"Work with the LSIA"

"Financially or otherwise support clean water best practices"

"Plan to put my house on the market in the next 6 mo"

Table 39: Interest in CE activities – ag respondents

Answer Choices	Responses
Comment on a watershed management plan	23.08% 3
Join in a neighborhood clean-up of a local lake or stream	7.69% 1
Attend a clean water workshop	30.77% 4
Take part in a "Community Clean-up for Water Quality" event (raking leaves from storm drains)	0% 0
Adopt a storm drain	0% 0
Organize your neighbors around solving a particular water quality issue	7.69% 1
Attend Pioneer Sarah Watershed Management Commission meetings	0% 0
Join the Pioneer Sarah citizen advisory committee (CAC)	0% 0
None of the above	61.54% 8
Total Respondents: 13	

Agricultural producers seemed less interested in civic engagement on watershed issues. Less than one-third (31%, n = 4)) indicated that they would attend a clean water workshop, and 23% (n = 4) said that they would comment on a watershed management plan. Only one person was interested in joining a neighborhood clean-up of a lake or stream, or organizing neighbors around solving a particular water quality issue. One producer commented:

"Have a bad fishing disease for which there is no cure"

Group-Specific Questions

At this point, the producer and non-producer questionnaires diverged in content. The two respective questionnaires asked questions that were specific to land management for each group. The questions for the non-agricultural respondents will be summarized first.

Non-agricultural respondent questions

Question 22: How would you describe your property? (Non-ag) Check only one response

Table 40: Non-ag respondents

Answer Choices	Responses
Residential	**37.50%** 27
Hobby farm (home with a few horses)	**2.78%** 2
Horse-related business (stable, boarding or breeding)	**0%** 0
Farm with beef or dairy cattle	**0%** 0
Farm with field crops	**0%** 0
Farm with cattle and field crops	**1.39%** 1
Lake shore property	**58.33%** 42
Total	**72**

The majority of repondents in this category own lake shore property (58%), followed by residential property owners (38%). Only a handful of people own a hobby farm (two individuals) or a farm with livestock (one individual).

Question 23: If you have horses,what manure/land management practices do you use? Check all that apply

Table 41: Non-ag respondents

	Responses
Managed grazing	5.77% 3
Nutrient management planning	0% 0
Manure management	5.77% 3
Store manure on pad	0% 0
Apply manure at agronomic rates	1.92% 1
Compost it	1.92% 1
Sell or trade it	0% 0
Apply it wherever it is convenient	0% 0
test it for nutrient content	0% 0
Haul manure elsewhere	3.85% 2
Restrict livestock from streams and lakes	3.85% 2
None of the above	1.92% 1
I don't have horses	90.38% 47
Don't know	1.92% 1
Total Respondents: 52	

Ninety percent of respondents report that they do not own horses. Three non-agricultural respondents in this group report owning horses. Of these, all three report using managed grazing and manure management. Two people report hauling manure elsewhere and restricting livestock from streams and lakes. One individual reports applying manure at agronomic rates, and another composts it. One respondent added the following comment:

> *" I drag my pastures to break up manure and distribute it. I also have pastures that are resting. In addition, I have the manure hauled away every three months and I have used fly predators for 10 years for fly control."*

Question 24: A shoreland buffer is a strip of vegetation (natural or planted) along the shoreline that prevents runoff from entering a water body. If you have lakeshore property, what are your views about shoreline buffers? Check all that apply.

Table 42: Non-ag respondents

Answer Choices	Responses
I like the appearance	**21.31%** 13
I don't like the appearance	**21.31%** 13
I already have shoreline buffers	**54.10%** 33
Doesn't apply to me (I don't have a shoreline)	**18.03%** 11
Total Respondents: 61	

More than half (54%) of respondents report already having a shoreland buffer. Equal numbers (21%) report that they like the appearance of a shoreland buffer, and do not like the appearance. Eighteen percent state that shoreland buffers don't apply to them. One respondent added the following note:

"I have property on the Crow River but there is a 7 or 8 foot drop down to the shoreline"

"No views"

"Little impact"

"Not sure I have seen one"

"We catch all water in a mowed catch basin – water garden"

"I kind of do with gardens planted along my shoreline"

"I don't have a lot of room for a buffer strip"

Question 25: What would help you to adopt a shoreland buffer? Check all that apply

Table 43: Non-ag respondents

Answer Choices	Responses	
Training or "how-to" information	27.59%	16
Environmental education	17.24%	10
Making it a family activity	1.72%	1
Knowing that I'm leaving a legacy or stewardship for my family and future generations	15.52%	9
Financial incentive	24.14%	14
Cost-share	22.41%	13
No "red tape"	13.79%	8
Seeing it tried on a neighbor's property	5.17%	3
Access to equipment	17.24%	10
Access to plant materials	27.59%	16
Show me the numbers (understanding the cost-benefit of the practice)	15.52%	9
All of the above	12.07%	7
None of the above	13.79%	8
Doesn't apply to me -- I don't have a shoreline	18.97%	11
Total Respondents: 58		

The most frequently reported options that would help people to adopt a buffer were access to plant materials (28%) and training or “how-to” information (28%). Twenty-four percent would like a financial incentive, and twenty-two percent would like a cost-share. All of the options were appealing to some people, which suggests that a having a range of offerings would be most effective at capturing the largest number of adopters. The following comments were also made:

“*I have a shoreline buffer”* (n = 3)

“You don’t need tall plantings by the water if you have a basin at water’s edge”

“Planning to sell home in the near future”

Question 26: What prevents you from installing a shoreland buffer? Check all that apply

Table 44: Non-ag respondents

Answer Choices	Responses
Don't know about it	**10.91%** 6
I don't like the look of a shoreland buffer	**21.82%** 12
It might block my view of the lake	**9.09%** 5
It might block my view of children playing in the lake	**7.27%** 4
It might harbor ticks and mosquitos	**9.09%** 5
I would need more technical information	**16.36%** 9
Cost	**21.82%** 12
Don't have the time	**12.73%** 7

It's not a priority	9.09%
Neighbor doesn't want me to	0
I already have a shoreland buffer	49.9%
Don't know	9.09%
Total respondents: 55	

The most frequently checked option preventing people from adopting a buffer is that half of all respondents report that they already have a shoreland buffer. Twenty-two precent report that cost is an issue, and another twenty-two percent don't like the look of a shoreland buffer. Sixteen percent report that they would need more technical information. Smaller numbers of respondents gave other reasons and comments:

"*Don't have shoreline"* (n = 6)

"I don't know that I need one and if I did I don't know what to do"

"Already have a boulder buffer and rain garden along property line with neighbor for runoff from street"

"Have partial; trying to expand as finances allow"

"I installed a rain garden to capture run off this year at a cost of $1,500. There was no grant available in the watershed and I ended up eating all the cost. I am doing my part."

"Catch basin works better"

"I plan to include a shoreline buffer in our landscape plan"

"I kind of do with gardens planted along my shoreline"

"Planning to sell home in the near future"

Agricultural producer questions

The agricultural questionnaire developed by the team contained more questions than the non-agricultural questionnaire. Most of the additional questions centered on soil and manure management practices. Some agricultural respondents did not complete the entire questionnaire, possibly because of respondent burden. For this reason the data for farmers' practices should not be considered representative of the larger population.

Question 17: How would you describe your property? Check all that apply?

Table 45

Answer Choices	Responses
Residential	**7.14%** 1
Hobby farm (home with a few horses)	**28.57%** 4
Horse-related business (stable, boarding or breeding)	**0%** 0
Farm with beef or dairy cattle	**7.14%** 1
Farm with field crops	**50%** 7
Farm with cattle and field crops	**7.14%** 1
Lake shore property	**0%** 0
Total	**14**

For those responding to the agriultural producer questionnaire, fully half (50%, n = 7) report have a farm with field crops. Twenty-nine percent (n = 4) report that they have a hobby farm (home with a few horses). One person reports having a farm with cattle and field crops, and another reports having a farm with beef or dairy cattle. One respondent reports having a residential property. None reported owning shoreland property.

Question 18: What kind of farming operation do you have?

Table 46

Answer Choices	Responses
Dairy or beef	**8.33%** 1
Field crops	**58.33%** 7
Both livestock and field crops	**8.33%** 1
Horses (hobby or personal use)	**33.33%** 4
Horses (business such as breeding, boarding or training)	**0%** 0
Total Respondents: 12	

The majority of respondents (58%, n = 7) report having field crops. Four are horse owners, and one each report having dairy or beef, and both livestock and field crops. Farmers also provided the following comments:

"I raise hay crop each year"

"Vegetable farm"

"All prairie grass on my property"

"Dogs (hobby or personal)"

Question 19: How would you characterize your operation? Check only one response

Table 47

Answer Choices	Responses
Own	**66.67%** 10
Rent	**0%** 0
Both own and rent	**20%** 3
I keep it as an investment or inheritance	**0%** 0
My operation is my livelihood	**13.33%** 2
My operation is a hobby	**0%** 0
Total	**15**

Ten agricultual producers report that they own their property, and three both own and rent. Thirteen percent (n = 2) report that their operation is their livelihood. One producer also noted "*I keep it as a place to call home."*

Question 20: How much crop residue do you leave on the surface in the fall and at planting time? Check only one response

Table 48

Answer Choices	Responses
Bare soil	**7.69%** 1
Less than half covered by residue	**15.38%** 2
More than half covered by residue	**38.46%** 5
Don't know	**0%** 0
Not applicable	**38.46%** 5
Total	**13**

Five respondents report that this question is not applicable to them. Another five (38%) report that they leave the field more than half covered by residue. Two (15%) report that they leave less than half covered by residue. One person reports leaving bare soil. Farmers added the following comments:

"*Land in Conservation Reserve Program"*

"Renter now maintains fields"

Question 21: What time of year do you apply manure to agricultural fields? Check only one response

Table 49

Answer Choices	Responses
Spring	15.38% 2
Fall	7.69% 1
Spring and fall	7.69% 1
Winter	0% 0
More frequently than twice per year	7.69% 1
I don't apply manure to agricultural fields	61.54% 8
Don't know	0% 0
Total	**13**

The majority (62%, n = 8) report that they don't apply manure to agricultural fields. Two report applying manure in the spring; one reports fall application; and one more reports applying more frequently than twice per year. Respondents also provided the following comments:

"I only have four cows so I don't have much manure, but I apply it in the spring"

"Faulted question"

"Renter applies wood ash to soil"

Question 22: In applying fertilizer and/or manure to pasture and fields, how you do account for the nutrients already in the soil? Check only one response

Table 50

Answer Choices	Responses
I do soil testing	50% 6
An agronomist tests my soil	0% 0
I don't sample soil	25% 3
Yearly cropping history and experience	25% 3
Don't know	0% 0
Total	**12**

Half of producers report doing soil testing. Twenty-five (n = 3) report that they don't sample soil, and another three producers (25%) report that yearly cropping history and experience help them to account for nutrients already in the soil.

Question 23: How often do you sample your soil? Check only one response

Table 51

Answer Choices	Responses
Every year	21.43% 3
2-3 years	28.57% 4
4-5 years	0% 0
5-10 years	0% 0
I don't sample my soil	50% 7
Total	**14**

Twenty-nine percent (n = 4) report soil sampling every two to three years. Three 21%) sample every year. Seven respondents (50%) do not sample their soil.

Question 24: Which of the following sources of information do you use to determine the fertilizer rates you apply? Check all that apply

Table 52

Answer Choices	Responses
U of MN Extension recommendations	38.46% 5
Agronomist recommendations	7.69% 1
Soil testing	30.77% 4
Personal experience	23.08% 3
I don't apply fertilizer	38.46% 5
Total Respondents: 13	

Thirty-eight percent (n = 5) follow UM Extension recommendations; four farmers (31%) do soil testing; three (23%) rely on personal experience; and one (8%) follow agronomist recommendations. Five (38%) don't apply fertilizer. Respondents also provided the following comments:

"*I only apply horse manure*"

"Farm supply recommendations"

Question 25: How do you currently manage manure? Check all that apply

Table 53

Answer Choices	Responses
Store on pad	**7.14%** 1
Compost it	**21.43%** 3
Test manure for nutrient content	**0%** 0
Haul manure elsewhere	**7.14%** 1
Sell or trade it (swap for labor)	**0%** 0
Apply it wherever it isconvenient	**14.29%** 2
Does not apply	**64.29%** 9
Total Respondents: 14	

The majority (64%, n = 9) report that this question does not apply to them. Three (21%) report composting; two (14%) report applying it wherever it is convenient; one farmer stores manure on a pad; and one hauls manure elsewhere. Respondents added the following comments:

"*Store and apply usually in fall or winter"*

"I only have a little which goes on the field"

"Spread on high ground"

Question 26: How do you store manure? Check all that apply

Table 54

Answer Choices	Responses
Lagoon or tank	**0%** 0
Uncovered pile	**57.14%** 4
Covered pile	**14.29%** 1
I don't store it - I spread it as soon as I gather it from my operation	**28.57%** 2
Don't know	**14.29%** 1
Total Respondents: 7	

The majority of producers (54%, n = 4) report storing manure in an uncovered pile. Two report not storing manure, but spreading it as soon as it is collected. One stores manure in a covered pile. One respondent was uncertain. Farmers provided the following additional comments:

"Faulted question"

"N/A"

"Does not apply" (n = 2)

"*Have no livestock"*

"Doesn't store manure"

Question 27: Does manure have any effect on the condition of local streams and lakes? Check only one response

Table 55

Answer Choices	Responses
Manure has no effect on local lakes and streams	**20%** 2
Manure affects conditions in local lakes and streams	**60%** 6
Don't know	**20%** 2
Total	**10**

Sixty percent (n = 6) of agricultural producers report that manure does affect conditions in local lakes and streams. Two (20%) report that manure has no such effect. Two producers (20%) were unsure.

Question 28: Do you have a written manure management plan? Check only one response

Table 56

Answer Choices	Responses
Yes	**8.33%** 1
No	**91.67%** 11
Total	**12**

The majority (92%) of the twelve producers that responded to this question do not have a written manure management plan. Only one does have a plan. The following comments were provided:

"As a small farmer with a few horses I already have a management plan to apply to hay fields."

"I don't have enough to merit a full fledged plan"

"NA"

"Does not apply" (n = 2)

"I would be motivated if I had livestock"

Question 29: What would motivate you to write, implement and maintain a manure management plan? Check all that apply

Table 57

Answer Choices	Responses
A financial incentive	**12.50%** 1
A "how-to" workshop	**0%** 0
Technical help in writing the plan	**12.50%** 1
Other technical assistance	**12.50%** 1
Seeing a neighbor do it	**0%** 0
Working with other farmers on it	**0%** 0
I already have a manure management plan	**12.50%** 1
I do a good job without one	**87.50%** 7
Total Respondents: 8	

The majority of respondents (88%) feel that they do a good job of managing manure without a manure management plan. One felt that they would need a financial incentive to adopt one; another would like technical help with writing a plan; and another reported needing other technical assistance. Of the eight farmers answering this question, one already had a plan, and three seem willing to consider a plan if financial assistance or technical help is available.

Question 30: What prevents you from trying something to improve water quality? Check all that apply

Table 58

Answer Choices	Responses
Cost	**8.33%** 1
Potential for reduced profit	**0%** 0
Equipment availability	**16.67%** 2
I don't have the knowledge or information	**0%** 0
I would need more technical information	**0%** 0
Don't know about it	**25%** 3
Don't have the time	**16.67%** 2
Concerned about government regulation or intrusion	**25%** 3
It's not a priority	0
I believe that I am doing a good job already	41.67
Neighbor doesn't want me to	0
Nothing prevents me	25%

Total respondents: 12

This question was designed to explore barriers to adoption of BMPs for agricultural producers. Twenty-five percent report that nothing prevents them from adopting a BMP. Another twenty-five percent report being concerned about government regulation or intrusion. Seventeen percent (three respondents) report that equipment availability is an issue, and another 17% report that they don't have the time. Eight percent are concerned about potential costs. However, forty-two percent report that they believe that they are doing a good job already. Respondents wrote in the following comments for this question:

"*Since I live here I protect the water quality"*

"City sewers are needed near Lake Sarah – is in Medina and can't get hooked up"

"*No longer farming – retired"*

Question 31: What would help you to adopt a clean water practice? Check all that apply

Table 59

Answer Choices	Responses
Financial incentive	**16.67%** 2
Cost-share	**33.33%** 4
Leaving a legacy or stewardship for my family and future generations	**25%** 3
Training or technical "how-to" information	**25%** 3
Environmental education	**25%** 3
A family activity	**8.33%** 1
No "red tape"	**25%** 3
Seeing it tried on a neighbor's property	**0%** 0
Access to equipment	8.33%
Show me the numbers	16.67%
None of the above	0
Total respondents:12	

One-third of producers report that a cost-share would help them to adopt a BMP, and 17% would like a financial incentive. Twenty-five percent report that training or “how-to” technical information would help them to adopt, and another twenty-five percent report that they would like environmental education. Twenty-five percent report that leaving a legacy for their family and future generations would be important in helping them to adopt a BMP. Seventeen percent (three respondents) would like cost-benefit information (“show me the numbers”), and eight percent would appreciate a family activity to help them adopt.

Conclusions and Recommendations

The following conclusions and recommendations are based upon the study data as well as numerous written and oral comments provided by the respondents. They are intended to contribute to civic engagement efforts and an educational strategy and content for the PSCWMC.

Generally speaking, the study results are very encouraging in that the majority of respondents are concerned about water quality; are inclined to adopt clean water practices with appropriate information and incentives; are very much interested in water quality information; and are interested in a variety of civic engagement efforts. Agricultural producers are less inclined to take on these activities, although it must be cautioned that the agricultural sample is too small to be representative of all producers in the watershed.

While a very small (but very vocal) minority prefer a limited role for the PSCWMC (*e.g*. no taxing authority), the majority of both non-agricultural and agricultural respondents express strong support for an expanded role and function of the Commission. At least half feel that PSCWMC should have a role in taxation and regulation. The great majority expressed a need for educational programming, technical support for property owners; financial incentives to assist property owners in BMP adoption; and other activities. 78% are willing to pay between $2.00 and $14.00/month to clean up local waters (agricultural producers were much less willing to pay.

The following recommendations are therefore offered for consideration by the PSCWMC board:

1. **PSCWMC should consider developing educational programming centered on the information needs and priorities expressed by the survey respondents**. There is clearly strong interest and apparent need for educational information and technical training. This finding holds for both agricultural and non-agricultural respondents.

2**. PSCWMC should consider a civic engagement effort that provides opportunities for individuals and families to become involved in clean water activities**. There is wide support for a variety of activities ranging from clean-ups to more direct involvement in watershed planning.

3. **PSCWMC should consider offering an incentive program for watershed residents including financial incentives and cost-shares to support the adoption of BMPs.** While most respondents will likely adopt without a financial incentive, cost is a concern for many and may be the factor that prompts adoption.

4. **PSCWMC should consider partnering with lake associations (*e.g*. LSIA) in communicating with shoreline property owners, which is a preferred and trusted source of information.** Another option is to partner with neighboring watershed

commissions (e.g. Elm Creek or Crow) to identify complementarities and achieve more cost-effective delivery of water quality messages, outreach, and educational messages.

References

Eckman, Karlyn. 2013. *Training Modules for Evaluating the Social Outcomes of Water Quality Projects.* Saint Paul: Minnesota Pollution Control Agency.

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