Survey and Methodology Overview

This survey was sponsored by the Huron River Watershed Council (HRWC), and was sent to 1000 inhabitants of the Norton Creek Watershed district. Norton Creek is a tributary of the Huron River and drains 24.2 square miles of land located in portions of Commerce, Lyon and Milford Townships, and the cities of Novi, Walled Lake, Wixom and Wolverine Lake in Oakland County. Those who reside in the municipality serviced by Norton Creek were the target audience for the survey. The survey results are meant to represent attitudes, behaviors, and water management practices of individuals residing of this area.

The purpose of the survey is to discover how residents of Norton Creek perceive the quality of water in their area, how they make decisions for their property, and if they are willing to change their behavior to protect their local water. The questionnaire is designed to measure five leading indicators:

1. The level of concern about pollution
2. Individual characteristics and barriers to behavior change
3. Understanding of the role between stewardship and water quality
4. Trusted sources of information
5. Preferred method(s) for receiving information

The questionnaire design, survey administration, and data entry were conducted in-house by staff at the HRWC. A printer and mail house printed and mailed the surveys. Two outside consultants were also employed to provide technical assistance in sampling and statistical analysis. One consultant provided the sampling frame. The other consultant provided statistical sampling and analysis, and report generation.

Respondents for this survey were selected using address based sampling. Respondents were selected from a list provided by the sampling vendor, Kelter Direct, LLC. This list contained all addresses in the district, including rental properties and totaled 12,377 addresses. The frame contained information about the individual including their name, address and marital status. It also provided information about their residence (such as, if it an apartment, house, or lot), the town and county of their residence, and their census block.
The frame from Kelter Direct was sampled by Jennifer Durow, a survey methodologist/statistician. Households were selected statistically using stratified random sampling. When the sampled population mirrors the known total population, stratified sampling increases the precision of statistical estimates if allocated proportionally. Towns in the Norton Creek district formed the eight strata used for sampling. The sample of 1,000 potential respondents was allocated proportionately to the size of the towns. Table 1 details the final sample dispositions per strata.

Table 1. Survey Sample Dispositions by Town in Stratified Random Sample of Norton Creek Watershed District (2016)

<table>
<thead>
<tr>
<th>Towns</th>
<th>Total</th>
<th>Allocated Proportion</th>
<th>Final Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commerce</td>
<td>2941</td>
<td>0.24</td>
<td>238</td>
</tr>
<tr>
<td>Lyon</td>
<td>204</td>
<td>0.02</td>
<td>17</td>
</tr>
<tr>
<td>Milford Township</td>
<td>708</td>
<td>0.06</td>
<td>57</td>
</tr>
<tr>
<td>Novi</td>
<td>983</td>
<td>0.08</td>
<td>79</td>
</tr>
<tr>
<td>Walled lake</td>
<td>1513</td>
<td>0.12</td>
<td>122</td>
</tr>
<tr>
<td>Wixom</td>
<td>2354</td>
<td>0.19</td>
<td>190</td>
</tr>
<tr>
<td>Wixom-s</td>
<td>2435</td>
<td>0.20</td>
<td>197</td>
</tr>
<tr>
<td>Wolverine lake</td>
<td>1239</td>
<td>0.10</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Kelter Direct List of Addresses in Norton Creek Region

The fielding period for the mail survey spanned from April 19 – May 25, 2016. First, an advanced letter was sent to the respondents informing that a survey would be mailed in the following weeks. The second mailed letter included a cover letter, the questionnaire, and a token gift of $2. Respondents mailed surveys to HRWC, and the survey data were entered into the Social Indicator Planning and Evaluation System (SIPES), an online platform for nonpoint source management. Respondents also had the option to enter their results directly into the SIPES platform instead of mailing the survey back.

The overall response rate for the survey was 29% via AAPOR response Rate 2. In total, 146 surveys were returned to the sender and were marked ineligible.
Descriptive data and statistical analyses were performed on unweighted data with the exception of the Social Indicator Scores (Page 13-15). All reported estimates and their standard errors are conducted at the=.05, 95% confidence level.

For more information on the survey, please contact:

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**Key Findings**

- Most respondents indicate that the quality of their local water is good even though it is listed by the State of Michigan as impaired. Most do not recognize stormwater run-off or channelization as being a problem in their area even though water quality studies show these two issues as being the primary sources of this area’s water problems.
- While most respondents connect their behavior to water quality and recognize the importance of maintaining clean water, and even express willingness to change behavior, fewer than half would be willing to pay more (fees/taxes) to improve the local water. However, most did not highlight cost as a constraint to adopting their own practices.
- Most respondents indicate that they would be willing to do activities to protect their water yet many are unaware of the actual the problems with their local water or the solutions they can take to help solve them.
- Home owners knew more about where water run-off goes but their other responses about their knowledge of water quality and appreciation for water were comparable to renters.
- In comparing the sample (respondents) demographics to US Census data, more men, more educated, and more homeowners participated in the survey.
- Overall, respondents have a low awareness level of water quality issues yet they care about their local water. Their willingness to take actions to improve water quality is moderate and their constraints to adopting various water protection practices are low. Current behaviors for using the practices are also low.
Sample Composition and Demographics

This section presents the demographic information reported by respondents. When reading reports coming from survey data, it is important to analyze the demographic makeup of the respondents to the survey. If one group is over- or underrepresented among those who responded to the survey, response bias can ensue. Respondent gender, age, race, and homeownership status are compared to the 2014 estimates of the American Community Survey (ACS) estimates, a survey sponsored by the U.S. Census Bureau.

The age range of respondents spanned from 24 to 87, the median age being 55 years. The gender of persons in the sample is 55% male and 45% female, compared to the 49% male and 51% female estimate from ACS.

Furthermore, the educational attainment of respondents is displayed in Figure 1 below. The majority of respondents (59%) possessed a bachelor’s degree or higher, while 28% held an associate’s degree or similar; and only 12% of respondents attended high school or less. Responding units held greater levels of education than ACS estimates in which approximately 28% have attained a high school education or less.

Figure 1. Norton Creek Sample Educational Breakdown

Source: HRWC Norton Creek Survey 2016
Although these data are unweighted, the racial composition of the sample (respondents) is similar to the ACS racial breakdown of the area. Table 2 compares respondent racial breakdown to the ACS estimates in the Norton Creek region.

**Table 2. Survey sample composition in percentage compared to American Community Survey (2014)**

<table>
<thead>
<tr>
<th>Ethnic Category</th>
<th>Percent Norton Creek Sample</th>
<th>Percent American Community Survey 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>1.7</td>
<td>5</td>
</tr>
<tr>
<td>American Indian</td>
<td>0.4</td>
<td>0</td>
</tr>
<tr>
<td>Asian/Asian American/Pacific Islander</td>
<td>4.8</td>
<td>8</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>1.7</td>
<td>n.s.*</td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>86.6</td>
<td>85</td>
</tr>
<tr>
<td>Multi-racial</td>
<td>1.7</td>
<td>n.s.</td>
</tr>
<tr>
<td>Other</td>
<td>3.0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Percent</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Note 1: *Not a specified ethnic category on American Community Survey

Demographic estimates of age, race, education, and gender of the Norton Creek Watershed area were derived using the EPA’s Environmental Justice Screening and Mapping Tool (Version 2016).

*Note 2: n=12 respondents failed to answer the race question.

In total, a smaller number of African Americans and Asians were in the sample than the percentage in the population. Because of the low cell count, subdomain analyses for specific minority populations cannot be compared. Separate white/Caucasian and minority groups will be formed to make demographic comparisons in the summary statistics below. Figure 2 displays the response frequency of white and other responding persons.
Furthermore, persons who owned their dwellings comprise 85% of the sample, while renter occupied dwellings comprised 15%. Figure 3 displays these proportions. The number of homeowners in the sample is higher than the 71% ACS estimate for the same area.

*Source: HRWC Norton Creek Survey 2016*
The owner-renter response bias in this survey can, in part, be explained though homeownership status. In survey data collections, renters are more difficult to be located in mail surveys than homeowners. Because renters move dwellings frequently, contact information for an address based sample is frequently obsolete.

Similarly, time that the respondents lived in their current residence ranged from 0 years to 64 years with a median of 11.5 years. Furthermore, the majority (60.44%) of respondents reported living on a lot size that was 0.25 acre or less in size. Fewer than 2% of respondents lived on a residence more than 5 acres in size. Figure 4 details the lot size for the full sample of respondents. Furthermore, 68% of respondents reported that they do make the home and lawn care decisions in their household, and 32% indicated that someone else does.
In regards to decision making, 76% of homeowners report that they themselves made the home and lawn care decisions; this proportion is only 31% for renters. Finally, the majority of respondents (57%) in the sample report hiring a professional lawn service in some capacity to maintain their yard. Conversely, 43% of respondents did not report using a professional service. Figure 5 reports proportions for lawn care service use.

Source: HRWC Norton Creek Survey 2016
Finally, seventy-nine percent of survey respondents reported living in a town, village or city, while 19% of persons reported living in a rural subdivision of development. Less than two percent of respondents reported living in an isolated rural residence or a farm.
Rating of Water Quality and Appreciation for Local Water Sources

Study participants were asked to rate the quality of their water. Questions 1-7 in the survey read: “Overall, how would you rate the quality of the water in your area?” The possible response options consists of a four point scale with a “don’t know” category. A variety of water based activities (i.e. boating, fishing, scenic beauty) were rated.

The majority respondents from the Norton Creek Watershed area rated the quality of their water as “good.” Figures 6 and 7 display the series of responses received by respondents. Figure 6 displays the responses of all respondents while Figure 7 is restricted to homeowners.

Figure 6. Rating of Water Quality among all Respondents

![Figure 6: Rating of Water Quality among all Respondents](chart.png)

Source: HRWC Norton Creek Survey 2016
In summary, respondents listed scenic beauty as the best aspect of their water, closely followed by picnicking and family activities, and boating. Conversely, eating locally caught fish was the response most common in the “poor” category. The distributions for homeowners varied slightly from the full sample. Homeowners ranked scenic beauty as the best aspect of their water, followed by picnicking and family activities. The response distributions between homeowners and renters were not measurably different.

Respondents were asked a slightly nuanced version of this question, “Of these activities, which is the most important to you?” and were asked to select their favorite activity of the activities listed in Figures 6 and 7 that they rated. Among homeowners, the responses scenic beauty and picnicking and family activities remain the most appreciated aspects of local water. Figure 8 displays the attitudes of homeowners about their favorite local water activity.
While many respondents noted appreciating local water resources, many note that they do not have a thorough understanding of issues related to water sources. More than half (51%) report that they do not know where rain water goes when it runs off their property. Unsurprisingly, property owners report knowing where rain water goes off of their property at significantly higher rates than renters $X^2(1) = 18.3750, p < .001$. An open-ended qualitative field asked respondents where the rain water went. The question yielded a variety of responses including, “drains, lakes, and “the local watershed.”

Willingness to Protect Local Water

The survey asked respondents about the relationship between personal responsibility and water quality, and willingness to change. Of particular interest to the researchers are the differences in perspectives and willingness to change among property owners. Table 3 details the responses of the full sample, property owners, and the change in percent of property owners as compared to the full sample.
Table 3. Personal Actions, Responsibility, and Willingness to change one’s actions with Regards to Water Quality; Opinions of Homeowners are Separated from the Full Sample

<table>
<thead>
<tr>
<th>Statements and Levels of Agreement</th>
<th>All Respondents</th>
<th>Homeowners Only</th>
<th>Percent Difference (Property Owners v. All Respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
</tr>
<tr>
<td>The way that I care for my lawn and yard can influence water quality in local streams and lakes.</td>
<td>4.6</td>
<td>10.4</td>
<td>85.0</td>
</tr>
<tr>
<td>Using recommended management practices on farms improves water quality.</td>
<td>2.9</td>
<td>14.9</td>
<td>82.2</td>
</tr>
<tr>
<td>It is my personal responsibility to help protect water quality.</td>
<td>2.1</td>
<td>8.7</td>
<td>89.2</td>
</tr>
<tr>
<td>It is important to protect water quality even if it slows economic development.</td>
<td>3.7</td>
<td>12.0</td>
<td>84.3</td>
</tr>
<tr>
<td>My actions have an impact on water quality.</td>
<td>2.1</td>
<td>9.2</td>
<td>88.7</td>
</tr>
<tr>
<td>I would be willing to pay more to improve water quality (for example: though local taxes or fees)</td>
<td>24.0</td>
<td>32.7</td>
<td>43.4</td>
</tr>
<tr>
<td>I would be willing to change the way I care for my lawn and yard to improve water quality.</td>
<td>6.3</td>
<td>18.1</td>
<td>75.5</td>
</tr>
<tr>
<td>I would be willing to change management practices to improve water quality.</td>
<td>3.8</td>
<td>21.7</td>
<td>74.6</td>
</tr>
<tr>
<td>The quality of life in my community depends on good water quality in local streams, rivers and lakes.</td>
<td>2.5</td>
<td>9.2</td>
<td>88.3</td>
</tr>
</tbody>
</table>

Note: Bottom and top categories two Likert scale categories were collapsed (i.e. the “Disagree” category presented in Table 2 also includes “Strongly Disagree” responses from the survey).
The majority of participants acknowledged the relationship between their action and water quality. However, significantly fewer expressed willingness to change their lawn and management practices to protect water quality. The least-agreed to statement was willingness to pay more to improve water quality. Homeowners and the full sample did not provide measurably different responses to this set of questions.

**Water Impairments**

We provided respondents the following information about water impairments, “Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?” The response options include sediment, phosphorous, bacteria, trash in the water, algae, not enough oxygen, flow alteration, and habitat alteration harming local fish. Respondents cited “trash and debris in the water” or “algae” in the water as the most common problems. This response is unsurprising because these issues can be seen by respondents, unlike low oxygen in the water and bacteria and viruses in the water which were selected at low rates. HRWC’s water quality research shows that lack of oxygen and flow due to past channelization construction projects are the most pressing issues for the Norton Creekshed.

Figures 9 and 10 display the response frequencies about water impairments section for all respondents and homeowners only. The response distributions for all respondents and homeowners do not measurably differ from one another.

**Figure 9. Water Impairments among All Respondents**

![Chart showing water impairments among all respondents](source: HRWC Norton Creek Survey 2016)
Sources of Water Pollution

We asked respondents the following question about water pollution, “In your opinion, how much of a problem are the following sources in your area?” The response categories included soil erosion, waste management problems, stormwater, and other issues. Respondents identified lawn care issues, excessive use of fertilizers (25%) and grass clippings entering storm drains (24%) as being the worst problems. Respondents did not identify discharges from sewage treatment plants, turf management, or storm water runoff to be problems in their area. Figures 11 and 12 display the response distributions for all respondents and homeowners only. The response distributions for all respondents and homeowners do not measurably differ from one another.
Figure 11. Water Impairments among All Respondents

Source: HRWC Norton Creek Survey 2016
Figure 12. Water Impairments among Homeowners

Source: HRWC Norton Creek Survey 2016
Consequences of Poor Water Quality

We provided respondents with the following background information and asked them to rate the water quality on their area on several dimensions, “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 your area?” The response options included contaminated drinking water, reduced beauty, odor, lower property values, and others. In general, respondents rated most issues as “not a problem.” Conversely, the most commonly elected problem was excessive aquatic plants or algae. Figures 13 and 14 display the response distributions for all respondents and homeowners only. The response distributions for all respondents and homeowners do not measurably differ from one another.

**Figure 13.** Reported Consequences of Poor Water Quality All Respondents

*Source: HRWC Norton Creek Survey 2016*
Figure 14. Reported Consequences of Poor Water Quality Homeowners

Source: HRWC Norton Creek Survey 2016
Positive Water Quality Practices and Barriers to their Use

The respondents were introduced to, and asked about their use of three positive water-quality practices. These included rain gardens, phosphate-free fertilizer, and vegetated streambank/shoreline protection. The survey gauged respondents’ familiarity with and use of the practice. Respondents who indicated that the practice was “not relevant” to them were given a follow-up question asking to explain why they expressed that opinion. Respondents were asked about their willingness to adopt the practice, and potential barriers to adapting the practice. The following three sections detail the responses to the three practices.

Rain Gardens

The survey respondents were provided the definition of a rain garden as “a garden that uses native plants to absorb and filter storm water collected off a roof, parking lot, sidewalk, or driveway.” Respondents were then asked about their familiarity with the practice of rain gardens. Table 4 displays respondent familiarity with the practice.

Table 4. Familiarity with Rain Gardens among All Respondents, and Homeowners

<table>
<thead>
<tr>
<th>How familiar are you with this practice</th>
<th>All Respondents</th>
<th>Homeowners Only</th>
<th>Percent Difference (Property Owners v. All Respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never Heard of it</td>
<td>46.6</td>
<td>47.7</td>
<td>0.02</td>
</tr>
<tr>
<td>Somewhat familiar with it</td>
<td>33.6</td>
<td>34.5</td>
<td>0.03</td>
</tr>
<tr>
<td>Know how to use it; not using it</td>
<td>10.9</td>
<td>10.2</td>
<td>-0.08</td>
</tr>
<tr>
<td>Currently use it</td>
<td>2.5</td>
<td>3.1</td>
<td>0.17</td>
</tr>
<tr>
<td>Not Relevant</td>
<td>6.3</td>
<td>4.6</td>
<td>-0.38</td>
</tr>
</tbody>
</table>

Source: HRWC Norton Creek Survey 2016

The most common response for the full sample is that most have not heard of the practice. Conversely only 3.1% of homeowners report current use of this practice.

When asked to explain why they do not believe the practice is relevant, the open ended responses contained statements like, “I live in an apartment, I do not garden, and we do not have a lot of runoff.” noted. When asked whether they would be willing to try this practice, 19.4% of all respondents indicate yes, 61.6% indicate maybe, and 19% indicate no. Figures 15 and 16 present graphically the following factors that influence the ability to implement rain gardens among the full sample and homeowners.
Figure 15. Barriers to Implementation of Rain Gardens among all Respondents

Source: HRWC Norton Creek Survey 2016
Figure 16. Barriers to Implementation of Rain Gardens among Homeowners

Source: HRWC Norton Creek Survey 2016

For both the full sample and homeowners only, not knowing how to perform the practice, and cost were the most frequently selected categories for the “a lot” category. Similarly, the “don’t know” category was frequently selected at a high rate among all respondents.
Use of Phosphate-Free Fertilizer

Use of Phosphate Free Fertilizer
The survey asked respondents about the knowledge and use of phosphate-free fertilizer. The definition of this practice was presented to the respondent in the following way, “Fertilizer without phosphates designed to reduce phosphorus runoff and water pollution.” Table 6 displays respondent familiarity with the practice.
### Table 6. Familiarity with Phosphate Free Fertilizer

<table>
<thead>
<tr>
<th>How familiar are you with this practice</th>
<th>All Respondents</th>
<th>Homeowners Only</th>
<th>Percent Difference (Property Owners v. All Respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never Heard of it</td>
<td>38.91</td>
<td>38.27</td>
<td>-0.02</td>
</tr>
<tr>
<td>Somewhat familiar with it</td>
<td>32.22</td>
<td>33.16</td>
<td>0.03</td>
</tr>
<tr>
<td>Know how to use it; not using it</td>
<td>6.69</td>
<td>6.12</td>
<td>-0.09</td>
</tr>
<tr>
<td>Currently use it</td>
<td>12.97</td>
<td>14.8</td>
<td>0.00</td>
</tr>
<tr>
<td>Not Relevant</td>
<td>9.21</td>
<td>7.65</td>
<td>-0.20</td>
</tr>
</tbody>
</table>

*Source: HRWC Norton Creek Survey 2016*

The most common response to the question about use of phosphate free fertilizer was that the respondents had never heard of it. The second response was “somewhat familiar” with it. At a much lower percent at 12.9% of respondents currently use this practice. Unsurprisingly three quarters of those who use phosphate free-fertilizer are homeowners.

We asked respondents an open ended question about why phosphate-free fertilizer was not relevant to them. The most common response was that the respondent lives in a residence where they do not make the lawn care decisions. Similarly, a common response was that they do not make use of fertilizer. On the contrary, one respondent relayed his view that, “2 percent phosphorus runoff ids due to residential use, 98 percent is from industry. Talk to industry and leave citizens alone!”

When asked whether they would be willing to implement this practice, 40% of respondents replied that they currently use it or would be willing to. On the contrary, 16% of respondents indicated that they are unwilling to try this practice. The reminder said that they would “maybe” implement this practice.

When asked about barriers to implementing phosphate-free fertilizer, homeowners and the full sample respond in a nearly identical way. For both groups, unfamiliarity with the practice and cost were the most selected barriers. On the other hand, desire to keep things the way that they are and physical and health limitations were the lowest elected barriers for all respondents and homeowners alike. Figures 19 and 20 display the set of responses for all respondents and homeowners separately.
Figure 19. Barriers to Implementation Phosphate-Free Fertilizer among all Respondents

Source: HRWC Norton Creek Survey 2016
Figure 20. Barriers to Implementation Phosphate-Free Fertilizer among Homeowners

Source: HRWC Norton Creek Survey 2016
Knowledge and use of Vegetated Streambank/Shoreline Protection

In addition to rain gardens, the survey asked respondents about the knowledge and use of vegetated streambank and shoreline protection. The definition of this practice was presented to the respondent in the following way, “maintaining vegetation that grows along streams, rivers or lakes acts as a protective buffer between the land and the water to reduce runoff and sediments flowing into the water.” Respondents were then asked about their familiarity with the practice of shoreline protection. Table 5 displays respondent familiarity with the practice.

Table 5. Familiarity with Vegetated Streambank/Shoreline Protection among All Respondents and Homeowners

<table>
<thead>
<tr>
<th>How familiar are you with this practice?</th>
<th>All Respondents</th>
<th>Homeowners Only</th>
<th>Property Owners v. All Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never heard of it</td>
<td>51.74</td>
<td>50</td>
<td>-0.03</td>
</tr>
<tr>
<td>Somewhat familiar with it</td>
<td>6.09</td>
<td>6.32</td>
<td>0.04</td>
</tr>
<tr>
<td>Know how to use it; not using it</td>
<td>22.17</td>
<td>22.63</td>
<td>0.02</td>
</tr>
<tr>
<td>Currently use it</td>
<td>4.78</td>
<td>5.79</td>
<td>0.17</td>
</tr>
<tr>
<td>Not Relevant</td>
<td>15.22</td>
<td>15.26</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*Source: HRWC Norton Creek Survey 2016*

Over half of the sample said they had never heard of vegetated streambanks practice. The second most common response was that they know how to use it but were not using it. Only 4.7% currently have buffer zones. All respondents who use the practice are homeowners.

To better understand why respondents do not employ vegetated streambank and shoreline protected practices, the survey asks an open ended question that reads, “If the practice is not relevant, please explain why.” There were only two variations in the responses to this question. The most commonly received response was that the individual does not live on the shoreline. The second most common response was that they do not make the landscaping decisions they live in a rented dwelling. Furthermore, when asked about whether they would be willing to try the practice, a third of the sample indicated that they would not be willing to try it, while 46% of the respondents indicated that they would maybe try the practice. The remainder of the individuals (21%) stated that “Yes” they would be willing to try the practice, or already do.

When asked about barriers to implementing vegetated streambank and shoreline protection, homeowners and the full sample respond in a nearly identical way. Property features make implementation difficult was the most elected response for the “a lot” category. Physical and health limitations was the most selected category for the “not at all” response. Figures 17 and 18 display the set of responses for all respondents and homeowners separately.
Figure 17. Barriers to Implementation of Vegetated Streambank/Shoreline Protection among All Respondents

Source: HRWC Norton Creek Survey 2016
Figure 18. Barriers to Implementation of Vegetated Streambank/Shoreline Protection among Homeowners

Source: HRWC Norton Creek Survey 2016
General Factors Impacting Decision Making on Property

After being asked about willingness to make positive changes though specific actions such as rain gardens, respondents were asked how general factors, such as physical ability, and property ownership status influence decisions making on their property. Figure 21 displays the general factors influencing decision making on property.

Figure 21. General Factors Influencing Decision Making on Property

![Bar Chart showing general factors influencing decision making on property]

Source: HRWC Norton Creek Survey 2016

The concern that the respondent does not own the property is the most prevalent response (61%). This is followed by physical abilities (37%) and hesitancy to learn new skills (30%). Surprisingly at just under (11%), respondents reported “cost” as the category as the most influential in their decision making processes.

Sources of Information

Respondents were asked about media consumption in relationship to water quality, conservation. They were also asked which source was the most trustworthy. Figures 22 and 23 below show a very similar pattern. Respondents are most likely to consume information about water quality from the Internet and newsletters:
Figure 22. Response to Survey Question about Media Consumption, “Where are you likely to seek information about soil and water conservation issues? (Check all that apply)”

Figure 23. Response to Survey Question about Media Consumption, “Where are you likely to seek information about water quality issues? (Check all that apply)”

Source: HRWC Norton Creek Survey 2016
The survey also asked respondents to rate their most trusted sources about soil and water. Figure 24 displays the most trusted sources separating property owners from the full sample. There was no remarkable difference in trusted sources of information about water quality among all respondents and homeowners. Respondents reported that a University extension was the most highly regarded source of information on water quality (33%). This was closely followed by the Local watershed project (30%) and the county health department (29%).

**Figure 24.** Most trusted source of information about Soil and Water by Homeownership Status and Source Type

![Bar Chart](chart.png)

*Source: HRWC Norton Creek Survey 2016*
Social Indicator (SIDMA) Scores

The Social Indicator Data Management and Analysis (SIDMA) tool is a web-based project management aid that supports SIPES watershed projects. Social indicators provide consistent measures of social change within a watershed and can be used by managers at local, state, and federal levels to estimate the impacts of their efforts and resources. SIDMA indicators are useful for providing a holistic overview on human behaviors effecting water quality. Using answers to survey questions, the SIDMA social indicator scores measure four key constructs: awareness, attitudes, constraints and behavior. Survey questions about these constructs are grouped together, and responses are weighted and recoded to form a composite measure. Figures 25-30 present the graphs generated using the SIDMA tool and a brief conclusion about each indicator.

Awareness

Figure 25 displays the SIDMA the Awareness of appropriate practices to improve water quality. This indicator ranges from 1-2, whereby a score of 1 is indicative of low awareness, and 2 is the highest possible score. With a mean of 1.36, respondents show low awareness about practices that improve water quality.

Figure 25. Awareness SIDMA score

Source: SIDMA tool using Norton Creek Data, 2016
Attitudes
Figure 26 displays the general water-quality-related attitudes indicator. Attitudes are scored from 1-5 with 1 being less positive and 5 being most positive. With a mean of 4.06, respondents have a strong positive perception towards the water quality in their area.

**Figure 26.** Respondent water Quality Attitudes SIDMA score

![Bar chart showing water quality attitudes](image)

*Source: SIDMA tool using Norton Creek Data, 2016*
Also related to attitudes, Figure 27 presents the willingness to take action to improve water quality indicator. This indicator ranges from 1-2, whereby a score of 1 is indicative of low awareness, and 2 is the highest possible score. With a mean of 1.5, respondents scored in the median of these two cut points, which demonstrates moderate willingness to take actions to improve water quality.

**Figure 27.** Willingness to take Action SIDMA score

*Source: SIDMA tool using Norton Creek Data, 2016*
Constraints
Figure 28 displays the constraints to behavior change SIDMA score. Constraints are scored from 1-4 with 1 indicating more constraint and 4 indicating more constraint. Respondents report low constraints to behavior change with a high mean of 2.69.

Figure 28. Constrains to Behavior Change SIDMA score

Source: SIDMA tool using Norton Creek Data, 2016
Furthermore, the SIDMA tool creates a second indicator on constraints: the constraints to adopting key practices. Identical to the way that behavior change is scored, constraints to adopting key practices is scored from 1-4 with 1 indicating more constraint and 4 indicating more constraint. Figure 29 displays the outcome constraints to adopting key practices. With a mean of 2.93, this constraint scored similar to the behavior change indicator. With these high overall scores on both operationalizations of constraints, can conclude that respondents face overall low level of constraints to adopt these practices.

**Figure 29. Constrains to Adopting Key Practices SIDMA score**

![Figure 29. Constrains to Adopting Key Practices SIDMA score](image)

*Source: SIDMA tool using Norton Creek Data, 2016*
**Behavior**

Figure 30 displays the behavior SIDMA score for Percentage of target audience implementing practices in critical areas. This indicator is a binary variable, whereby respondents are assigned a score of 0 if they do not perform a behavior and 1 if they practice the behavior. Results from Figure 30 suggest low adoption of practices by respondents, with only 8% adopting the practices in critical areas.

**Figure 30.** Percentage of Respondents Adopting Water Quality Practices in Critical Areas

Source: SIDMA tool using Norton Creek Data, 2016

**Discussion, Recommendations, and Conclusions**

This survey has examined attitudes and behaviors of individuals living in the Norton Creek Watershed region. It has investigated issues surrounding water quality, appreciation, and sustainable practices, and barriers to change.

There is a high level of appreciation for local water, especially the aesthetic qualities of waterways, boating, and picnicking. However, many individuals do not recognize that severe water problems exist. This could explain a common attitude seen repeatedly in the data: many feel that a practice is not relevant to him or her. This would further explain why so few respondents have rain gardens, use phosphate-free fertilizer, or have shoreline buffer zones.
Since most respondents don’t know about sources of local water problems or what is impairing the quality of water, there is a strong need to raise awareness about what causes water problems and what can be done to address them as an initial step to encouraging behavioral change.

Other limitations to mobilize change are cost and knowledge of using the practices. Since respondents are generally open to implementing changes, the biggest barrier that they can overcome through outreach and education is knowing what the best practices are and how to do them. Furthermore, small actions that can be completed at low or no-cost, as well as those that can be completed with limited physical strain should be promoted. Promoting these smaller protection activities, and framing them in the context of protecting the scenic beauty of their local water (the most cited “appreciation” response) may encourage individuals who have not previously engaged in sustainable practices to become involved, even if in a limited way.

Other recommendations:

- Since those who own property have the greatest ability to take action that can directly benefit Norton Creek, home owners should be the primary target audience for outreach. The message should first focus on the problems, the sources of the problems, the outcomes of the problems (why it is important to know about them), and solutions that they, as home owners, can do.

- Highlight beautiful local scenery featuring waterways and people canoeing/kayaking in outreach materials to engage this target audience with imagery showcasing the aspects they value most regarding local water.

- For take-action messaging, focus outreach efforts on ways to capture storm water and reduce phosphate fertilizers as the top two solutions people can do to protect local water.

- When giving information about what residents can do to protect water, focus on solutions that also save money where possible.