

Maintaining the Health of the Nippersink Creek Watershed:

An Evaluation of Phase II Outreach Activities and Community Survey

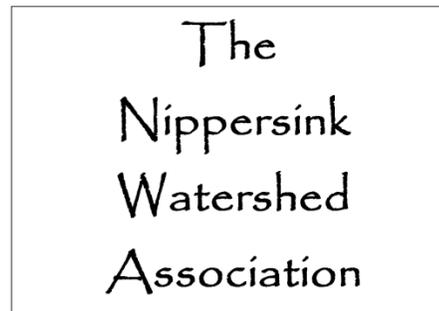
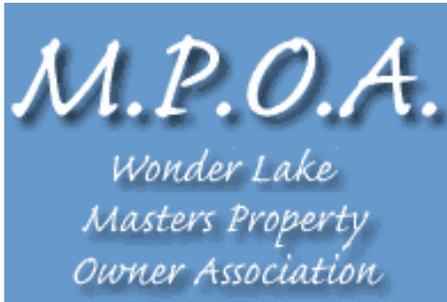


Prepared By the Department of Sociology and Anthropology, Illinois State University, June 1, 2014.

Dr. Joan M. Brehm
Professor of Sociology
Department of Sociology and Anthropology
Illinois State University

Dr. Brian W. Eisenhauer
Associate Professor of Sociology
Director, Office of Environmental Sustainability
Plymouth State University

Project Partners:



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Ray Mathis, <http://www.pbase.com/raymathis>, unless otherwise noted.

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Executive Summary

Nonpoint Source (NPS) pollution is a major threat to water quality, and several efforts to address the issues in the Nippersink Creek Watershed have been undertaken through collaboration among local stakeholders, residents, and researchers. The project, *Maintaining the Health of the Nippersink Creek Watershed: An Evaluation of Phase II Outreach Activities and Community Survey* was designed and conducted to assess how values and attitudes towards the natural resources within the watershed have changed over time since the initial social assessment, and to determine how knowledge and use of Best Management Practices (BMPs) has been influenced by outreach and educational activities designed to address NPS issues. The evaluation of this project to protect water quality was designed to achieve six primary objectives.

- Evaluate changes in property owners' understanding and knowledge about water quality issues and threats to water quality within the Nippersink Creek Watershed.
- Assess the effectiveness of outreach and education efforts in meeting the goals, intended outcomes and core social indicators for nonpoint source pollution management.
- Identify changes in attitudes among residents towards nonpoint source management actions.
- Identify changes in perceived constraints for using appropriate practices.
- Identify changes in capacity to address nonpoint source management issues in the Nippersink Creek Watershed area.
- Identify changes in adoption of nonpoint source management practices by residents and determine their relationship with exposure to education and outreach.

The findings indicate that outreach and education efforts in the Nippersink Creek Watershed have been effective in facilitating the adoption among residents who were exposed to these programs. Although only 19 percent of respondents indicated that they saw the Phosphorus Free Fertilizer campaign logo, findings indicate that this material was statistically significant in increasing the use of selected BMPs. In addition, there was a significant increase in the percentage of respondents who indicated that they had some level of familiarity with the Watershed Management Plan, which is another key variable for facilitating the adoption of BMP use among residents. Overall the results indicate that while significant challenges to NPS management remain, the use of social science to inform the design of effective education and outreach is essential for program success.

Introduction: Evaluating Effectiveness of Outreach and Education Activities for Nonpoint Source Pollution Management in the Nippersink Creek Watershed

Like many regions of the country, Northern Illinois is experiencing high rates of conversion of formerly agricultural and prairie/forest lands to residential development. One area that is experiencing such threats is the Nippersink Creek Watershed, which is located in northeastern Illinois and southern Wisconsin and is home to the largest tributary to the Fox River, draining 137 square miles in Illinois and about 50 square miles in Wisconsin (see Figure 1). Nippersink Creek is considered among the finest of Illinois streams. As a result of being situated on the edge of the Chicago metropolitan area, changes are rapidly occurring in the Nippersink Creek watershed. Current municipal comprehensive land use plans indicate that a potential exists for significant growth in development over the next twenty years. Many of the municipalities in the Nippersink Creek watershed have already begun significant residential and commercial development, or are anticipating it in the near future. The water resources within the Nippersink Creek Watershed necessitate a proactive approach to protect this valuable resource from the potential negative impacts from current and future development. Some of these impacts include wastewater treatment, pollutant loadings in the streams, groundwater contamination, and increasing amounts of impervious surfaces and associated storm water management (Nippersink Creek Watershed Plan 2008).

Along with the conversion of land use comes a conversion of ownership from one land steward (e.g. farmer or woodlot manager) with primarily commercial or traditional interest in the land to many land stewards (e.g. subdivision residents) with primarily non-commercial interest in the land. The acreage that was once under a single land manager is now under many land managers with diverse interests, attitudes, knowledge, practices and connections to the land. When land is converted from farm or forest to residences, water quality threats may compound because of both environmental and behavioral influences. Ecologically functioning natural areas become developed areas and land stewardship transfers from a single, potentially prudent owner to multiple owners with varying levels of environmentally responsible behavior. In addition, the increase of human impacts in the area from habitation also changes the nature of water quality impacts. This change in land use and ownership patterns has the potential to bring about negative impacts on water quality and overall watershed health.

Although the water quality in the Nippersink Creek and its tributaries is relatively high compared to other Illinois EPA listed 303 (d) impaired waterways within the state, its relatively high water quality condition provides a critical and atypical opportunity to be proactive in the protection of the watershed for its ecological health and the quality of life for its residents. Many impaired watersheds within Illinois suffer from significant urban impacts, which require their watershed plans to focus on retrofitting of mediation tools to reduce the water quality impact from an urbanized environment. In contrast, the Nippersink Creek Watershed offers an opportunity to be proactive in our approach to watershed health by implementing conservation efforts that address the changing land use and ownership patterns and that will work to protect the water quality and quality of life from the negative impacts of future development efforts.

By taking a proactive approach to protecting the water quality and ecological health of the watershed, future development efforts may proceed with the hope that the water quality and ecological integrity of the watershed have been managed effectively, which may attract residents and associated business for the high quality of life and environment in the Nippersink Creek Watershed.

In an effort to improve nonpoint source (NPS) pollution management through the use of social indicators in the Nippersink Creek Watershed and beyond, the second phase of this project was again funded as part of a pilot program of the Region 5 Environmental Protection Agency's (EPA) Social Indicators for Planning and Evaluation System (SIPES) program.¹ The use of social indicators for NPS management provides valuable insights into local residents' values, beliefs, awareness, constraints and behaviors that are related to water quality improvement and protection at a watershed scale. The inclusion of social indicators can assist water quality managers and practitioners to better target project activities and assess their impacts on water quality over time. In the case of the Nippersink Creek Watershed, an examination of these social indicators will provide valuable information to further guide and direct the recommendations that have been outlined in the Nippersink Creek Watershed Plan.

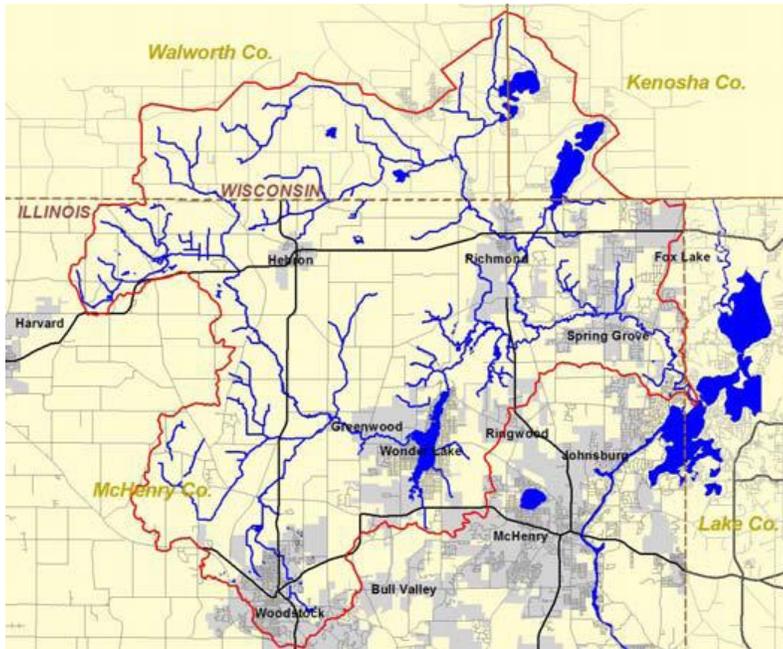
In phase I, a randomly sampled survey of property owners in four subwatersheds was conducted to learn about the values and desires that need to be considered to guide the implementation of the Nippersink Creek Watershed Plan. The survey, which was conducted in summer of 2010, documented residents' and property owners' knowledge and concern for watershed pollutants, use of specific best management practices, values and beliefs about watershed protection, and sentiments and perceptions about recommendations made in the plan. Findings from this phase were used to develop place-based outreach materials focusing on those BMPs identified as most underutilized and most likely to respond to behavior-modification outreach campaigns.

In phase II, a scientific, randomly sampled survey of property owners in the same four subwatersheds was conducted. The objective was to assess how values and attitudes towards the natural resources within the watershed have changed over time since the initial social assessment in 2010 and how knowledge/use of BMPs were influenced by outreach and educational activities. The second survey, which was conducted in summer of 2013, documented residents' and property owners' knowledge and concern for watershed pollutants, use of specific best management practices, values and beliefs about watershed protection, and sentiments, and their exposure to and knowledge about the specific outreach activities that were developed as part of this project.

The completed evaluation of the social assessment and outreach activities within the Nippersink Creek Watershed assists in the facilitation and implementation of various conservation efforts (as outlined in the Nippersink Creek Watershed Plan) through a more accurate understanding of current values and attitudes towards the natural resources within the watershed, and also provides a clear picture of how effective outreach and education built on that information has been in shaping behaviors to address NPS issues. This understanding, in turn, will be utilized to continue the development and implementation of additional place-specific outreach and education efforts beyond those developed in this project to continue to improve stewardship of water quality and natural resources within the Nippersink Creek Watershed (Figure 1).

¹ For more information on the EPA Region 5 SIPES Project, please visit:
<http://www.uwex.edu/ces/regionalwaterquality/Flagships/Indicators.htm>

Figure 1: The Nippersink Creek Watershed



Source: Nippersink Watershed Association

Research Methods

A self-administered questionnaire survey was administered to property owners in four subwatersheds in the Nippersink Creek Watershed (Silver Creek; Nippersink Headwaters; Lower Nippersink; and Wonder Lake) in the summer of 2013. The Nippersink Creek Watershed encompasses a total of fourteen subwatersheds covering approximately 94,800 acres in Illinois, with additional acreage in Southern Wisconsin. All samples in each subwatershed were drawn using a scientifically random selection based on residence within the subwatershed. Although we did not utilize the exact same sample from 2010 to avoid any bias in response due to survey burnout, we did utilize the same sampling frame to ensure we reach the same general population within the targeted subwatersheds. Samples were purchased and drawn from Survey Sampling International (with the exception of Wonder Lake). To develop the sampling frame the research team identified all census block groups within the same four subwatersheds that were studied in 2010 (Silver Creek, Nippersink Headwaters, Lower Nippersink, Wonder Lake). From these block groups, Survey Sampling International drew a scientifically random sample for each subwatershed. The randomly selected sample included 2,500 property owners within the four subwatersheds, but due to bad addresses and unoccupied households, the final sample size was 2,471 eligible households.

Table 1. Watershed Land Area; Size Of Population By Subwatershed; Samples Drawn From Each Subwatershed

Subwatershed	Acres in Watershed	% of Watershed Acres	Subwatershed Population	% of Watershed Population	Sampled Population	Response Rate
Silver Creek	12,010	9.3	17,527	42.3	1,172	21.0%
Nippersink	6,600	5.1	472	1.1	183	30.0%
Headwaters						
Lower Nippersink	12,432	9.6	6,620	16.0	500	28.8%
Wonder Lake	7,884	6.1	6,800	16.4	622	17.7%
Total	38,926	30.1	31,419	75.8	2,477	22.8%

Source: Nippersink Creek Watershed Association; US Census

The survey was administered using a modified version of the Tailored Design Method (Dillman 2009) that employed many techniques intended to enhance response rates including customizing letters, using multiple waves of contacts with carefully timed reminders, and providing clear information about the need for responses and how they will be used. The sampled population was sent a total of three contacts. First, respondents received a package that included a letter informing them about the project, the survey questionnaire, and a postage-paid response envelope. The second contact consisted of a postcard mailed within the next two weeks as a reminder to complete and mail in the questionnaire. A final contact, which contained a letter reiterating the importance of responses as well as a replacement questionnaire and return envelope, was sent two to three weeks after the reminder postcard.

After the survey was administered, 29 mailings were returned as undeliverable throughout the process. Rather than repeating the process and holding up data collection, the original sample went from 2,500 to 2,471. Of the 2,471 questionnaires mailed to valid addresses, 564 were completed and returned for an overall response rate of 22.8%.

Our overall response rate of 23% is lower than expected. Sometimes low response rates can indicate the data collected does not accurately represent the demographics of the surveyed population. The first step to address this concern is a comparison of the demographics of our data with data from the American Community Survey 2006 – 2008 of McHenry County (See Table 2). Although advanced statistical analysis shows some minor differences between the demographics of our data and the general population of McHenry County, they are not large enough to meaningfully impact the integrity of the data collected.

Table 2. McHenry County American Community Survey Demographics vs. Nippersink Survey Demographics.

	McHenry Co - ACS	Nippersink Survey Respondents
Male	50%	63%
Female	50%	37%
Education: High School Diploma or more	92%	98.3%
Education: BS or more	33%	45.2%
Median Income	77,325	75,000 - 99,999
Own Home	83%	95.2%
Rent Home	17%	4.8%
Age: 18 and up	72.7%	100%
Age: 65 and up	10.1%	36%

Source: <http://factfinder.census.gov/servlet>

Due to the lower response rate the concern for non-response bias was also a factor that needed to be addressed in the research. To assess non-response bias we drew a random sample of 300 households from non-respondents. Of these 300 households only 243 had active/accurate phone numbers. These households were asked to complete an abbreviated sample of survey questions via a phone survey. A total of 36 respondents completed the abbreviated questionnaire. Table 3 presents the results of the t-tests comparing mean responses between respondents and non-respondents. The analyses indicate that non-respondent bias is not a significant problem within our sample.

Table 3. T-test results comparing Non-respondents to Respondents

Variable	Mean Response of Respondents	Mean Response of Non-Respondents
Water Quality: Canoeing, Kayaking, Other Boating	2.20	2.50
Water Quality: Eating Fish	1.52	1.80
Water Quality: Swimming	1.55	1.96
Water Quality: Picnicking	2.23*	2.59*
Water Quality: Fishing	1.94	2.23
Water Quality: Scenic Beauty	2.26	2.48
I am not concerned about the impact of fertilizer use at home on water quality	2.21	2.37
The way that I care for my lawn and yard can influence water quality in local lakes and streams	3.84	4.18
Lawn and yard-care practices (on individual lots) do not have an impact on local water quality	2.01	2.23
My actions can have an impact on water quality	3.81	4.22
The quality of life in my community depends on good water quality in local streams, rivers and lakes*	3.80*	4.56*
Familiarity with the Nippersink Creek Watershed Plan	1.44	1.39
Change the way storm water is managed	3.82	3.69
Gender* (1= Male; 2= female)	1.28*	1.47*
Highest Education Level (1= some formal schooling; 2= high school diploma/GED; 3= some college; 4= 2 yr college degree; 5= 4 yr college degree; 6= graduate degree)	3.64	4.09
Total Household Income (1= <\$24,999; 2= \$25,000-49,999; 3= \$50,000-74,999; 4=\$75,000-99,999; 5=\$100,000 >)	3.35	3.19

**Statistically significant difference at the .05 level*

Key Findings from the Non-Respondent Bias Analyses

- Only three of the sixteen variables were statistically significant in their differences between respondents and non-respondents.
- The variables that were the strongest predictors of differences in specific value orientations or support for watershed management recommendations (level of education, income) were not statistically significant.
- Gender was statistically significant – respondents to the survey were more likely to be male compared to non-respondents and compared to the census data for McHenry County. However, this was not a statistically significant predictor of differences in adoption of BMPs among respondents.
- Overall, the non-respondent data analysis demonstrates that non-respondent bias is not likely to be a significant issue of concern in the sample data.

Results

Analyses of the questionnaire data were conducted using Statistical Package for the Social Sciences (SPSS). Descriptive statistics, t-tests, and multivariate procedures were used to examine the results and to identify important findings that can be applied to achieve the goals of the project. Select data points were analyzed in comparison to the data points from the first survey phase (2010) to identify any statistically significant changes in specific behaviors or attitudes over time.

This report presents key findings from the survey of particular importance for the continued implementation of the Nippersink Creek Watershed Plan through the use of tables, charts, and by highlighting the most important findings. Complete information about the responses to all questions in the survey is provided in the appendix to this document, which presents tables and charts giving the complete responses to each question in the questionnaire. A copy of the questionnaire used in the survey appears at the end of this report and as the last section of the appendix.

Who Responded To The Survey?

In order to best understand the uses and limitations of the survey data collected, a series of questions asked about the characteristics of the respondent and their household. Asking about background characteristics enables responses to all questions to be analyzed using multivariate statistical analyses to identify how respondents' characteristics are related to patterns of responses. This information can be used to better understand responses to specific questions that may be affected by differences between those who responded to the survey and the demographic characteristics of all property owners in towns in the watershed.

The text below highlights some of the key demographic findings from the phase II survey. Complete tables and charts representing responses to all questions in the survey including responses to open-ended questions are in the appendix to this document.

- 46% of respondents have at least a two year college degree. 21% have some college experience, while 22% of respondents hold a high school diploma or equivalent.
- The median age of respondents is 62 years.
- The majority of the survey's respondents, 95%, own their property, and 5% rent their property.
- The mean income for respondents is \$50,000-\$74,999.
- 46% of respondents indicated that they live in a rural area, 48% of respondents indicated that they live in a suburban area, and 6% of respondents indicated that they live in an urban area.
- 69% of residents do not use a professional lawn care service.

Respondents' Opinions on Water Impairments

As part of the objective to improve nonpoint source (NPS) pollution management through the use of social indicators, respondents were again asked to rate how much of a problem common water pollutants and conditions were in their area. In an effort to evaluate change in perceptions of water quality impairments, the seven most common pollutants or conditions within the Nippersink Watershed that were measured in 2010 were repeated in 2013. Respondents were asked to rate each water impairment on a 4-point Likert scale from “not a problem” to a “severe problem”. Comparing change in perceptions of these impairments over time provides valuable insights into changes in local residents’ awareness and perceptions about common pollutants that are related to water quality improvement and protection at a watershed scale. Table 4 presents a Crosstab comparison for 2010 and 2013 survey respondents.

Table 4: Crosstab Comparison between Survey Years on Water Impairments

Impairments	Survey Year 2010				Survey Year 2013				Chi-Square	Phi
	Not a problem	Slight problem	Moderate Problem	Severe Problem	Not a problem	Slight problem	Moderate problem	Severe Problem		
Excess dirt and soil in the water	16.0%	16.2%	40.4%	27.4%	12.9%	19.0%	43.6%	25.3%	.249	.080
Excess nitrogen	9.8%	18.8%	43.8%	27.7%	11.8%	18.8%	48.4%	21.0%	.438	.081
Excess phosphorus	11.1%	19.4%	37.3%	32.3%	12.9%	20.0%	42.9%	24.1%	.353	.092
Bacteria and viruses in the water (E.coli/coliform)	13.6%	19.5%	33.1%	33.7%	15.5%	28.6%	37.6%	18.4%	.000* **	.178
Trash in the water	11.3%	27.9%	38.4%	22.4%	14.1%	40.1%	31.4%	14.4%	.000* **	.157
Excess algae in the water	11.8%	23.6%	42.6%	22.1%	12.0%	29.5%	40.1%	18.3%	.264	.073
Invasive aquatic plants	15.3%	19.5%	37.8%	27.3%	13.4%	26.9%	38.3%	21.3%	.118	.100

- Overall, perceptions of each water quality impairment as a ‘severe problem’ showed at least a minimal decline or improvement from 2010 to 2013. Comparatively, a larger percentage of respondents in 2013 indicated that these 7 impairments were ‘not a problem’ compared to those in 2010.
- More specifically, there were statistically significant changes in perceptions of water impairments for two impairments: bacteria and viruses in the water and trash in the water.
 - In 2010, 33.7% of respondents felt that bacteria and viruses in the water were a severe problem, compared to only 18.4% of respondents in 2013. This indicates that perceptions of bacteria and viruses such as E.Coli and coliform as problems for water quality have gone down significantly in three years.
 - In 2010 22.4% of respondents viewed trash in the water as a severe problem compared to only 14.4% of respondents in 2013. This result also indicates an overall improvement in the view of this specific water quality impairment as a problem.

Respondents’ Opinions on Water Quality

Respondents were asked to rate water quality for specific types of activities or uses on a 3 –point Likert scale (“1-poor”; “2-OK”; and “3-good”). Perceptions of water quality are related to perceptions of water impairments, but focus on the use of the resource for specific activities. This information is important for understanding various user groups’ perceptions of the resource, and also for identifying ways to communicate with targeted audiences of users. In an effort to evaluate change in perceptions of water quality impairments, the four most common uses or activities within the Nippersink Watershed that were measured in 2010 were repeated in 2013. Comparing change in perceptions of water quality for these specific uses over time provides valuable insights into local residents’ perceptions about how their water quality is changing. Table 5 presents a crosstab comparison for 2010 and 2013 survey respondents.

Table 5: Crosstab Comparison between Survey Year on Water Quality Rating

Water Quality	Survey Year 2010			Survey Year 2013			Chi-Square	Phi
	Poor	OK	Good	Poor	OK	Good		
For scenic beauty	5.0%	33.6%	61.4%	5.2%	44.7%	50.1%	.001**	.117
For eating fish caught in the water	41.5%	40.7%	17.8%	45.1%	39.4%	15.5%	.536	.041
For swimming	43.7%	39.4%	16.9%	44.5%	42.0%	13.5%	.365	.048
For picnicking and family activities near the water	4.7%	42.4%	52.9%	6.1%	45.9%	48.8%	.231	.054

* p < .05; ** p , .01; *** p < .001

- Interestingly, although respondents generally indicated that specific impairments were less of a problem overall, the trend for water quality rating is in the opposite direction. Overall, respondents generally rated water quality as more “poor” and less “good” in 2013 as compared to 2010. This finding highlights the importance of integrating specific activities into messages encouraging activities to protect water quality.

- However, only one variable was statistically significant in this change – “For scenic beauty”. For this variable, 61.4% of respondents rated water quality for scenic beauty as “good” in 2010, while only 50.1% of respondents rated it as “good” in 2013.
- It is difficult to ascertain specific causes of this decrease in water quality rating, given the complexities of occurrences and activities between 2010 and 2013. This would be an area that may be worthy of further examination in terms of understanding the decline in perceptions of water quality for scenic beauty.

In general, respondents’ perceptions of water quality have decreased slightly between 2010 and 2013. However, their views on negative consequences for specific activities from poor water quality have improved during the same time period.

Respondents’ Opinions on Consequences of Poor Water Quality

Following the questions about water quality rating, respondents were then asked a series of questions about the consequences of poor water quality in lakes, rivers and streams in relation to specific activities and outcomes that were most relevant to the Nippersink Creek Watershed. Respondents were asked to rate each issue on a 4-point Likert scale from “not a problem” to a “severe problem”. The seven most common consequences that were measured in 2010 were repeated in 2013 to allow for a comparison over time. Table 6 presents the crosstab comparisons between 2010 and 2013 survey respondents.

Table 6: Crosstabs Comparison between Survey Years on Consequences of Poor Water Quality

Consequences	Survey Year 2010				Survey Year 2013				Chi-Square	Phi
	Not a problem	Slight problem	Moderate Problem	Severe Problem	Not a problem	Slight problem	Moderate problem	Severe Problem		
Polluted swimming areas	30.2%	31.5%	27.4%	11.0%	19.0%	36.9%	31.3%	12.8%	.003**	.129
Contaminated fish	27.7%	27.4%	28.2%	16.7%	24.7%	35.1%	24.3%	16.0%	.209	.085
Reduced beauty of lakes or streams	23.7%	32.0%	28.1%	16.2%	30.3%	34.3%	24.7%	10.7%	.014**	.106
Reduced opportunities for water activities such as boating, canoeing, and fishing	26.8%	33.0%	26.1%	14.0%	37.1%	28.6%	23.3%	10.9%	.011**	.113
Reduced quality of water activities	21.6%	36.7%	26.8%	14.9%	28.3%	34.7%	26.1%	10.9%	.083	.089
Excessive aquatic plants	16.8%	30.3%	33.5%	19.4%	22.5%	29.9%	31.9%	15.8%	.239	.079
Lower property values	34.4%	27.8%	20.0%	17.8%	37.3%	28.0%	20.4%	14.3%	.589	.050

* p < .05; ** p , .01; *** p < .001

- In general, respondents' rating of the consequences of poor water quality for the seven indicated activities as a "severe problem" decreased from 2010 to 2013.
- The one exception to this was 'polluted swimming areas' which actually showed a statistically significant change between 2010 and 2013. More specifically, in 2010 30.2% of respondents indicated that polluted swimming areas were "not a problem" compared to only 19% of respondents in 2013. 11% of respondents indicated that polluted swimming areas were a "severe problem" in 2010, and that increased to 12.8% in 2013. These changes may be related in part to several significant algae blooms on Wonder Lake in 2012 that caused beach closures during critical summer events, including the Labor Day holiday.
- The remaining two variables that were statistically significant were 'reduced beauty of lakes and streams' and 'reduced opportunities for water activities such as boating, canoeing, and fishing'. In both of these instances, there was a decrease in rating these consequences as a 'severe problem' and an increase in rating them as 'not a problem'.
- For the variable 'reduced beauty of lakes and streams', in 2010 16.2% of respondents rated this as a 'severe problem' compared to only 10.7% of respondents in 2013.
- For the variable 'reduced opportunities for water activities such as boating, canoeing, and fishing', in 2010 14% of respondents rated this as a 'severe problem', compared to only 10.9% of respondents in 2013.



What Do Residents Value? Comparing Changes in Opinions and Beliefs Regarding Water Quality

Respondents' values and opinions regarding water quality are an important consideration when trying to determine support for specific recommendations in the Watershed Management Plan. The choices people make that impact the overall quality and health of their watershed are driven in large part by their value systems and beliefs. In order to influence people's awareness, attitudes, skills and capacity to act, a firm understanding of the values and beliefs that form the basis of those actions is necessary. In both 2010 and 2013, respondents were asked to indicate their level of agreement or disagreement with a series of statements that measure their values and opinions related to water quality and its relationship to their own actions and behaviors. Table 7 shows the crosstab comparison of those values and attitudes between the two points in time.

Table 7: Crosstab Comparison between Survey Year on Respondents' Values and Attitudes about Water Quality Issues

Value	Survey Year 2010			Survey Year 2013			Chi-Square	Phi
	Disagree	Neutral	Agree	Disagree	Neutral	Agree		
The economic stability of my community depends upon good water quality	8.2%	20.4%	71.4%	3.7%	18.1%	78.2%	.002**	.103
The way that I care for my lawn and yard can influence water quality in local streams and lakes	4.3%	9.0%	86.7%	4.1%	12.7%	83.2%	.122	.061
It is my personal responsibility to help protect water quality	2.3%	8.3%	89.4%	3.0%	8.9%	88.2%	.751	.022
It is important to protect water quality even if it slows economic development	6.0%	12.4%	81.6%	4.5%	18.6%	77.0%	.010*	.090
What I do on my land doesn't make much difference in overall water quality	76.8%	11.2%	12.0%	74.9%	13.1%	12.0%	.607	.030
Lawn and yard care practices (on individual lots) do not have an impact on local water quality	76.5%	9.2%	14.3%	73.5%	10.2%	16.1%	.551	.032
My actions can have an impact on water quality	3.7%	8.0%	88.4%	4.1%	11.8%	84.1%	.082	.066
Taking action to improve water quality is too expensive for me	41.6%	44.2%	14.2%	42.4%	47.2%	10.4%	.145	.058
It is OK to reduce water quality to promote economic development	86.7%	7.7%	5.7%	83.8%	11.8%	4.5%	.049*	.073
It is important to protect water quality even if it costs me more	11.8%	28.3%	59.8%	13.4%	27.9%	58.7%	.726	.024
I would be willing to pay more to improve water quality	32.8%	26.3%	40.8%	36.9%	28.6%	34.5%	.087	.065
I would be willing to change the way I care for my lawn and yard to improve water quality	6.0%	19.9%	74.1%	6.7%	22.7%	70.6%	.419	.039
The quality of life in my community depend on good water quality in local streams, rivers and lakes	5.5%	15.9%	78.6%	3.0%	16.8%	80.2%	.107	.063

* p < .05; ** p , .01; *** p < .001

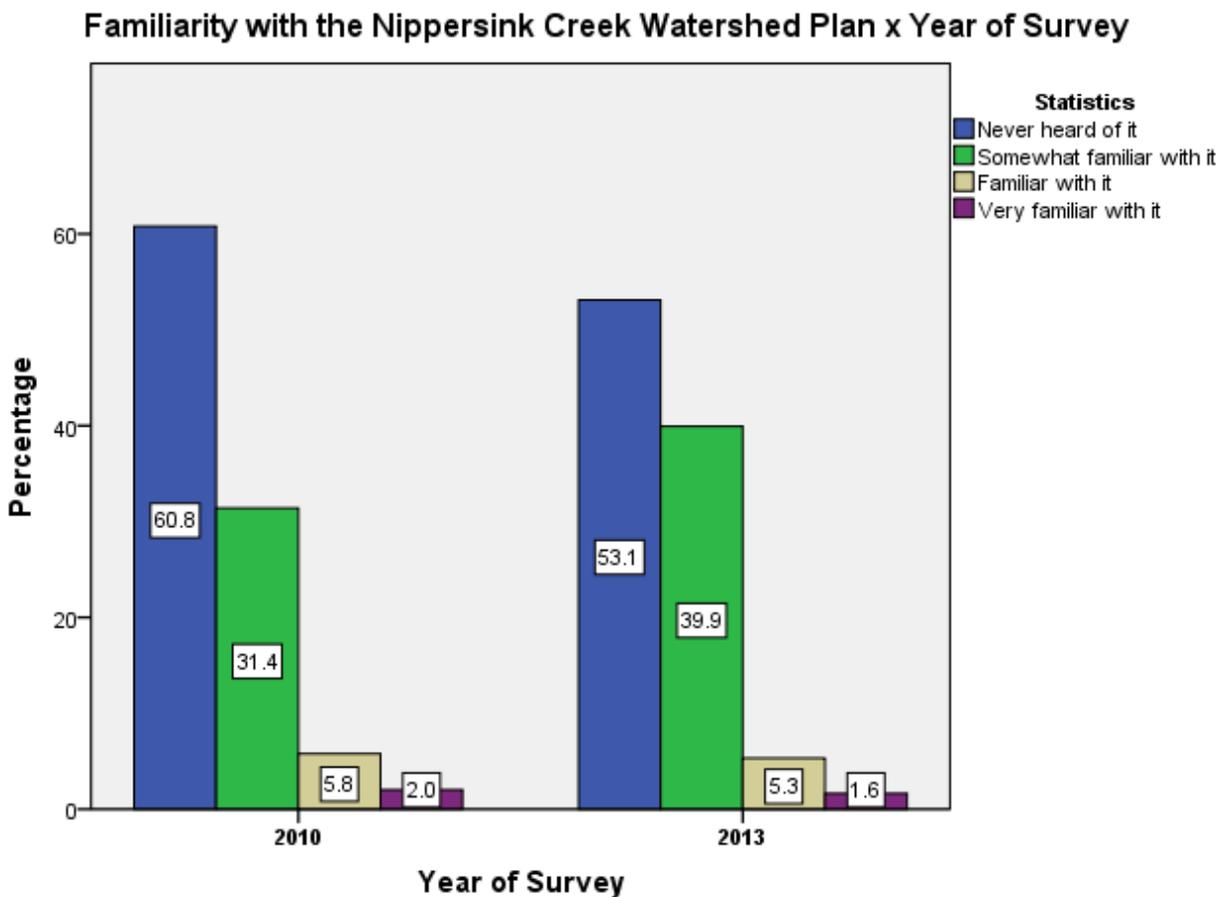
- Overall, values and attitudes have remained fairly constant between 2010 and 2013 with only minor changes that do not reach a level of statistical significance for the majority of the indicators.
- Only three value statements demonstrated a statistically significant change between 2010 and 2013, and all the changes indicate increasing support for protecting water quality:
 - “The economic stability of my community depends upon good water quality”
 - “It is important to protect water quality even if it slows economic development”
 - “It is OK to reduce water quality to promote economic development”
- In the case of the statement, “The economic stability of my community depends upon good water quality”, 71.4% of respondents agreed with that statement in 2010, compared to 78.2% in 2013, representing a statistically significant increase.
- Responses to the assertion, “It is important to protect water quality even if it slows economic development” also show increased support for ensuring water quality is maintained. In 2010, 81.6% of respondents’ agreed with the statement, compared to only 77.0% in 2013, but changes in the disagree and neutral response categories indicate higher agreement with the need to maintain water quality.
- Agreement with the statement, “It is OK to reduce water quality to promote economic development”, was expressed by 5.7% of respondents in 2010, compared to only 4.5% of respondents’ in 2013.

In general, respondents’ values and attitudes towards water quality have remained fairly constant over time. The one notable exception is for those attitude statements that involve elements of economics, where we see some an increase in the importance placed on economics as compared to protecting water quality.

Familiarity with the Nippersink Creek Watershed Management Plan

Familiarity with the Nippersink Creek Watershed Management Plan was one specific area of improvement that was identified based in the results from the phase I project in 2010. The initial data collected in 2010 indicated that a majority of respondents (61%) had never heard of the Watershed Management Plan. As a result, references to the Plan were incorporated into the various outreach and education activities during the phase II project and increased media exposure was also given to the plan during this time. Figure 2 illustrates the changes in familiarity with the plan between 2010 and 2013.

Figure 2: Familiarity with the Nippersink Creek Watershed Plan



- The percentage of respondents who indicated that they have never heard of the Nippersink Creek Watershed Management Plan decreased from 60.8% in 2010 to 53.1% in 2013. However, those who indicated that they were 'very familiar' with the plan showed a slight decrease from 2.0% in 2010 to 1.6% in 2013.
- An independent samples t-test comparison of the means was statistically significant at the .01 level (.009), indicating that the increase in awareness from 2010 to 2013 was statistically significant.

- Overall, awareness of the Watershed Management Plan has increased between 2010 and 2013, which was one of the primary goals related to the initial survey in 2010. Although it is not possible to draw direct correlations between knowledge of the plan and specific actions by homeowners or activities, this awareness will undoubtedly have a positive impact on broader changes within the watershed and helps to promote overall watershed health.

Outreach Activities Related to Best Management Practices (BMPs)

A key component to this second phase of the Nippersink Creek Watershed Social Assessment (*Maintaining the Health of the Nippersink Creek Watershed*) was the improvement and expansion of specific outreach and education activities designed to help increase adoption of critical BMPs to protect water quality. Based upon analyses of findings from phase I of the project, two primary BMPs were identified as the most critical and that provided the most opportunity for improvement: *increasing proper maintenance of septic systems* and *increasing the use of phosphorus free fertilizer in home lawn care by individual homeowners*. To address these specific BMPs two targeted outreach activities were designed to directly address each objective.

Increasing Proper Maintenance of Septic Systems: "Septic Socials"

Data from the phase I survey indicated that a majority of respondents (60.7%) reported having a septic system. Of those with a septic system, 13% reported having had at least one problem with their septic system in the past year. Due to the significant presence of septic systems within the four sub-watersheds in this study and the high levels of concern for bacteria and viruses in the water (such as E. coli), it is important to develop approaches to ensure that septic systems are regularly serviced and properly maintained. As a result, this project developed "septic socials" to provide a more accessible and informative environment to convey information about proper septic system maintenance.

A total of three "septic social" events were scheduled (March 11, 2013, March 12, 2013, and May 4, 2013), and the events focused on the Wonder Lake subwatershed due to the high percentage of homes that are on septic systems there, which are the highest proportion of homes with such systems within any area of the entire watershed. In discussions with key stakeholders in the Wonder Lake subwatershed, two specific neighborhoods or 'associations' were identified as priority audiences for this tool: St. Francis Heights and Wooded Shores. In addition, a third event (May 4, 2013) was held as part the annual "Lake Fest" activities for all residents of Wonder Lake.

For each event, a flier announcing the event was mailed to every homeowner in each of the two targeted neighborhood associations. Figure 3 is an example of the flier that was mailed to all residents in the two specific neighborhood associations. In addition, fliers were placed in various communal areas within each neighborhood and in the Wonder Lake Master Property Owners Association offices. A local septic system maintenance company (Pitel Septic) donated their time and expertise to participate in all three events, and provided very professional and locally relevant perspectives on proper maintenance and problems that were common to the Wonder Lake area. In addition, each event had a full septic cleaning service (donated by Pitel Septic) as a door prize, which was drawn at random from those who attended.

Results from this activity were less than encouraging. Unfortunately the two events held on March 11 and March 12 were negatively impacted by poor weather (snow and sleet) which led to a very minimal turnout. The

event on March 11 had a total of 4 participants and the event on March 12 had 2 participants. The event on May 4, 2013 as part of Lake Fest had a much better response, with approximately 12 participants. The general feeling among participants was one of skepticism and concern for 'who wanted to know if they were maintaining their septic system' and fear that this might generate more ordinances or policies that would dictate what they can and can't do on their property. These feelings were evident among those who even made the effort to attend, which would suggest that those feelings may well have prevented many others from even participating.

Figure 3: Septic Social Announcement

A Septic Social Event



Mon., March 11, 2013, 7-8pm, MPOA Offices
OR
Tues., March 12, 2013, 7-8pm, Wonder Lake Village Hall

Refreshments will be provided, along with an opportunity to win a \$100 certificate towards a septic cleaning from local professionals at Pitel Septic.

Did you know that most of the homes in Wonder Lake use a septic system to manage their wastewater? Are you one of them?
Are you concerned about how Wonder Lake looks and if it is safe for residents' recreation? Do you want to avoid costly repairs to your septic system?



If so, please join your neighbors on March 11 or March 12, 2013 for the first of several "septic social" events in the watershed – a free one-hour gathering organized by the Nippersink Watershed Association and the Wonder Lake Master Property Owners Association to share information about healthy septic systems and how to minimize the costs of their maintenance by ensuring they work properly. Local experts from the Nippersink Watershed Association, Illinois State University, and Pitel Septics will lead an informal discussion among neighbors to share important tips and information. Understanding how your septic works can help you to do something good for your home, your family, your community and the environment.

All information exchanged will be used to assist homeowners in understanding and properly maintaining their systems. These actions will in turn contribute to protecting the water quality of Wonder Lake and Nippersink Creek. **This event is being organized for one simple reason: We want to help you to learn easy and inexpensive practices you can use to keep your system running effectively and to know the signs that you might have a problem, before it becomes a very expensive problem.**

Sponsored by:

The
Nippersink
Watershed
Association






Funding for this project provided, in part, by the Governor of Illinois and the Illinois Environmental Protection Agency through Section 319 of the Clean Water Act.

For more information, or to RSVP, please contact the MPOA Office, 815-653-1000 or email nippersinkcreek@gmail.com

Among those who participated in the events, respondents seemed most concerned with the proper timing and procedures for cleaning of the septic system and how to prevent more catastrophic and costly events from system failures. Respondents seemed to respond in a very positive manner to the local septic professional and several knew him and the family business. The inclusion of a local service provider added a critical element of trust and familiarity to the discussions, enabling a more free-flowing exchange of information. Overall the idea of “septic socials” has potential to provide valuable information to stakeholders, but there are significant barriers to program success that should be considered to determine if these engagements are cost effective means to address key water quality issues.

Changes in Reporting of Septic Problems:

The percentage of respondents who indicated they had a septic system was consistent in both phase I and phase II of the research. In 2010 60.7% of respondents indicated that they had a septic system, compared to 59.7% in 2013. Although the ‘septic social’ outreach project was not as successful as we had initially hoped in terms of participation, it is still important to examine any possible changes in perceptions of septic problems from 2010 to 2013. However, given the limited contact and impact from the ‘septic social’ events, it is not appropriate to assert that any changes in perceptions of problems can be attributed to the specific “septic social” outreach activities. Table 8 compares the reporting of common septic problems in 2010 and 2013 and indicates that there was virtually no change across the various common problems.

Table 8: Crosstab Comparison between Survey Year Respondents on Common Septic Problems

Variable: Septic Problems	Survey Year 2010		Survey Year 2013		Chi-Square	Phi
	YES	NO	YES	NO		
Slow drains	5.4%	94.6%	5.3%	94.7%	.929	-.003
Sewage backup in the house	2.0%	98.0%	2.0%	98.0%	.974	-.001
Bad smells near the tank or drain field	3.0%	97.0%	1.6%	98.4%	.119	-.046
Sewage on the surface	1.0%	99.0%	.5%	99.5%	.371	-.026
Sewage flowing to the ditch	.3%	99.7%	.2%	99.8%	.607	-.015
Frozen septic	.3%	99.7%	.2%	99.8%	.607	-.015
None	47.7%	52.3%	49.7%	50.3%	.485	.020

- None of the observed septic problems showed a statistically significant change between 2010 and 2013.
- The most commonly reported problem remains slow drains. However, reporting of this problem still represents no more than 5% of respondents.
- Respondents almost equally report NO problems (47.7% and 49.7%) in each survey year. However, it is not possible to discern if this is truly representative of no problems, or rather that homeowners are simply not aware of the problems.

Increasing the Use of Phosphorus Free Fertilizers Among Residential Homeowners: "Lawns for the Nippersink" Campaign:

In the phase I survey, 87.5% of respondents indicated that a lack of information about a practice influenced their ability to change their lawn care or storm water practices. It appears that structural issues were not limiting the use of lawn care and storm water best management practices, rather, individuals were primarily responsible for changing their practices and viewed their own knowledge and competencies as the most limiting factors to using BMPs. The identification of the need to learn new skills and the need for information may be addressed through local outreach efforts and educational events that provide the necessary information on specific best management practices, such as the use of phosphorus free fertilizer. Data from phase I indicated that 43% of respondents had never heard of phosphorus free fertilizer (PFF) and only 35% of respondents were actually using PFF products. This finding presented an opportunity to develop a place-based campaign to help improve not only knowledge about PFF, but ultimately to increase their use of this BMP.

Utilizing Community-Based Social Marketing techniques (McKienzie-Mohr 2011), the first step in the PFF outreach campaign involved the development of a logo to help 'brand' the campaign. The goal of the logo was to make a clear connection to the Nippersink Creek Watershed as a valuable place to protect and preserve and to provide a visible graphic that could be easily identified in a variety of contexts. The logo was designed in collaboration with local stakeholders throughout the Nippersink Creek Watershed and the Illinois State University Marketing and Communications staff. Figure 4 represents the completed logo.

Figure 4: Phosphorus Free Fertilizer Campaign Logo "Lawns for the Nippersink"



The logo was incorporated into a variety of outreach and educational materials and also appeared in several local media outlets, including a special section of the Landscapes Magazine (Summer 2013), which is a quarterly publication of the McHenry County Conservation District. The PFF campaign involved two primary audiences: residential homeowners and local retailers/garden centers that sold PFF products.

Retail Audience:

Initially a list of 30 residential retailers was identified as carrying fertilizer products. Following our initial contact, 15 retailers were confirmed as carrying PFF products and were also willing to include our promotional materials in their store. One significant barrier that emerged in this process was with 'big-box' retailers. It became quickly apparent that although many of the 'big-box' stores (ie: Walmart, Lowes, etc..) did carry PFF products, but due to their corporate structure the local managers were unable to make any decisions about including our campaign materials in their stores. We made several attempts to reach individuals at a higher corporate level for a decision, but were unsuccessful in every instance. As a result, our list of local retailers was reduced to a total of 11 stores, all locally-owned or locally-run franchises of a larger company (i.e.: Ace Hardware). In each of these cases, the local owner or manager agreed to incorporate our campaign materials into their store. In return, we agreed to list their specific store/location on the Nippersink Creek Watershed website as a location to purchase PFF products.

Three primary tools were developed for use in the retail locations to help promote the purchase/use of PFF products. The first was a window cling that could be clearly displayed on the front door/window of the store to help alert the consumer to the fact that this retailer carried PFF products (see Figure 5). The second tool was a laminated point of sale shelf tag that could be placed directly on the shelf next to the PFF product. This would help clearly direct the consumer to where these products were on the shelf (see Figure 6). Finally, we also created a button that was worn by store employees to help promote interest or conversation about PFF products. Each participating retailer received two window clings, 10 shelf tags (or more if requested), and 12 buttons for their employees.

Figure 5: PFF Window Cling

Phosphorous-Free Fertilizers **SOLD HERE**

Help protect the Nippersink Creek Watershed

PROTECT A KEY ILLINOIS RESOURCE

It begins with you, right in your yard. The Nippersink Creek watershed is one of the highest quality watersheds in Northeastern Illinois. It is home to over 50 endangered or threatened species of plants, fish and freshwater mussels and boasts one of the best river trails for canoeing and kayaking.

For more information,
go to www.nippersinkwatershed.org



Photo Credit: Ray Mathis

Figure 6: PFF Point of Sale Shelf Tag



Residential Homeowner Audience:

The second audience for the PFF Campaign focused on residential homeowners. We chose to employ a door-hang tag (n=2500) (see Figure 7 and 8) as the primary vector to deliver key information about PFF products, articulate their importance to watershed health, and provide information on where to purchase these products. The door hang tags were delivered in person rather than simply sent through the US Postal Service to help ensure a more personal connection, and to lessen the chance that they would be lost in the crush of junk mail that seems to fill most mailboxes today. Delivering the door hang tags in person also allowed for more interpersonal contact if the resident was home or otherwise available to talk about the issue with the volunteer. To deliver the door hang tags we involved a variety of volunteers including students from two high schools in Woodstock and students from Illinois State University.

In consultation with key stakeholders within the Nippersink Creek Watershed four communities were identified as the target areas for the delivery of the door hang tags: Spring Grove, Wonder Lake, Woodstock, and Alden. These communities were selected due in part to their close proximity to Nippersink Creek and its tributaries as well as for their more urbanized/residential style of development (rather than the more dispersed ex-urban/rural development patterns in other locations throughout the watershed). A total of 2500 door hang tags were delivered during May to early June to try to coincide with the more active lawn care season. The door hang tags included both factual information about the benefits of phosphorus free fertilizer and normatively framed information about using PFF that was gleaned from findings from the phase I survey to help promote the use of this product in their home lawn care practices. The use of normative message framing also worked to

further enhance the place-based messaging and connect this BMP to a locality and context that was more directly relevant to the homeowner.

Figure 7: PFF Door Hang Tag (front and back)



Figure 8: PFF Door Hang Tag (interior)

Runoff from lawn fertilizers with phosphorus can stimulate over-growth of algae and aquatic plants in the lakes and streams. This causes a lack of oxygen for native aquatic life. Homeowners can take steps to help protect their local lakes and streams.

- 1) Apply phosphorus-free fertilizers
- 2) Test your soil to see if it needs additional nutrients.
- 3) Mow grass 3 to 4 inches tall
- 4) Leave lawn clippings as a source of Nitrogen for the soil.



Bags of lawn fertilizer contain three numbers to represent the amount of Nitrogen-Phosphorus-Potassium (N-P-K).

A “zero” in the middle means it is phosphorus-free. Most lawns have enough phosphorus and may only need some extra nitrogen.

Use phosphorus-free fertilizers and help protect our valuable water resources.



In a 2011 survey of homeowners in the Nippersink Watershed, the majority of your neighbors stated they were willing to change the way they care for their lawn and yard to improve water quality.

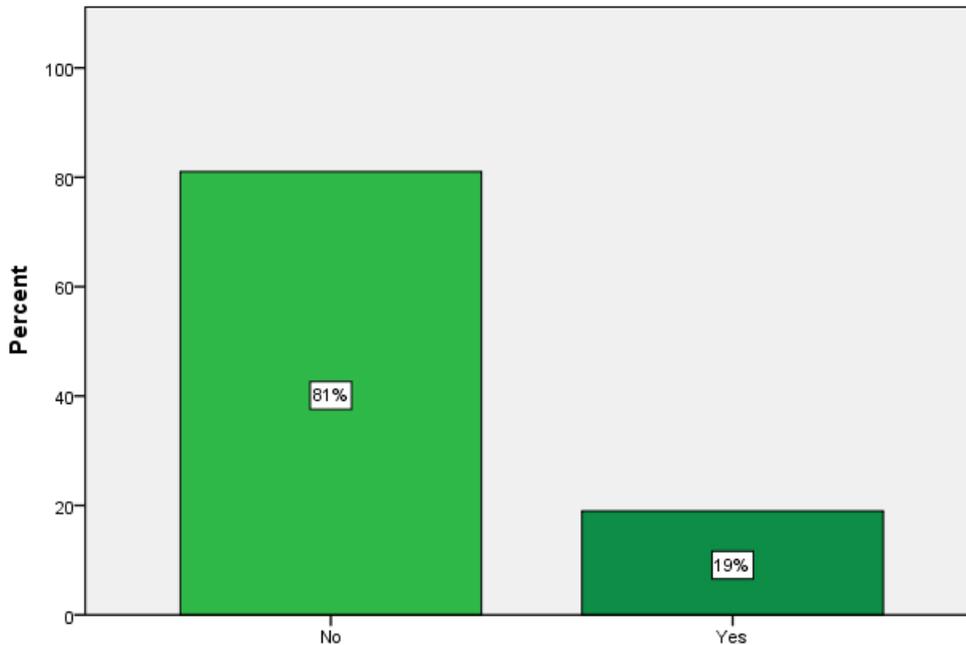
Check out www.nippersink.org for a complete list of local garden retailers who sell phosphorus-free fertilizers.



Evaluating the Phosphorus Free Campaign and Best Management Practices

Respondents in the phase II survey were asked if they had seen the logo anywhere within the watershed. Figure 9 shows that 19% of respondents indicated that they recalled having seen the logo. Similarity, when respondents were asked if they had seen stores in the area with stickers identifying that they sell phosphorus free fertilizer, 17.5% of respondents indicated that they had. This percentage is smaller than the result desired, but it is still a respectable percentage given the more targeted nature of the campaign. This percentage may also be partially reflective of the trend where most residents shop at the big-box stores and do not frequent the smaller, independently-owned retailers. As noted previously, we were unable to include any of our materials in the big-box stores due to corporate governance structures that would not allow local managers to make those decisions at the local level.

Figure 9: Percentage of Respondents Indicating They Saw the Logo Anywhere in the Watershed



Overall, the outreach signs promoting the use of phosphorus free fertilizers appeared to be effective at reaching the general public within the targeted sub-watersheds. The random sample for the survey had no direct connection to the random households that received the targeted door hang tags, so the fact that 19% of respondents indicated that they have at least seen the materials somewhere in the watershed is promising.

One of the primary goals of this project was to identify changes in adoption of nonpoint source management practices by residents through the measurement of specific BMP adoption. To address this goal, Crosstab comparisons were run on BMP adoption by survey year. Table 9 presents the results from that analysis, comparing changes over time from 2010 to 2013.

Table 9: Crosstab Comparison between Survey Year Respondents on Adoption of BMPs

Variables: Use of BMP	Survey Year 2010		Survey Year 2013		Chi-Square	Phi
	YES	NO	YES	NO		
Create a Rain Garden	4.9%	95.1%	12.4%	87.6%	.000***	.135
Keep Grass Clippings and Leaves Out of Roads, Ditches, Gutters	65.8%	34.2%	84.1%	15.9%	.000***	.209
Use Phosphorus Free Fertilizer	35.0%	65.0%	58.3%	41.7%	.000***	.233
Properly Dispose of Pet Waste	60.4%	39.6%	80.3%	19.7%	.000***	.216
Inspect Septic System for Size and Condition	52.9%	47.1%	62.0%	38.0%	.003**	.093
Restore Native Plant Communities	21.1%	78.9%	35.0%	65.0%	.000***	.156
Improve Stream Habitat	10.5%	89.5%	25.6%	74.4%	.000***	.198

- Overall, adoption of BMPs is improving over time. This is the one of the most important goals of the efforts undertaken, so the results are very encouraging. However it should be noted that because there are so many possible intervening variables that can influence change over time, it is difficult to connect this change to a SINGLE influence, such as our PFF campaign. However, the consistency in statistically significant changes in the use of BMPs that all indicate an increase in BMP use is the single best indicator of project effects.
- The increase in the use of all seven BMPs was statistically significant, with the use of phosphorus free fertilizer and properly disposing of pet waste showing the largest increases in adoption over time.

To better understand the more specific relationship between changes in BMP adoption and the specific PFF campaign, crosstab analyses were run comparing changes in adoption by those who have seen the Lawns for the Nippersink logo. Table 10 presents these results (only for the 2013 respondents) and shows that statistically significant changes in BMP adoption decreased when evaluated by viewing the logo.

Table 10: Crosstab Comparison between Those Who Have Seen the Logo /Those Who Have Not on Adoption of BMPs.

Variables: Use of BMP	Seen Logo NO		Seen Logo YES		Chi-Square	Phi
	YES	NO	YES	NO		
Create a Rain Garden	11.7%	88.3%	16.5%	83.5%	.189	.189
Keep Grass Clippings and Leaves Out of Roads, Ditches, Gutters	82.1%	17.9%	93.2%	6.8%	.005**	.119
Use Phosphorus Free Fertilizer	56.2%	43.8%	67.7%	32.3%	.040*	.091
Properly Dispose of Pet Waste	79.1%	20.9%	85.9%	14.1%	.130	.067
Inspect Septic System for Size and Condition ^a	77.9%	22.1%	88.9%	11.1%	.051	.108
Restore Native Plant Communities	31.7%	68.3%	50.5%	49.5%	.000***	.155
Improve Stream Habitat	22.8%	77.2%	37.4%	62.6%	.003**	.131

^a Cases selected for only those that indicated that they had a septic system

* p < .05; ** p < .01; *** p < .001

- The findings show that four specific BMPs showed a statistically significant increase in adoption that was correlated with recognition of the Lawns for the Nippersink logo.
- “Keeping grass clippings and leaves out of road, ditches and gutters” increased from 82.1% for those who had not seen the logo, to 93.2% among those who saw the logo.
- “Restoring native plant communities” increased from 31.7% to 50.5% among those who saw the logo.
- “Improving stream habitat” increased from 22.8% to 37.4% among those who saw the logo.
- "Using phosphorus free fertilizer" also increased from 56.2% to 67.7% for those who saw the logo.
- The difference in conducting septic system inspections between those who had seen the logo and those who had not was extremely close to significant (standard is .050).
- Overall the findings indicate that the use of the logo in the overall campaign appeared to have had some positive impacts. It is especially promising to see that the use of phosphorus free fertilizer increased, given that this was the primary message of the Lawns for the Nippersink logo and campaign.
- Considering that only 19% of respondents indicated that they saw the logo, these findings are even more promising for the implementation of future outreach efforts.

Another approach to evaluating the changes in BMP adoption over time is to examine these changes in relation to knowledge about the Watershed Management Plan. In 2010, 61% of respondents had never heard of the Watershed Management Plan. In the current survey (2013) this percentage dropped to 53% (see Figure 6 in

previous discussion). Since several of the objectives of the Watershed Management Plan are directly related to increasing the use of BMPs within the watershed, it is helpful to analyze the relationship between changes in BMP adoption and familiarity with the Watershed Management Plan. Table 11 presents the crosstab analysis results for this examination.

Seeing the Lawns for the Nippersink logo is positively correlated with an increase in the adoption of four out of seven specific BMP practices.

Table 11: Crosstab Comparison between Familiarity with Watershed Plan on adoption of BMPs

Variables: Use of BMP	Familiar with Plan NO		Familiar with Plan YES		Chi-Square	Phi
	YES	NO	YES	NO		
Create a Rain Garden	5.9%	94.1%	12.1%	87.9%	.000***	.110
Keep Grass Clippings and Leaves Out of Roads, Ditches, Gutters	71.1%	28.9%	79.5%	20.5%	.001**	.095
Use Phosphorus Free Fertilizer	40.7%	59.3%	52.5%	47.5%	.000***	.118
Properly Dispose of Pet Waste	65.5%	34.5%	75.8%	24.2%	.000***	.111
Inspect Septic System for Size and Condition	51.5%	48.5%	64.6%	35.4%	.000***	.131
Restore Native Plant Communities	20.6%	79.4%	37.6%	62.4%	.000***	.187
Improve Stream Habitat	11.1%	88.9%	27.0%	73.0%	.000**	.206

* p < .05; ** p < .01; *** p < .001

- Results indicate that overall, familiarity with the Watershed Management Plan is related to increases in BMP adoption.
- All seven of the BMPs showed a statistically significant increase in adoption for those who were familiar with the plan, compared to those who were not.
- The use of phosphorus free fertilizer increased from 40.7% for those not familiar with the plan to 52.5% for those who were familiar with the plan.
- Those who created a rain garden increased from 5.9% for those who were not familiar with the plan to 21.1% for those who were familiar with the plan.
- Restoring native plant communities increased from 20.6% for those who were not familiar with the plan to 37.6% for those who were familiar with the plan. The Phi value of .187 indicates that familiarity with the plan accounted for 18% of the variance in this change.

- Finally, improving stream habitat increased from 11.1% for those who were not familiar with the plan to 27.0% for those who were familiar with the plan. The Phi value of .206 indicates that familiarity with the plan accounted for 20% of the variance in this change.

Conclusions

Phase II of the Nippersink Watershed Social Assessment was designed and conducted to assess how values and attitudes towards the natural resources within the watershed have changed over time since the initial social assessment, and to determine how knowledge and use of BMPs has been influenced by outreach and educational activities designed to address NPS issues. The evaluation of this project to protect water quality was designed to achieve six primary objectives.

- Evaluate changes in property owners' understanding and knowledge about water quality issues and threats to water quality within the Nippersink Creek Watershed.
- Assess the effectiveness of outreach and education efforts in meeting the goals, intended outcomes and core social indicators for nonpoint source pollution management.
- Identify changes in attitudes among residents towards nonpoint source management actions.
- Identify changes in perceived constraints for using appropriate practices
- Identify changes in capacity to address nonpoint source management issues in the Nippersink Creek Watershed area.
- Identify changes in adoption of nonpoint source management practices by residents and determine their relationship with exposure to education and outreach.

The survey results informing the evaluation of these efforts are encouraging, and demonstrate that the overall knowledge and understanding about water quality issues either remained constant or increased. Although respondents in 2013 were more critical of some specific consequences of water quality (for example an increase in the identification of polluted swimming areas as a severe problem), the overall evaluation showed only a modest and limited decrease in poor perceptions of water pollutants and specific consequences of poor water quality. It should be noted that it is also possible that an increasing awareness of water quality issues in the area that resulted from these efforts could have influenced these results.

When examining changes in values and attitudes towards water quality issues within the watershed, the data illustrates that values and attitudes have remained fairly constant between 2010 and 2013 with only minor changes that do not reach a level of statistical significance for the majority of the indicators. The three value statements that did reach a level of statistical significance all had a common focus on economics, indicating a greater concern for economics over water quality in 2013 compared to 2010, and changes were in the direction of increased support for maintaining good water quality. As previously noted, this may in part be reflective of the economic recession that began in earnest in 2008 and was still in a slow state of recovery at the time of the phase II survey.

In respect to assessing the outreach and education efforts to influence core indicators for nonpoint source pollution management, the data indicate positive project impacts, but also demonstrated some mixed results. Perhaps most importantly, responses indicate that as a result of project efforts residents are more aware of the watershed plan and are more commonly using BMPs to protect water quality. In contrast, the efforts to improve septic maintenance activities and awareness of septic issues were less successful than anticipated in terms of reaching the identified target audience. However, the data showed almost no change in the overall perception

of specific septic problems between 2010 and 2013. So although that specific outreach activity was not as successful as intended, we also did not observe any continued decline in perceptions of these problems among respondents.

The outreach efforts to address the increased use of phosphorus free fertilizers were much more successful in reaching the target audiences, and the results are encouraging for continuing these efforts and expanding their use into “box stores”. The analyses of the data demonstrated an overall increase in the adoption of specific BMPs by residential homeowners on every variable. When examining these changes more specifically in relation to exposure to the PFF campaign, several of the specific BMPs continued to demonstrate statistically significant increases in adoption, indicating that the outreach materials were playing a role in this overall change.

As efforts to maintain water quality in the watershed continue into the future this data and the analyses conducted can continue to be applied to assist outreach and education efforts. Given the dispersed nature of NPS these efforts are an essential part of maintain water quality, and through the continued collaboration of both local and regional stakeholders the future of water quality in the Nippersink is encouraging.

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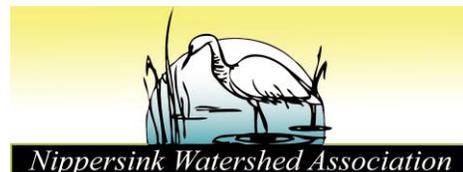


Questionnaire Used in the Survey

**Your Home --- Your Watershed --- Your Survey
Maintaining the Health of the Nippersink Creek Watershed**



**ILLINOIS STATE
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The Nippersink Watershed Association is conducting this survey in coordination with local watershed partners and Illinois State University. The survey will identify concerns in your community regarding water quality for rivers, streams, and lakes in the Nippersink Creek watershed as well as current practices to maintain water quality. This project is funded by Section 319 of the Clean Water Act, through the Illinois Environmental Protection Agency.

We are contacting you as part of a random sample of community residents to learn about people's perceptions and concerns about water issues in the Nippersink Creek watershed. To inform planning for the future, learning how residents view issues like water quality, and what they consider to be the biggest threats to the future well being of the natural environment within the watershed, is essential. To ensure we accurately represent the views of residents it is important that we hear from you, so please take a few minutes of your time to let us know what you think about water issues in your community.

The questions in this survey were developed from conversations that we have had with leaders and members of your community. This study will inform public officials about citizens' needs and concerns, current practices to maintain water quality, as well as your community's ability and desires to engage in activities that will help to maintain and improve the quality of the natural environment within the Nippersink Creek watershed.

We ask that this survey be completed by the person in your home that makes most of the lawn and yard care decisions and is at least 18 years old. Your participation in this survey is voluntary. Your answers will be kept confidential and findings will be released only in summary form where individual answers cannot be identified. Please return your survey by August 30, 2013.

Unless otherwise instructed, please fill in the circle that corresponds to the answer category that best describes you and your situation or opinion. Your opinions and perspectives are extremely valuable, and your neighbors and we greatly appreciate you taking about 15-20 minutes of your time to complete the survey. Please read each question carefully. **Thank you for your time and consideration in completing this survey to help guide the future of the Nippersink Creek Watershed.**

A watershed is the land area that drains to a specific body of water.

Watersheds come in all shapes and sizes. They cross county, state, and national boundaries. In the continental US, there are 2,110 watersheds. The Nippersink Creek Watershed is located in northeastern Illinois and southern Wisconsin and is the largest tributary to the Fox River, draining 137 square miles in Illinois and about 50 square miles in Wisconsin.

This project has been reviewed and approved by the Illinois State University Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Research Ethics & Compliance Office at Illinois State University at (309) 438-2529.

Your Water Resources

Q1. Do you know where the water goes when it runs off of your property?

- No, I don't know
- Yes, it goes to _____

Rating Water Quality

Q2. How would you rate the quality of the water in your local rivers, streams, and lakes?

	Poor	Okay	Good	I don't know
a. For scenic beauty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. For canoeing and/or kayaking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. For boating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. For eating fish caught in the water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. For swimming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. For picnicking and family activities near water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. For fish habitat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. For fishing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Water Pollution

Q3. 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?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Excess dirt and soil in the water	<input type="radio"/>				
b. Excess nitrogen	<input type="radio"/>				
c. Excess phosphorus	<input type="radio"/>				
d. Bacteria and viruses in the water (such as E. coli / coliform)	<input type="radio"/>				
e. Trash in the water	<input type="radio"/>				

f. Excess algae in the water	<input type="radio"/>				
g. Invasive aquatic plants and animals	<input type="radio"/>				

Consequences of Poor Water Quality in Lakes, Rivers, and Streams

Q4. Poor water quality in your lakes, rivers, and streams can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in your area?

	Not a problem	Slight problem	Moderate problem	Severe problem	Don't know
a. Contaminated drinking water	<input type="radio"/>				
b. Polluted swimming area	<input type="radio"/>				
c. Contaminated fish	<input type="radio"/>				
d. Increase in water bill	<input type="radio"/>				
e. Loss of desirable fish species	<input type="radio"/>				
f. Loss of desirable wildlife species.	<input type="radio"/>				
g. Reduced beauty of lakes or streams	<input type="radio"/>				
h. Reduced opportunities for water activities such as boating, canoeing, and fishing	<input type="radio"/>				
i. Reduced quality of water activities	<input type="radio"/>				
j. Excessive aquatic plants	<input type="radio"/>				
k. Lower property values	<input type="radio"/>				

Practices to Improve Water Quality

Q5. Please indicate which statement most accurately describes your level of knowledge about each practice listed below.

	Never heard of it	Somewhat familiar with it	Familiar with it	Very familiar with it
a. Create a rain garden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Keep grass clippings and leaves out of the roads, ditches, and gutters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Use phosphorus free fertilizer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Properly dispose of pet waste	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

e. Inspect septic systems for size and condition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Restore native plant communities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Improve stream habitat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Other _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6. Have you adopted any of the following practices since the Nippersink Creek Watershed Plan came out in 2008? (Please indicate if you used the practice prior to the plan's publication in 2008)

	No	Yes	Used prior to 2008
a. Create a rain garden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Keep grass clippings and leaves out of the roads, ditches, and gutters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Use phosphorus free fertilizer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Properly dispose of pet waste	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Inspect septic systems for size and condition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Restore native plant communities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Improve stream habitat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Other _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Fertilizer Use Practices

Q7. Do you fertilize your lawn?

- Yes, I personally apply the fertilizer to my lawn (Please continue to Question 8)
- No, I use a lawn care company (Please skip to Question 12)
- No, I do not apply fertilizer to my lawn (Please skip to Question 12)

Q8. Do you use any of the following products?

	No	Yes
a. Phosphorus free fertilizer	<input type="radio"/>	<input type="radio"/>

- | | | |
|----------------------------|-----------------------|-----------------------|
| b. Organic fertilizer | <input type="radio"/> | <input type="radio"/> |
| c. Slow release fertilizer | <input type="radio"/> | <input type="radio"/> |

Q9. How often do you fertilize your lawn in a typical growing season?

- | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 time | 2 times | 3 times | 4 times | 5 or more times |
| <input type="radio"/> |

**Q10. How much do you agree with the following statement:
I am not concerned about the impact of my fertilizer use at home on water quality**

- | | | | | |
|-----------------------|-----------------------|------------------------|-----------------------|-----------------------|
| Strongly disagree | Somewhat disagree | Neither agree/disagree | Somewhat agree | Strongly agree |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q11. The use of phosphorus free fertilizer is recommended in the Nippersink Creek Watershed Plan to protect water quality. How much does each of the following factors limit your ability to use phosphorus free fertilizer?

- | | Not a problem | Slight problem | Moderate problem | Severe problem |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| a. Lack of availability (no place to purchase it) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b. Cost | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c. Concerns about effectiveness for lawns | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d. Lack of information about the product | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| e. No one else I know is using phosphorus free fertilizers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| f. I'm not concerned about the impact of my fertilizer use at home on water quality | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| g. Starting a new lawn | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| h. Other _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Septic Systems

Q12. Do you have a septic system?

-
- Yes (Please continue to Question 13)
 - No (Please skip to Question 17)
-

Q13. How old is your septic waste treatment system?

_____ years

- I don't know
-

Q14. Within the last five years, have you had any of the following problems? Check all that apply.

- Slow drains
 - Sewage backup in the house
 - Bad smells near the tank or drain field
 - Sewage on the surface
 - Sewage flowing to ditch
 - Frozen septic
 - Other _____
 - None
 - I don't know
-

Q15. In the future, would you like a reminder from your local health department regarding inspection/maintenance of your septic system?

- Yes
 - No
 - I don't know
-

Q16. Would you be interested in receiving information on proper operation and maintenance of a septic system?

- Yes
 - No
 - I don't know
-

Phosphorus Free Fertilizer Campaign McHenry County

Q17. Have you seen the following logo anywhere within the watershed?

- Yes
 - No
-



Q18. Have you seen information about the benefits of using phosphorus free fertilizers?

- Yes
 - No
-

Q19. Have you seen stores in the area with stickers identifying that they sell phosphorus free fertilizers?

- Yes
 - No
-

Q20. Were you aware of phosphorus free fertilizers before seeing any of the previously identified information?

- Yes
 - No
 - I have not seen information about phosphorus free fertilizer within my watershed
-

Q21. How familiar are you with the Nippersink Creek Watershed Plan completed by the Nippersink Watershed Planning Committee in 2008?

- | | | | |
|-----------------------|---------------------------|-----------------------|-----------------------|
| Never heard of it | Somewhat familiar with it | Familiar with it | Very familiar with it |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
-

Your Opinions About Water Quality Issues

Q22. Please indicate your level of agreement or disagreement with the statements below

	Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree
a. The economic stability of my community depends upon good water quality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The way that I care for my lawn and yard can influence water quality in local streams and lakes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. It is my personal responsibility to help protect water quality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. It is important to protect water quality even if it slows economic development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. What I do on my land doesn't make much difference in overall water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

f. Lawn and yard-care practices (on individual lots) do not have an impact on local water quality.	<input type="radio"/>				
g. My actions can have an impact on water quality.	<input type="radio"/>				
h. Taking action to improve water quality is too expensive for me.	<input type="radio"/>				
i. It is okay to reduce water quality to promote economic development.	<input type="radio"/>				
j. It is important to protect water quality even if it costs me more.	<input type="radio"/>				
k. I would be willing to pay more to improve water quality (for example: through local taxes or fees).	<input type="radio"/>				
l. I would be willing to change the way I care for my lawn and yard to improve water quality.	<input type="radio"/>				
m. The quality of life in my community depends on good water quality in local streams, rivers and lakes.	<input type="radio"/>				

Personal Characteristics

Q23. Do you make the yard or lawn care decisions in your household?

- Yes
- No

Q24. What is your gender?

- Male
- Female

Q25. In what year were you born?

Q26. What is the highest grade in school you have completed?

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

Q27. What was your total household income last year?

- Less than \$24,999
 - \$25,000 to \$49,999
 - \$50,000 to \$74,999
 - \$75,000 to \$99,999
 - \$100,000 or more
-

Q28. What is the approximate size of your residential lot?

- ¼ acre or less
 - More than a ¼ acre but less than 1 acre
 - 1 acre to less than 5 acres
 - 5 acres or more
-

Q29. Do you own or rent your home?

- Own
 - Rent
-

Q30. How long have you lived at your current residence?

_____ years

Q31. Which of the following best describes where you live?

- Rural
 - Suburban
 - Urban
-

Q32. Do you use a professional lawn care service?

- Yes, just for mowing
 - Yes, just for fertilizing
 - Yes, just for pest control (including herbicide)
 - Yes, some combination of mowing, fertilizing and/or pest control
 - No, I do not use a professional lawn care service
-

Thank you for your time and assistance!

Please return your completed survey in the postage-paid envelope provided by August 30, 2013. Please use the space below for any additional comments about this survey or water resource issues in your community. **To learn more about the Nippersink Creek Watershed Plan and other related activities please visit: www.nippersink.org.**

Project Coordinator:

Joan M. Brehm, Ph.D.
Department of Sociology and Anthropology
Illinois State University
Campus Box 4660
Normal, IL 61790-4660
Tel: 309-438-7177

Email: jmbrehm@ilstu.edu

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