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Fall 2014

Water Your Opinions: A Social Assessment of the Lake Bloomington and Lake Evergreen Watersheds

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Aceves, Jessica; Anstirman, Michael; Backstrom, Jordan; Herbert, Ryan; Johnson, Courtney; Neaves, Julia; O'Hare, Alicia; Perez, Erika; Rego, Emily; and Spurgis, Mark, "Water Your Opinions: A Social Assessment of the Lake Bloomington and Lake Evergreen Watersheds" (2014). *Stevenson Center for Community and Economic Development*. Paper 2.
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Water Your Opinions: A Social Assessment of the Lake Bloomington and Lake Evergreen Watersheds

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Funding Information:

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



Abstract:

The purpose of this report is to better understand the knowledge of and attitudes of residents towards water resources in the McLean County area. The assessment consisted of nine key informant interviews and two community focus groups with local residents who have a vested interest in and specific knowledge about these water resources. This is one part of a larger assessment in partnership with the McLean County Soil and Water Conservation District (MCSWCD). The results of this assessment will help to inform specific questions to be used in a residential household survey in spring 2015. The survey will be used to gain a better insight into the public's knowledge and attitudes towards water resources in McLean County. This will enable MCSWCD and water managers to strategically plan for future water resources in McLean County. A number of other findings, limitations of the assessment, and recommendations and future research are discussed.

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I. Introduction

The Stevenson Center for Community and Economic Development at Illinois State University in partnership with the McLean County Soil and Water Conservation District (MCSWCD) conducted a community assessment in fall 2014 to determine the knowledge of and attitudes towards water resources in the McLean County area. Specific focus was placed on the Lake Bloomington and Lake Evergreen watersheds, which encompass the villages of Hudson and Towanda, as well as portions of Bloomington and Normal. Both lakes are reservoirs constructed primarily to provide a water supply to the city of Bloomington and to other nearby communities.

Our assessment consisted of nine key informant interviews and two community focus groups with local residents who have a vested interest in and specific knowledge about these water resources. The key informant interviews with local water managers and other officials produced valuable knowledge that helped us shape the design of the additional focus group meetings. The focus groups facilitated an in-depth analysis of priorities, concerns, and assets of the water resources of McLean County. Water resource issues examined included: drinking water quality, water quantity, lake water quality, water clarity, as well as agricultural and residential practices. The results of this assessment will help to inform specific questions to be used in a residential household survey in spring 2015. The survey will be used to gain a better insight into the public's knowledge and attitudes towards water resources in McLean County. Together, these findings will inform key stakeholders of salient watershed issues identified by the public. This will enable MCSWCD and water managers to strategically plan for future water resources in McLean County.

Area of Study

McLean County is located in central Illinois approximately 120 miles southwest of Chicago. It is home to 174,647 residents and covers an area of 1,183 square miles. The median household income is just over \$60,000 and 14% of the population is below the poverty line (US Census, 2010). Lake Bloomington and Lake Evergreen are located about 15 miles north of Bloomington (Figure 1). Built in 1929, Lake Bloomington is a reservoir with an area of 635 acres and a capacity of over 6,000 acre-feet. It is primary used as a source of drinking water for the City of Bloomington and other nearby communities. There are more than 200 homes located on the lake (City of Bloomington (COB, 2012).

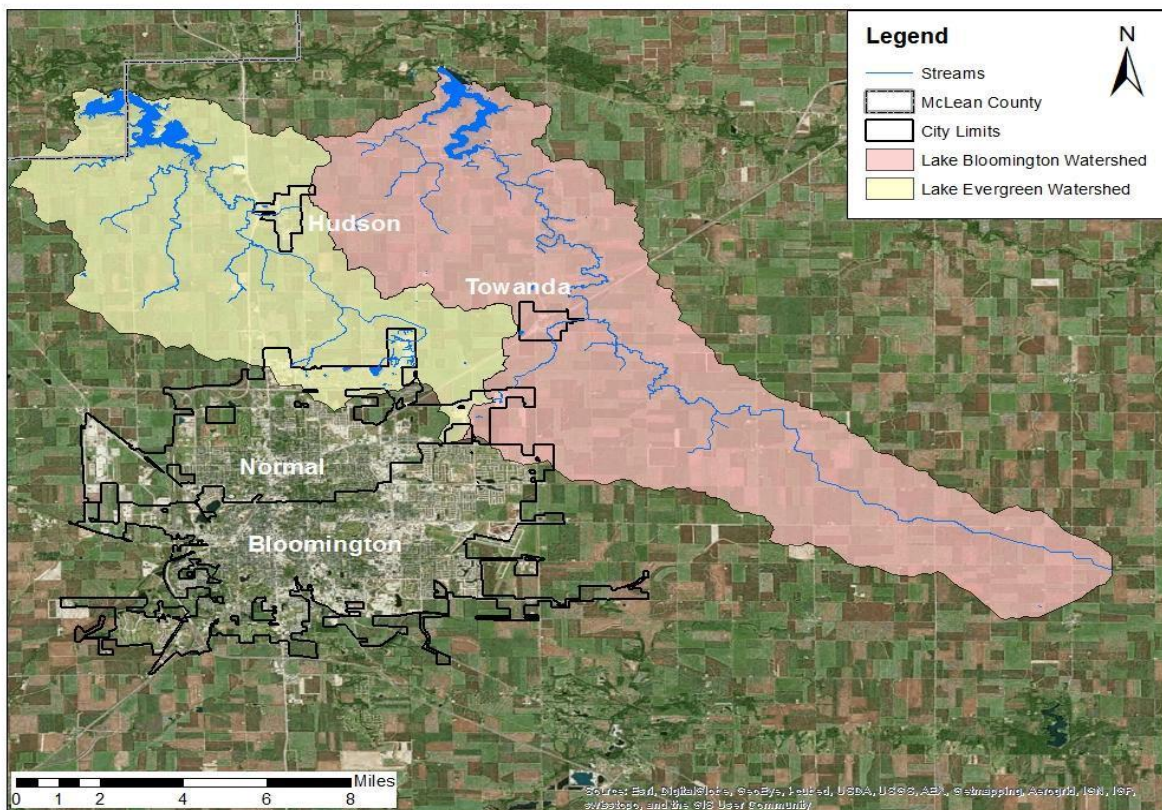


Figure 1. The watersheds associated with Lake Evergreen (yellow) and Lake Bloomington (pink).

In 1971, Bloomington expanded their water supply with the construction of Lake Evergreen. It has an area in excess of 900 acres and a capacity of over 15,000 acre-feet. Lake Evergreen is surrounded by Comlara County Park and open to low horsepower boats (McLean County).

The Lake Evergreen watershed is divided by the county line between McLean County and Woodford County (Figure 1). The Village of Hudson, population 1,838, is encompassed in the watershed (US Census, 2010). It extends south to include the northern portion of Normal, IL. The Lake Bloomington watershed lies entirely within McLean County. It includes the Village of Towanda, population 480 (US Census, 2010). It includes small portions of the western edges of Bloomington and Normal. An important detail to note is that while Bloomington, Hudson, and Towanda are all supplied with drinking water from the lakes, Normal's drinking water is supplied by a well. However, protecting the water resources within the Lake Bloomington and Lake Evergreen watershed is of significant importance for all of Bloomington and Normal, as they also provide critical habitat and recreational opportunities for all community members.

II. Literature Review

Urbanization's Effects on Water Resources

Increasing urbanization has consequences for water resources. Urban populations are increasing at twice the rate of the global population (Cohen, 2003). Scientists are now able to predict the responses of the stream to increasing urban development (Walsh et al., 2005b). The physical and chemical makeup of a waterway is dependent on the land area that drains to it. Humans have changed the landscape dramatically. Perhaps the most significant of these changes

with regards to water quality is the increase in impervious surface cover (Walsh et al., 2005b). As suburbs are built and urban areas expand, impervious surfaces such as roofs, sidewalks and roads increase, while fields and forest areas decrease. This expansion of infrastructure can negatively affect water quality (Walsh et al., 2005b) as increases in impervious surface cover have been directly linked with degradation of water quality (Brabec et al., 2002). Water that cannot soak into the ground cannot be filtered by natural processes. It also takes much less time for water traveling over these surfaces to reach streams and waterways (Bloschl and Sivapalan, 1995). While contaminants can enter rivers and lakes from a variety of sources, the most significant source of pollution is runoff resulting from an increase in impervious surface cover (Merrick and Garcia, 2004). Some contaminants of concern are fertilizer and pesticides that homeowners apply to their lawns (Brehm et al., 2013). Any other substance spilled on a parking lot or driveway will also find its way to the river. Degradation occurs quickly; even low levels of impervious surface cover will begin to affect our water resources (Brabec et al., 2002).

Urban water infrastructure was originally designed with the safety and wellbeing of people in mind. To prevent flooding and disease, conduits were created to remove water and sewage as quickly and efficiently as possible (Brabec et al., 2002). As infrastructure ages, it can contribute to contamination as well. Sewer lines may leak and contaminate groundwater sources. Other contaminants come from the needs of society such as road salt to clear roadways of ice and snow in the winter time as indicated by rising levels of chloride. Chloride itself is relatively inert but it can indicate other sources of contamination. It is then possible to determine if contamination is human caused or the result of a natural process, such as bedrock leaching (Eisen and Anderson, 1979).

Watershed Participation

Most people identify themselves to be a part of a community based on culture, or political lines. Now natural resource professionals are starting to recognize that instead of basing their projects on cultural or political lines they should consider the use of ecological lines (Barham, 2010). Groups like these are often organized at the grassroots level and integrate all forms of landscapes within the watershed: urban, rural, industrial, and agricultural. Additionally, these groups encourage collaboration between many overlapping boundaries of social organizations, as well as government agencies at all levels. Determining where the boundaries of an ecosystem actually are often subjective and difficult (Barham, 2010). Watershed boundaries are commonly used, but the scale of watershed chosen does matter, as watersheds can cover half a country like the Mississippi, or only a few square miles like Sugar Creek in Bloomington, IL. It has become the responsibility of scientists or community organizers to create a new *in-group* revolving around an ecosystem (Cheng and Daniels, 2005).

Environmental projects are most successful when the stakeholders feel that they are an important part of the project and benefit from the project goals. This is what Cheng and Daniels (2005) call the “in-group”. Social indicators such as awareness of recommended practices, changed attitudes or behaviors, increase leverage and increased support (Genskow and Prokopy, 2011) may help determine which members of the community consider themselves as part of the in-group.

In order to make sure that an environmental project is successful, community perspectives should be considered (Genskow and Prokopy, 2011). If community members have similar views, positive sanctions such as zoning may be implemented, but if community

members oppose a measure, negative sanctions such as fines may become necessary (Morton and Padgitt, 2005).

The federal government conducts many environmental projects every year. Due to limited personnel resources and funding, they must concentrate their efforts on the big picture problems, like drinking water. Watershed groups and conservation districts are able to conduct projects on the local scale but are also limited by funding. Recruitment of volunteers not only allows for watershed groups to expand their projects and collect more data, but it also increases involvement and trust (Morton and Padgitt, 2005).

Several studies approach the problem of project scale and holism. Cheng and Daniels (2005) discuss the benefits of small scale projects. The authors contend that self-identifying as part of the community (part of the in-group) of the watershed organization is incredibly important in reaching agreement over problems affecting the watershed, and in agreeing to solutions to those problems. Cheng and Daniels (2005) also assert that geographically smaller organizations are more likely to achieve a sense of community, cooperation, and group belonging. Individuals are more likely to become invested in small scale projects. A cultural difference can be seen in the larger-scale organizations' member differences in framing issues. For example, large watershed organizations as a whole have different goals than many of the individual stakeholders, particularly those upstream and farther from the more urban areas.

Water Resource Education

Educating the public is the duty of community leaders. Seemingly the most effective watershed organizations are focused at a grass-roots level of organization that emphasize “de-centralized approaches that rely on citizen stewardship.” (Brehm et al., 2013) The adoption of

“best management practices” (BMPs) among watershed residents have been proven to mitigate the degradation of water resources (Brehm et al., 2013). The difficulty is that BMPs need to be implemented by individuals and many people lack knowledge of BMPs or even what a watershed is (Merrick and Garcia, 2004). Brehm et al. examine the factors that may compel citizens and stakeholders to utilize BMPs in their daily routines. The key finding in their study is that broad knowledge of BMPs is the strongest predictor of use for a specific BMP. Only through awareness can local individuals, organization, and governments act (Merrick and Garcia, 2004). Brehm et al. (2013) found that with increased awareness there was a 50% increase in the implementation of BMP’s. They also found that individuals who were likely to implement BMP’s were also more knowledgeable about water quality principles (Brehm et al., 2013). Merrick et al. (2004) explicitly reinforce this notion and believe that “increasing awareness of the watershed’s problems would be the critical leverage to initiate improvements,” and that, “citizen awareness leads to their participation”. They also state that rather than starting with a top-down approach, awareness of individual citizens will lead to organizational awareness and work its way up to elected officials.

III. Conceptual Description and Research Methods

Conceptual Framework

McLean County Soil and Water Conservation District (MCSWCD) partnered with the Stevenson Center for Community and Economic Development in an effort to collect data from

McLean county residents (focusing on residential homeowners) in the Lake Evergreen and Lake Bloomington watersheds that will be used to develop appropriate outreach and education materials, as well as to update their existing watershed management plans. This portion of the larger project focused on gathering qualitative data regarding key stakeholders and residents' attitudes, perceptions, and behaviors toward the region's water resources. The guiding research questions of this project are:

- *What kinds of knowledge do residents have about water resources in the McLean County Area?*
- *What are their attitudes towards water resources?*

Answering these was accomplished by utilizing two qualitative research strategies: key informant interviews and focus groups. Over the course of six weeks, researchers from the Stevenson Center completed nine key informant interviews and two focus groups with selected residents of the area. This preliminary research will inform the creation of a household survey to be sent to residents of the city of Bloomington, the town of Normal, and the villages of Towanda and Hudson located in McLean County. The survey is scheduled to be administered in May, 2015.

The following report contains a number of concepts that require some detailed conceptual definitions. In the assessment, the term "*Best Management Practices (BMP)*" describes those methods which are determined to be the most effective at achieving a desired goal. In this project, BMPs are used to refer to physical, structural or managerial practices that decrease the potential for pollution of water resources, specifically drinking water (Environmental Protection Agency, <http://water.epa.gov/polwaste/npdes/swbmp/>).

“Conservation District” refers to “any district or unit of State or local government formed under State or territorial law for the express purpose of developing and carrying out a local soil and water conservation program” (16 USCS § 3801). A *“Conservation Program”* denotes an activity or organization which focuses on the “preservation, control and development of water resources, both surface and groundwater, and prevention of pollution” (Glossary of Environment Statistics 1997). *“Water Quality”* represents a description of the physical status of water anywhere within the region, and can encompass a wide variety of characteristics from clarity to taste to levels of contamination. *“Water Resource”* references sources of water which are used by human and wildlife populations for essential and/or recreational activities (ex. lakes, rivers, ponds, streams, etc.). A *“Watershed”* is a geographical area which denotes “....where all of the water that is under it or drains off of it goes into the same place” (EPA.gov 2014). This project focused on two adjacent watersheds in McLean County, Illinois: Lake Bloomington and Lake Evergreen. Finally, a *“Watershed Management Plan”* describes a community-based strategy “to address regulatory requirements and to improve & protect agricultural, water, recreational and other natural resources with proactive strategies that maximize local control” (Evergreen Lake Watershed Management Plan 2012).

Research Methods

Our specific research strategy was as follows: (1) Identify possible individuals for key informant interviews; (2) design a key informant interview protocol based on the guiding research questions; (3) schedule and conduct key informant interviews; (4) analyze themes from key informant interviews; (5) identify potential focus group participants; (6) create the focus group interview protocol; (7) schedule and conduct focus groups; (8) analyze the data for

recurring themes and relevant information; (9) synthesize the data into final report. IRB approval from Illinois State University was obtained for all aspects of research.

Key Informant Interviews

The first step was to design a key informant interview protocol with a standard set of questions to be asked in each interview. Questions were designed to solicit information relevant to the research question in a neutral manner, with care taken to allow the interviewee to answer the question with as little guidance as possible (See Appendix X). Once the standardized interview protocol was created, we then brainstormed and identified specific individuals for the key informant interviews. Participants were chosen not only for their knowledge concerning local watershed issues, but also for their connection to the community and awareness of urban residents' knowledge and attitudes towards local water resources. Stevenson Center researchers were split into pairs responsible for contacting, scheduling, and performing interviews. If a potential interviewee was unwilling or unable to participate an alternate person was identified.

All nine interviews were conducted face-to-face by teams of graduate students. Persons interviewed fell under three general categories: representatives from local government agencies, environmental nonprofits, and residential homeowner's associations. In addition to professional opinions and involvements, all interviewees provided insight into their personal experiences as residents of the greater watershed system. The interviews were conducted in locations most convenient for the interviewee. Each interview lasted around one hour with one researcher focused on conducting the interview while the other took notes. The notes taken during each interview were recorded in a timely manner in order to document the contents accurately. The

interview responses were then analyzed for key themes and served as a basis for guide the future focus groups and the questions asked in focus groups.

Focus Groups

Two focus groups were identified representing individuals associated with local nonprofit organizations: Friends of Everbloom and the Ecology Action Center. These nonprofit organizations strive to improve local water resources through conservation projects and community awareness. A key leader from each organization was contacted by members of the project team and each leader agreed to assist in recruiting individuals associated with their respective organization. The organization leader specifically identified individuals associated with their organization that would represent a variety of opinions and types of knowledge.

Both focus groups were held in the evening hours of weekdays and offered a meal to help encourage participation. The first focus group was held on the evening of October 14, 2014 at the Davis Lodge in Hudson, IL near Lake Bloomington. Eight members of the nonprofit organization Friends of Everbloom participated in an approximately one hour discussion. The second focus group took place on the evening of October 28th, 2014 in Stevenson Hall on the campus of Illinois State University. Seven individuals affiliated with the Ecology Action Center engaged in a discussion that also lasted a little over one hour. Each focus group had two student moderators who facilitated the discussion using prompts when necessary to further stimulate the conversation, while the other students were assigned food, logistical, and other related tasks. Among the 15 total participants, nearly all were from either Bloomington, IL or Normal, IL, with each city having near equal representation. The average focus group participant had lived in the

community nearly 30 years, ranging from 8 to 63 years. Extensive notes were taken by at least 5 class members focused on recording the responses in a detailed and accurate manner.

The notes taken during each of the focus groups were documented and shared for further analysis. Key themes, topics, and ideas across both the focus groups and key informant interviews were then analyzed and discussed in class, serving as the basis for synthesis into the final report.

IV. Findings

This section explains the key findings of our research. First, we summarize the important themes from our key informant interviews. Key informant interview findings are categorized into three major themes: perceptions of water, knowledge and logistics, and community awareness and engagement. We then outline key information gathered from focus group interviews with Friends of Everbloom and Ecology Action Center. Focus group themes were broken down into similar themes: water quality, complication and barriers to BMP's, and suggestions for improvements. Lastly, we present common themes that apply to our collective research findings.

Key Informant Interviews: Perceptions of Water

All of the key informants viewed Bloomington-Normal water quality as satisfactory. Responses to “How would you describe the water quality in your community?” ranged from “fine” to “excellent” with long-term residents perceiving improvement over time. One informant noted, “There is more attention paid to water quality these days than there has been in the past.” Others specified beneficial practices such as the implementation of buffer zones, natural filtration systems and flood control programs (Key Informant Interviewee). Despite overall

positive reviews, five of the informants mentioned a noticeable difference in water quality between Bloomington and Normal. People expressed concern regarding high nitrate concentrations in Lake Bloomington. There was a general perception, however, that agricultural nitrate contributions are decreasing. An informant who works in agriculture remarked that the “farming community is growing more aware of environmental issues,” which is reflected in practices such as conscious fertilizer application and tilling practices (Key Informant Interviewee).

Five of the nine informants expressed concern over future droughts, many of them long-term residents who had experienced previous droughts firsthand. A few of these informants mentioned the need to find a third water source for Bloomington. There was also consensus that the establishment of a third water source would be difficult, primarily due to fiscal and regulatory constraints.

Key Informant Interviews: Knowledge and Logistics

Key informants were asked about their knowledge and understanding of the watershed plan for Lakes Bloomington and Evergreen. Familiarization with the plan varied; some respondents demonstrated an intimate knowledge of plan details while others were unaware that a plan existed. The majority of informants had tangential awareness of the plan, i.e. they had heard of it, but did not know what it contained. Consequently, informants concluded that the larger residential community is likely unaware of the plan.

The majority of informants described communication between watershed groups as “good” or “excellent” particularly among non-governmental agencies. Several informants expressed some concerns about working with the City of Bloomington and Town of Normal

governing bodies, noting that the former can be “difficult to work with” and the latter “don’t always seem to care” about water issues (Key Informant Interviewees). It was also noted that the City of Bloomington government seems somewhat set in its ways of dealing with water issues whereas the Town of Normal government seems more willing to try new approaches.

Key Informant Interviews: Community Awareness and Engagement

Perceptions of community knowledge of water resources varied widely across key informant interviews. Several informants indicated that residents are well-informed, while others suggested a complete lack of awareness. Key informants agreed, however, that there is a distinct difference between knowing about water issues and taking individual action to address them. Several informants noted that because rain has been plentiful this year, residents do not feel pressure to actively conserve or protect water resources.

Informants had a variety of suggestions for connecting residents to their watershed. The majority of informants indicated that a growing media presence would help put water issues on the local agenda. Suggestions included advertising in the local newspaper, utilizing social media and adding promotional materials to the water bill. Other suggested tactics included seeking political support for water-friendly policies and engaging corporations (e.g. State Farm) in water-related initiatives. Lastly, informants stressed the importance of community education programs that emphasize hands-on activities such as visiting the water treatment plant or picking up trash at the lakes. Several informants mentioned Ecology Action Center initiatives as positive models for this type of programming.

Focus Groups: Water Quality

Findings revealed that most focus group participants believe there is a drastic difference in the quality of water between Normal and Bloomington. Many expressed that Normal water was better quality than Bloomington. In particular, some participants expressed that contaminants, pollutants, fertilizer and run-off debris were the main causes in damaging the water in Bloomington. Others expressed a belief that there was a “fishy” smell and taste in Bloomington’s water. Participants also revealed their perceptions about what they believe to be detrimental practices that have become harmful in recent years. For example, farming practices and the use of fertilizers were blamed as the main cause of harming water quality.

The lack of residents' use of water- related “Best Management Practices” (BMPs) were also perceived to cause a decrease in water quality. For instance, many participants revealed that environmentally-friendly lawn management practices and water conservation did not seem to be a priority for most residents. Some stated observing excess lawn fertilization and improper disposal of lawn clippings in their neighborhoods. Participants stated the lack of use of BMP’s among citizens could use improvement. Furthermore, since access to water is convenient and affordable many participants expressed a belief that residents are unlikely to change their water practices.

Focus Groups: Complications and Barriers to Best Management Practices

A number of barriers pertaining to the conservation and quality of water were expressed by both focus groups. A lack of education about water resources among most citizens was cited as a major barrier. Minimal BMP use could be blamed on lack of knowledge according to many participants. Participants also expressed a general lack of concern for healthy water quality but

they indicated that this could also be blamed on the broader lack of knowledge. Time and costs were also perceived as barriers to committing to changing or improving water related problems. Participants noted the high cost related to improving old infrastructure, incentive programs to change bad habits, or even adding an additional water resource would be too costly and may therefore create reluctance or resistance. Finally, participants also argued that changing habits of people within the community may be one of the most difficult barriers, as this requires time and possibly incentive programs to gain support from many.

Focus Groups: Suggestions for Improvement

While most participants expressed a number of barriers, many suggested a variety of solutions to the issues relating to water quality and quantity. For example, some suggested that changing the format of the water bill to include more information on water use or suggestions on conserving could be a possible solution for the average citizen to become aware of the concerns relating to water resources. Participants did however acknowledge that this solution would be difficult to accomplish as they believe that some citizens never see a bill but rather pay their bill electronically. Other suggestions included the use of media or social networks as viable mechanisms to make people aware of the dangers that may arise when one does not use BMP's. Most participants agreed that educating the general public would possibly be the greatest solution to water quality issues. Expanding on the theme of education, many suggested that education programs for the youth could generate positive changes, possibly more than among the general public. One participant included a suggestion for implementing water conservation programs in the school system and contacting the districts to encourage their involvement. Other suggestions included adding financial incentives and getting elected officials more involved.

Participants stated that with incentives, people will have a reason to make changes in their daily water use and lawn care behaviors and increase the use of BMP's.

Common Themes of Key Informants Interviews and Focus Groups

Water Quality

There appears to be a general consensus among respondents that water sourced from Lake Evergreen and Lake Bloomington could be of better quality. The most cynical viewpoints asserted that the quality of Bloomington-Normal water is “horrible” and “garbage”. Frequent criticisms referred to the amount of chemicals in the water coming from both agricultural practices and urban lawn care. The disposal of harmful products (e.g. prescription pills, motor oil, cleaning products) into the water system was the second most discussed concern. Although there were differing opinions regarding the “fishy” taste and smell of Bloomington water, this point was also often discussed. However, respondents often differentiated between the low quality of Bloomington water sourced from the lakes from the high quality of Normal water sourced from wells.

Water Quantity

Water quantity was a general concern for both Bloomington and Normal. Several respondents remember the drought in 1980s when the lakes were almost completely emptied. Many fear the possibility of droughts in the future. Although the residents of Normal source their water from wells, several respondents also expressed quantity concerns for this water supply. As the population grows, participants expressed concern that supply will not be able to match demand.

Barriers to Change

Despite these concerns, the participants agreed that there are several barriers to eliminating harmful water practices and adopting positive water practices. The respondents consistently suggested that they believe that most urban residents do not care about water quality or quantity. Several people made comments to the effect of: “As long as the faucet turns on, they don’t care” (key informant interviewees). The respondents gave several reasons for this detachment. First, lack of knowledge; urban residents might not know that their water comes from Lake Evergreen and Lake Bloomington. Respondents also speculated that urban residents are not aware of water-conscious practices or BMPs. Second, cost of both money and time; harmful water practices such as fertilizer, dumping chemicals, and excessive water use are more cost-efficient and convenient behaviors than changing habits. In addition, environmentally safe products are perceived to be more expensive and less convenient. Third, a lack of incentives; since water is cheap, people have limited financial incentive to be aware of water usage.

Proximity to Lakes

Close proximity to either Lake Bloomington or Lake Evergreen seems to have the biggest impact on water awareness, potentially changing behavior. As observed in key informant interviews with respondents who are closer to the lakes, informants believed that residential knowledge and concern about water resources was relatively high. They explained that these residents care because water directly affects their neighborhood. Flooding, negative smells, and low water levels can impact daily life and property values. Additionally, the individuals selected for the key informant interviews were particularly well informed. Either by working in a career related to water resources or joining water related groups, some urban residents are well informed about water quality and are engaging in positive water quality practices. This

demonstrates that those who either have a stake in water quality or self-select into a water resources group are an exception to the previous generalization.

In-Group Differences

Additionally, research revealed a difference in attitude between community leaders (key informants) and focus group members. Across the board, the leaders were significantly more optimistic about the future of water resources. When asked about the state of the water ten years from now, most answered that it would be good, even better. The leaders often believed the greatest barrier to improvement was getting an equal (if not more) amount of people involved in water improvement projects in the future. They expressed that as long as people continued to “do what I do” then water should be better in ten years (key informant interviewee). In contrast, the members of the focus groups were more pessimistic about the future of water resources. They believed that both Bloomington and Normal were simply not doing enough to address the increasing threats to water quality and quantity. Several people mentioned the tendency to act “reactionary rather than preemptively” to water resource threats. In both focus groups the consensus was that the water would be worse in ten years. It is interesting to note this difference of opinion because it may affect the way people view future water resource projects. In order to avoid misperceptions and miscommunication, future projects should be aware of this difference.

Education

A common theme to overcome these barriers to change was education. Almost every respondent suggested that education and awareness outreach would be the most effective approach to improve water resources in Bloomington-Normal. They believe that knowledge of

water resources will decrease harmful practices while increasing positive practices. Some respondents suggested that increasing outreach activities such as tours of the water treatment plant, fishing tournaments, and boat races, or other activities on the lakes would likely increase awareness. Publishing important information in newspapers, websites, and online media might also increase knowledge. In particular, respondents in both focus groups thought that youth education programs would help change the attitudes of future generations while challenging their parents to change current behavior. Some people suggested the implementation of water resource knowledge programs in school as well as after school programming. This is a potential area of impact. The participants also suggested ways to change the behavior of adults through education. Several respondents mentioned the inaccessibility of the McLean County website, the Watershed Management Plan, and the household water bill. Updating these resources to make them user friendly might increase the knowledge of urban residents.

IV. Limitations of the Study

Limitations of the Study

Focus groups and key informant interviews were chosen to help inform the development of the future survey, however limitations emerged with this method. A major weakness in our data collection resulted from the small number of interviews and focus groups conducted. There were only nine key informant interviews and two focus groups completed. This amounts to a small body of data to use for formulating the survey. In order to better consider the entire urban population in the Lake Evergreen and Lake Bloomington watersheds, there needs to be additional interviews and focus groups. The main factors limiting the research came from the interview procedure, time, group membership, and access to data.

The interview procedure for the key informants and the focus groups followed the same guidelines. Some students used a set of predetermined questions and facilitated the interviews while other students took notes. There was no equipment used to video or voice record the interviews. The lack of video or voice recording devices may have hindered the results because the facial nuances, emotions, and different physical reactions could not be adequately recorded. A common feature among the individuals chosen to participate in key informant interviews or focus groups was that they each possessed some previous knowledge of the given subject. When searching out these individuals, a lot of people that knew one another or worked together to combat water quality issues ended up participating. The two focus groups specifically involved individuals that were familiar with one another. Personal connections may have affected the genuine quality of responses. A final issue with the interview procedure came from the questions asked. The most optimal questions to get the desired discussion may not have been asked. The lack of knowledge and experience of the students that created the questions may have been the reason for the quality of the questions. The interview procedural issues were amplified by the lack of time available to conduct this project.

This project had a total of 15 weeks to educate the students on the given subject, compile interview protocols, contact community members to participate, secure focus group meetings and resources, execute the interviews, and write up the report. The researchers were not able to thoroughly complete each of these tasks. Time constraints were a main reason for the lower number of key informant interviews and focus groups. The variety of participants, advertising of the project, and background research were also all severely limited due to lack of time available. With limited time to recruit participants, the broader population and demographics of the watersheds were not adequately included.

A time constraint not only limits the number of focus groups that can take place but also the quality of data obtained from the different levels of knowledge. Considering the short time-frame, data was only obtained from residents with “above average” levels of knowledge. Given adequate time, focus groups involving residents with “average knowledge” of water resources could offer a better representation of perceptions of water resources among the general public.

Furthermore, since the focus groups were member-based, a group dynamic could have limited the quality of data received from participants. Members might feel obligated to agree with opinions or shy away from rebuttals to fellow organizational members in order to avoid conflict. Also the presence of a group leader may restrict participation of members and prevent diverging opinions. Alternatively, an added presence of a group leader to the group dynamic may also encourage participation. Members are likely to know each other on some basis and may feel more comfortable engaging conversation with their peers rather than strangers.

The two groups that participated also included a narrow spectrum of demographics. Respondents had similar ages, races, occupations, and levels of knowledge. Therefore, the data gathered is not generalizable to the broader public of Mclean County.

VI. Recommendations and Future Research

Gauging local concern/awareness about an additional water source

We discovered from the key informant interviews and the focus groups that there is a serious concern about the future of Bloomington-Normal’s water quantity as well as quality. Many have expressed that they believe if nothing else changes, there will not be enough water for the growing population. In both focus groups, residents indicated that Bloomington-Normal

should seriously consider creating an additional water source. It was acknowledged that these plans are tentative and may be financially costly to the members of the community. Therefore, it is important to understand how the broader public feels about the creation of an additional water source.

Costs of Best Management Practices

One important consideration for the survey is to inquire about what the general population is willing to change in order to implement BMP's. For example, using more eco-friendly products (lawn care, household cleaning supplies, etc.). While the respondents were not deterred by the costs themselves, they theorized that the general population in McLean County would likely not favor buying costly eco-friendly products. However, some believed that the costs of BMP's were not any higher than adverse practices and may even save money over time. Additionally, enhancing education and providing people with incentives to use BMP's could lead to changes in behavior.

Education as a Best Management Practices

Creating avenues for expanding knowledge about water quality and resources was a major theme addressed by all participants of the focus groups. Interviewees recommended that talking to schools and education institutions would be helpful to inform the younger generations as well as the parents. For example, if the school system taught children not to run water when brushing their teeth, they might bring home that knowledge and share it with their parents.

Parents, who run water while brushing, may change their practice to set a good example for their kids. Through this method, the primary education system can teach many BMPs such as the use of environmentally-friendly cleaning products, phosphorus-free fertilizers, and conservation practices for water use that may then transfer to a change in overall household practices and behaviors.

Additional Recommendations

As mentioned above, due to certain limitations in the study we were unable to get an accurate depiction concerning resident's knowledge of the Bloomington-Normal water resources. Therefore there are several logistical recommendations that we propose. First we propose to conduct more focus groups that should be representative of the population as a whole, not just those with above average knowledge. Additionally, we recommend that more questions in the focus groups and in the key-informant interviews are specifically geared towards individual resident behavior and practices. Lastly, we recommend that all focus groups should be filmed so the researchers can better assess complex reactions to water quality issues.

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Appendix A: Key Informant Interview Protocol

Introduction:

Thank you for your time today and agreeing to participate in the interview.

As we may have mentioned previously, the larger goals of this research project are to assist the

McLean County Soil and Water Conservation District with a more directed social assessment of urban residents' general level of knowledge and concerns of water quality and their knowledge of and opinions of water conservation activities related to water quality and quantity. The data from the interviews and survey will be used to help direct outreach and education efforts to address social aspects of watershed management for the future.

Background Information

1. Can you tell me about yourself and your position? How long have you lived or worked in the area?
2. What is your relationship with the lakes and/or watershed? What types of water-related activities do you do here?

Perceptions of Water Resources (strengths/weaknesses)

3. How knowledgeable do you think the local population is about water resources and quality?
 - a. What do you think the public/people in your neighborhood know(s) about where the water comes from in their community/neighborhood?
4. How would you describe the water quality in your community/neighborhood?
 - a. What makes it healthy or unhealthy?

Knowledge (types of knowledge)

5. Are you familiar with the watershed management plans for Lake Bloomington and Lake Evergreen?
 - a. What do you see as strengths of the plan?
 - b. What do you see as weaknesses of the plan?
6. (*managers/special interest group only question*) How would you describe communication with other water management organizations in the watershed?

Priorities for Water Resources

7. Are water related issues part of your association/organization's agenda?
 - a. What types of water related issues does your association/organization discuss?

Involvement (projects)

8. Have you participated in (or facilitated) any water resource management or conservation programs?
 - a. How would you describe that experience?
9. What do you think are the best ways to get members of this community involved in water resource management or conservation programs?

Practices (positive/negative)

10. What do people in your community/neighborhood do in an effort to conserve and/or protect water resources?
 - a. Any examples?
11. What practices do you believe to be the most detrimental/harmful to water resources?
 - a. Do you think that these practices can be changed easily? If not, what are the barriers preventing people from adopting better practices?
12. Can you tell me about any policies or practices that are in place related to the protection of water resources?
 - a. Lawn care and gardening practices?
 - b. Water conservation policies?
13. Which water resource issues should Mclean County (*as an area*) be prioritizing?
14. If current practices continue, what do you think the water quality will be like in ten years?
 - a. What concerns do you have in regards to future water quality?
 - b. What assets do you think are available to improve water quality?
 - i. MCSWCD, ISU, community monitoring...etc
15. Are there any other comments you would like to add?

Finally, we will be using this data to help develop a survey questionnaire that will be sent to a random selection of households within Bloomington, Normal, Hudson, and Towanda during the summer of 2015. We would like to develop a community research team of key stakeholders to help us pilot test, review, and provide feedback on the survey instrument to ensure it is gathering locally valuable information for those involved in water resource issues. Would you be willing to be part of the community research team to provide this feedback? The investment of time will be minimal but the value of your perspectives will be substantial

Thank you again for your time and insights.

Appendix B: Focus Group Interview Protocol

Introduction and welcome

Background Information

1. What do you enjoy the most about Lake Bloomington/ Lake Evergreen?

Perceptions of Water Resources (strengths/weaknesses)

2. How knowledgeable do you think the local population is about water resources and quality?
 - a. What do you think the public/people in your neighborhood know(s) about where the water comes from in their community/neighborhood?
3. How would you describe the water quality in your community/neighborhood?
 - a. What makes it healthy or unhealthy?

Involvement (projects)

4. What do you think are the best ways to get members of this community involved in water resource management or conservation programs?

Practices (positive/negative)

5. What do people in your community/neighborhood do in an effort to conserve and/or protect water resources?
 - a. Any examples?
6. What practices do you believe to be the most detrimental/harmful to water resources?
 - a. Do you think that these practices can be changed easily? If not, what are the barriers preventing people from adopting better practices?

7. If current practices continue, what do you think the water quality will be like in ten years?
 - a. What concerns do you have in regards to future water quality?
 - b. What assets do you think are available to improve water quality?
 - i. MCSWCD, ISU, community monitoring...etc
8. Are there any other comments you would like to add?