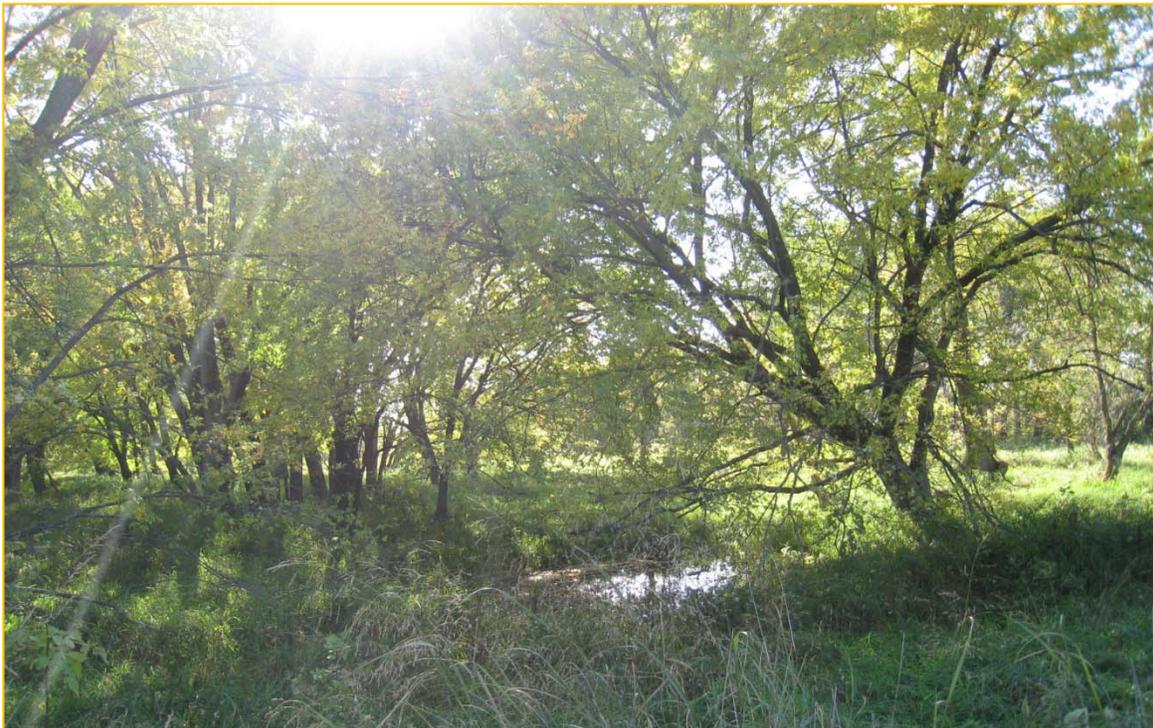




Sustainable Shoreview Wetlands: Fostering Community Involvement through Education and Communication



ESPM 4041W: Problem Solving for Environmental Change

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Executive Summary

This report serves as a resource for the community of Shoreview as they consider environmental education and communication options to promote healthy wetlands and waterbodies as well as support sustainable livelihoods based on strong resident support for learning and involvement in the care of these ecosystems. We trust that the goal to enhance and protect wetlands, agreed upon by the Shoreview City Council and staff, can be supported by following the recommendations discussed in this report.

As University of Minnesota students in environmental education and communication, we partnered with Shoreview to develop strategies for wetlands conservation through education. We developed findings through secondary sources including the Household Choices survey (Nelson et al. 2007) and Shoreview's Quality of Life survey (Decision Resources Ltd. 2005), as well as through the city of Shoreview's Comprehensive Management Plan (City of Shoreview 2003) and website. We completed a literature review, publications assessments, and conducted interviews to examine existing programs and uncover residents' interest in wetland conservation.

By analyzing and evaluating the information gained from all of these sources we developed three recommendations designed to increase awareness and understanding of wetlands processes, strengthen social norms for water quality, and increase opportunities for residents to take action. The following recommendations can help lead Shoreview residents toward long-lasting sustainable behaviors:

1. Strengthen multimedia communication to increase knowledge and self-efficacy.
2. Utilize educational programming to foster a shift in environmental social norms.
3. Provide resources and opportunities for volunteer participation and community involvement in wetland preservation and restoration.

With these recommendations, Shoreview residents will have the resources and support to preserve wetland and water quality. With citizen engagement and responsibility, Shoreview can be a leader in sustainability.

Introduction

Shoreview's goal is to maintain a high quality of life for its residents; here we explore how to do this through resident engagement and environmentally responsible behavior that will preserve wetland and water quality. Shoreview's natural landscape, open space, lakes and wetlands make the city a desirable place to call home, and Shoreview residents value their high quality of life (Decision Resources Ltd. 2005). Maintaining a high quality of life is important for Shoreview so that the city attracts residents who can value the same quality of life in the future. Many Shoreview residents want to preserve the city's natural features: about half say they would like to preserve open spaces, 21% wish to preserve parks and 7% want to preserve lakes (Decision Resources Ltd. 2005). The natural landscape valued by Shoreview residents encompasses 1,281 acres of wetlands and open water bodies (Metropolitan Council 2005).

Shoreview is, for all practical purposes, fully developed, which implies that sustainability in Shoreview will be the result of an educated, engaged, and active citizenry. Sustainable development attempts to go beyond the traditional conservation approach that reacts to problems, to a proactive role in promoting renewal and recovery of ecosystem services (Corral-Verdugo et al. 2008). In a city such as Shoreview, sustainable development can extend to fostering and supporting a sustainable residency that will keep current residents motivated and involved, while attracting new residents. In creating a sustainable residency, Shoreview will be more capable of promoting long-lasting ecosystem functions (Corral-Verdugo et al. 2008) that are important components of maintaining a high quality of life.

In the fall of 2009, seminar students from the University of Minnesota in *Environmental Science Policy and Management* partnered with the Shoreview City Council and staff to aid in their initiative to become more sustainable. Specifically, we were charged with making recommendations that will facilitate community education, communication, and involvement in wetlands protection and enhancement. Through community education and involvement, and strong communication between Shoreview and local watershed organizations, we hope current and future Shoreview residents will sustain the natural landscape and resources the area provides.

One way Shoreview can lead its residents toward environmentally responsible behavior is by providing education, resources, and support for sustainable behavior. Environmental education supports resident capabilities and self-efficacy, while

decreasing barriers to proactive behaviors that will protect and enhance Shoreview's natural resources. Ultimately, the residents are responsible for preserving and enhancing wetlands and water quality. All Shoreview residents, even those who are not located adjacent to a wetland, pond, or lake, influence these systems because cities such as Shoreview are connected by stormwater drainage that channels water from all over the city to common stormwater ponds, wetlands, and other waterbodies. This connectedness means the lawn care practices of every resident affect the whole community's water resources. For example, when residents build rain gardens on their property they are providing services for the entire community; when residents overuse chemical fertilizers on their lawns, they contaminate the water resources of the entire community through surface water runoff into common water bodies, while at the same time wasting money spent to make their property beautiful.

A community that is proactive in the renewal and enhancement of its natural landscape is one that takes action, making changes in their homes and yards that will ensure their natural resources are in good condition, now and in the future. These proactive behaviors grab attention and build the awareness of current and potential community members. An example of the attention proactive cities receive for their sustainability efforts was documented by the *Star Tribune* in "Nature shapes the course of storm drainage;" Bloomington, Maplewood, Plymouth, Arden Hills, St. Paul Park, and Stillwater were acknowledged for their efforts in reconstruction projects that installed rain gardens to slow and filter storm water runoff (Smetanka 2009). Shoreview can continue to be a leader in sustainable actions by guiding and supporting a community that behaves sustainably, together making changes to recover, renew, and enhance natural ecosystems before they are in jeopardy.

In order to bring attention to environmental issues in Shoreview, environmental education can be used to encourage environmentally responsible behavior and promote wetlands conservation. Environmental education about wetlands works to positively influence residents' attitudes and self-efficacy toward maintaining and enhancing wetland ecosystems, which may result in behaviors that strengthen the environmental services wetlands provide, ensuring their sustainable use (Kremen and Ostfeld 2005). The key to behavioral change in relation to Shoreview wetlands is not only to provide the information needed to understand wetland functions and the actions that affect them, but also to support residents in gaining the skills necessary to take action while inspiring a personal stake in the issue (Hungerford and Volk 1990).

Along with environmental education, wetland communication seeks to connect residents with existing efforts for wetland enhancement in Shoreview. The City of Shoreview, the Shoreview Environmental Quality Commission, watershed districts, and management organizations, as well as community groups engage in valuable education and communication efforts. Encouraging strong communication and partnerships between organizations working with wetlands can provide the critical connectivity among different agencies, organizations, groups, and individuals working to achieve similar goals. Organizations can be successful in promoting sustainable resident behavior regarding water quality and wetland health, but interorganizational collaborative effort is even more effective (Knight 2002).

Project Vision

Shoreview staff identified eight key topics for our class to address: energy efficiency, wetlands and pond policies, wetlands communication and education for residents, landscape-level planning for forests and wetlands, sustainable management of parks: users and open spaces and infrastructure management, as well as urban vegetation assessment: tree canopy assessment and tree inventories. As a class, the reports were guided by the following vision:

We envision a sustainable Shoreview: a city that balances social equity, economic vitality, and environmental integrity to maintain and improve the quality of life for current and future residents. We aim to further enable Shoreview by:

- Providing relevant tools and information.
- Encouraging an active and aware citizenry.
- Addressing perceived barriers to action.
- Fostering responsible and collaborative resource management.

Our project strives to empower sustainable behavior and policy changes that will establish Shoreview as a model for other communities.

Report Vision

In collaboration with the City of Shoreview, we will recommend opportunities for wetland education and communication that will inspire positive long-term behavioral change, proactively supporting the renewal and enhancement of wetland ecosystem functions, while maintaining the quality of life Shoreview residents value.

To carry out this vision, the objectives for this report are to:

- Assess existing initiatives promoting wetland ecosystem functionality in Shoreview including the initiatives of agencies, organizations, groups, and individuals.
 - Recommend communication strategies for further promotion of and participation in existing wetland initiatives.
- Identify the next steps for improving wetland education and communication in Shoreview.
 - Generate innovative community involvement opportunities to inspire a high level of self-efficacy, empowerment, and motivation for sustainable behaviors.
 - Create new educational programming as needed.
 - Design implementable communication efforts where public outreach and education is needed via print, sign, and multimedia materials.
 - Recommend strategies for increasing resource sharing between organizations working with wetland and water quality education, and for initiating partnerships to achieve common goals.

The overarching goal for this report is to make recommendations for promoting a citizenry that is proactive in sustainable behavior, thereby supporting an excellent quality of life for current and future residents.

Methods

Site Description

The city of Shoreview is considered a second-ring suburb of the Twin Cities Metropolitan area in Minnesota. It is located in Ramsey County, about 10 miles northwest of St. Paul and shares borders with nine other cities including Blaine, Circle Pines, Lino Lakes, North Oaks, Vadnais Heights, Little Canada, Roseville, Arden Hills, and Mounds View (Figure 1). Shoreview is an almost fully developed city, primarily a residential community with most of the residential development having occurred in the 1970s and 1980s (City of Shoreview 2009).

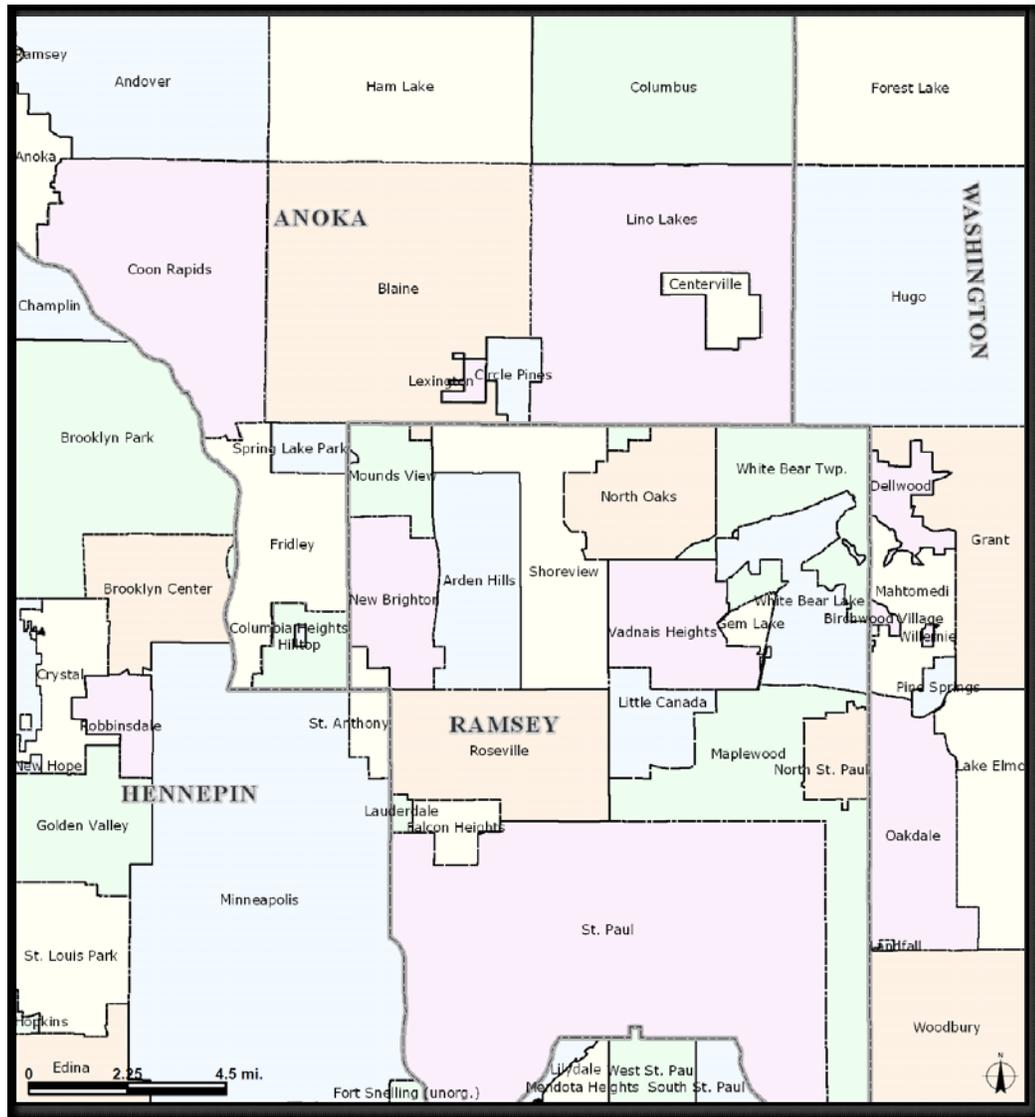


Figure 1. Map of Twin Cities Northern Suburbs (Metropolitan Council 2009).

There are several major roads, county highways, and freeways that border or intersect the city of Shoreview, making it easily accessible to adjacent communities and the greater Twin Cities area. Many of these major routes into or through Shoreview also make up borders between Shoreview and its neighboring communities. Interstate 35W, Interstate 694, and County Highway 96 all travel through Shoreview. In addition to these freeways there are many major roads with heavy traffic flow that

adds to the connectivity of Shoreview: these include Lexington Avenue N and Rice Street traveling north-south; and County Road J West, County Road I West/Turtle Lake Road running east-west.

The City of Shoreview has an abundance of natural and community resources. Within Shoreview's area of 7,800 acres, residents have access to an extensive park and trail system, 11 lakes, 1,400 acres of open spaces, and an abundance of wetlands (City of Shoreview and Metropolitan Council). The dominant ecosystems in Shoreview are lake and wetlands. Much of the public space as well as private property owned by the residents of Shoreview include wetland areas of differing types (Figure 2). Central to the city is a large community complex that offers many programs and opportunities for involvement, including a fitness center, *Tropics Water Park*, meeting spaces, and recreational facilities.

According to an estimate by the US Census Bureau (US Census Bureau 2005-2007), Shoreview has a predominantly Caucasian population, estimated at 94.4%. Shoreview residents tend to be well educated; 97% of people 25 years and over are high school graduates, and 49 % have earned a bachelor's degree or higher. The median annual income of Minnesota households is \$58,058, whereas the median annual income in Shoreview is higher at \$77,433. Shoreview home ownership is high at 86% of occupied homes. Age demographic data shows that 18.2% of residents are 60 years or older and 26.6% are between the ages of 45 and 59. Residents under the age of 19 only comprise 24.1% of the population. Overall, these percentages suggest an aging population.

Research Techniques

To address the report objectives, we needed a better understanding of existing environmental education in Shoreview, in particular programs and related media tools targeting wetlands conservation. We were able to determine possible environmental education needs through secondary sources such as the Household Choices survey (Nelson et al. 2007) and Shoreview's Quality of Life survey (Decision Resources Ltd. 2005), as well as through the city of Shoreview's Comprehensive Management Plan (City of Shoreview 2003) and website. We conducted expert interviews to inventory existing programs, levels of resident awareness, and interest in wetlands conservation.

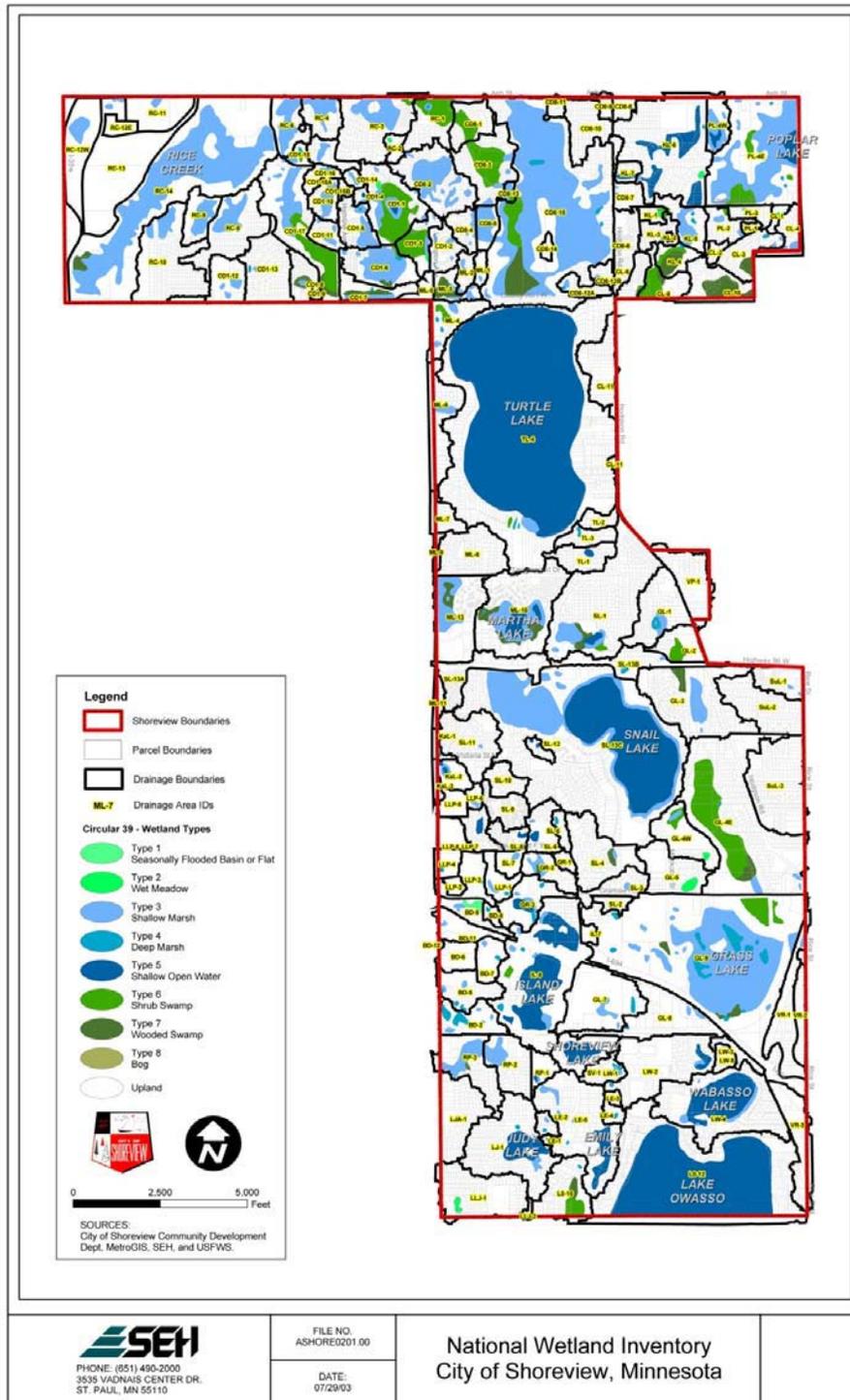


Figure 2. Map of Shoreview wetland areas (City of Shoreview 2003).

Individual and Group Interviews

We spoke with a number of key individuals and group leaders with specialized knowledge and experience in Shoreview, as well as expertise in communication, environmental education, watershed management, and community involvement. These interviews revealed information critical to understanding existing environmental education and outreach in Shoreview, as well as, areas where improvements could be made. The key informants for our interviewing process include: Tom Wesolowski, Shoreview Water Resources Engineer; Gene Kruckenberg, Shoreview Environmental Officer; Shari Kunza, Shoreview Park and Recreation Manager; Dawn Pape, Environmental Education Coordinator of the Rice Creek Watershed District; Doug Thomas, Rice Creek Watershed District Administrator; Karen Eckman, Chair of the Sierra Club Green Communities; and several Environmental Quality Commission members from Shoreview.

For each of these eight interviews, lasting from 10 minutes to 1 hour, the interviewer took notes and coded their interviews, adding this data to an online document on *Google* documents for further analysis. We developed a thematic code to be used with information obtained from interviews as a means for identifying patterns in key informant information, which created stronger support for specific ideas and provides evidence for recommendations in this report. The thematic codes include: key audiences; information on existing programs, classes and outreach; gaps in existing initiatives; education and outreach needs; suggestions for projects.

Surveys

To gain a better understanding of needs in Shoreview, we collected data through surveys. The sustainable park user group in ESPM 4041W (Report 5/8) administered a survey to which we added a question to better identify the motivation for wetland conservation and environmental behaviors among residents. Their on-site survey asked park users five questions related to their park use, participation, and satisfaction. Survey locations and times were determined by the group's unobtrusive survey to maximize their response rate, 18 participants (Report 5/8). The question we included on the survey was, "Are you interested in learning how to change your personal or community behaviors in order to preserve wetlands and water quality in Shoreview?" (Yes, No, Maybe). We analyzed the responses using frequencies and percentages.

Other secondary data we reviewed and analyzed came from the Shoreview Residential Quality of Life Survey (Decision Resources, Ltd. 2005) to determine the

values held by residents of Shoreview. This survey data provided information to understand the need for education and conservation that reflect these values.

Finally, we analyzed secondary data from a mail survey conducted in the spring and summer of 2008 (Nelson et al. 2008). Approximately 15,000 households in Ramsey and Anoka counties received a survey sponsored by the University of Minnesota entitled *Our Household Choices in Urban Living* (Nelson et al. 2007). The survey was funded by the National Science Foundation (Biocomplexity Project EAR-0322065) and was sent to a randomized selection of residents, based on land-line phone numbers, and census blocks. The survey dealt with several different topics related to household choices, environment including transportation choices, household waste, energy use, lawn care, home efficiency, and diet, as well as sociodemographic factors. Of the 15,000 sampled, 3,300 responded, sufficient for statistical and generalizable findings, we analyzed descriptive statistics for the Shoreview responses (n=109).

Publications Assessment

We reviewed a number of publications to assess the information available to Shoreview residents through the internet, print media, and television. Secondary sources included the City of Shoreview's Website, Comprehensive Management Plan, the quarterly publication *ShoreViews*, Rice Creek Watershed District's Website, Grass Lake Watershed Management Organization's website, local and regional newspapers, and any flyers pertaining to environmental issues distributed by the city. We assessed these publications for their information on wetlands and wetlands conservation, any included action steps, additional resources and contacts for more information. To evaluate these publications we developed a set of questions including whether there was information about wetlands or not, whether there was any mention of existing volunteer groups or activities, whether there were links with other resources or information, etc. (Appendix A).

Pilot Testing

We consulted with environmental education and interpretation professionals, as well as Shoreview staff and residents to develop and improve a few of our multimedia outreach materials. This process helped us create prototypes that are ready to use in Shoreview.

Interpretive Sign Prototypes. After developing three interpretive sign prototypes, we conducted a pilot test to obtain feedback from trail users in some of Shoreview's heavily trafficked parks. We conducted interviews on two separate occasions,

receiving feedback from 22 trail users, both resident and nonresident. Each interviewee was asked the same questions, primarily asking for likes, dislikes, and general opinions.

After a round of editing, we sought out professional opinions of six National Park Service rangers working locally at Mississippi National River and Recreation Area. After reviewing the signs, the rangers provided valuable feedback and suggestions that were incorporated into the prototypes provided in this report.

Educational Brochure Prototype. With the guidance of Brian Horgan, a turf specialist from the University of Minnesota Extension, we developed a brochure for Shoreview residents about the most important practices for preserving water quality around their homes. After the brochure was designed, Stephan Carlson, a professor of environmental education and interpretation at the University of Minnesota, reviewed the brochure and provided feedback to make it a more effective communication tool. Following the second round of revision, the brochure was reviewed by two professional naturalists, one of whom is a Shoreview resident. We revised the brochure a third time, and have included the prototype in this report.

Literature Review

Finally, we conducted a literature review to gain insight from previous studies of environmental education, behavioral theory, and methods for fostering sustainable behavior. We used this literature to support our recommendations for educational programming and increased communication efforts as tools to encourage wetland conservation in Shoreview.

Findings

The following section details the results from diverse methods to provide background information and inform recommendations. To begin, we conducted a literature review and found the Theory of Planned Behavior, a model that provides a framework for understanding the factors that contribute to sustainable behavior change.

The Theory of Planned Behavior

Proactive, sustainable behaviors by residents must be inspired, developed, and supported with attention to what influences human decision-making. The Theory of

Planned Behavior (TPB) is a well-respected model that describes the connections between social psychological variables and actual behavior (Nelson et al. 2004; Trumbo and O’Keefe 2001). TPB models how a person’s attitudes toward an issue, the subjective norms surrounding the issue, and their perceived control over the outcome influence their behavioral intentions; a person’s intentions to behave a certain way strongly influence their actual behavior (Figure 3). Studies show there is a link between environmental education that influences these TPB factors and environmentally responsible behavior. These behaviors are not only the result of new knowledge, but of the feeling of competency in the new knowledge and skills (Hungerford and Volk 1990) (Figure 4). Proactive behaviors come as a result of awareness, knowledge, concern for the environment, and skills. Action, therefore, results from an understanding of the impacts on known people and places, a sense of ownership or responsibility, and the belief that their action will have an effect (Chawla and Cushing 2007).

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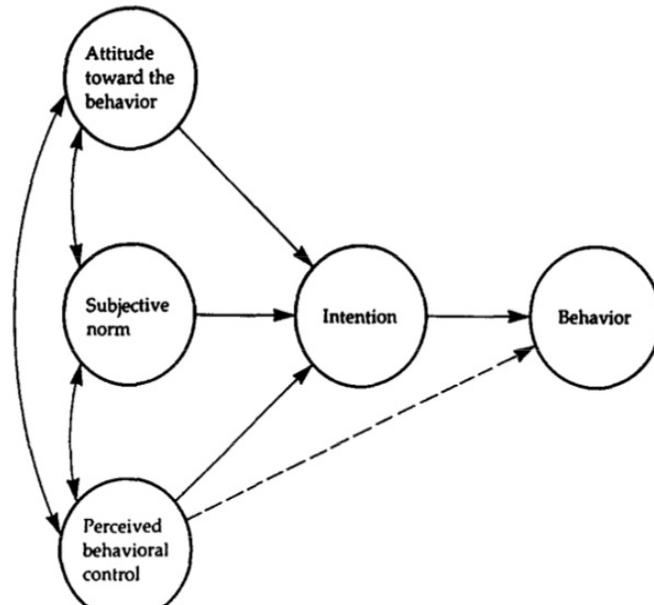


Figure 3. The Theory of Planned Behavior: Attitudes Norms, and Perceived Control (Ajzen 1991).

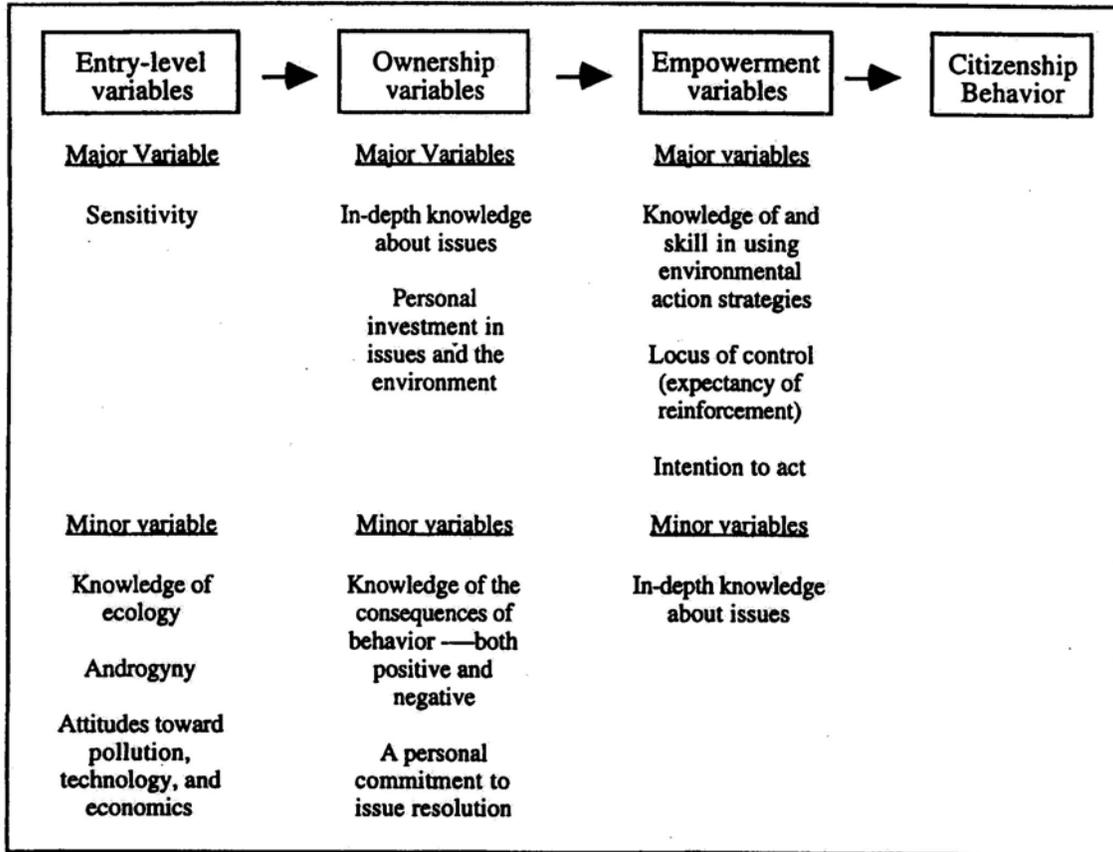


Figure 4. Environmental Behavior Model: Major and Minor Variables in Environmentally Responsible Citizenship Behavior (Hungerford and Volk 1990).

Shoreview Inventory of Wetlands Conservation Programs

The following is a brief synopsis of the existing efforts and relevant organizations working in Shoreview on issues related to water and wetland conservation.

The Environmental Quality Commission sponsors a speaker series that engages residents in information related to environmental topics such as native planting, green landscaping practices, and lakeshore restoration. The speaker series is used to facilitate communication about important issues between the city and its residents and may be the most direct way to reach residents.

There are several community groups in Shoreview, organized around shared values, some of which are already active in wetland conservation efforts. One example is the North Star Chapter of the Sierra Club, whose members started a program that gives awards to residents who use rain gardens, native plants, buffer strips, and other

tactics to improve water quality in their landscaping. Each summer since 2006, a free, self-guided tour of the award recipients' gardens has allowed residents to see voluntary best management practices for water quality being used in the homes and yards of their neighbors and community members (Shoreview Environmental Quality Committee 2009).

The Rice Creek Watershed District (RCWD) serves as a general resource to the community for information and assistance on water quality, storm runoff management, and wetlands conservation. Rice Creek engages residents through programs such as volunteer group activity days and reaches out to youth via a program that helps to put environmental educators in schools as substitute teachers. Rice Creek Watershed Management District also provides cities with local information, permits, and wetlands education for a variety of audiences such as local officials and homeowners. Through the RCWD residents can also check out displays to be used at public events in order to communicate with a wider audience. The RCWD makes use of storm water and wetland information sheets both on their website and at public events (Rice Creek Watershed District). We found that the RCWD is a valuable resource for the communities it serves and its representatives are dedicated to educating and supporting those communities.

The RCWD also launched Blue Thumb, an extensive resource that promotes rain gardens, native plantings, and shoreline stabilization and has proven to be a valuable resource to the many communities it serves. Through Blue Thumb Shoreview residents can volunteer to: help with a Blue Thumb planting, adopt a project, host a neighborhood Blue Thumb party, or staff a Blue Thumb booth at a local fair. Blue Thumb is open to ideas from its participants on ways to promote clean water awareness and action, offering the opportunity for resident-directed projects (Blue Thumb).

In the course of our research we identified a number of existing programs that deal with environmental education and wetlands conservation, many of which could more effectively network and share resources. Several key informants emphasized their desire to foster collaborative relationships between existing programs and link organizations together under a common cause. Knight (2002) found that groups that understand the process of collaborating with other groups find it easier to realize their organizational objectives. Networks of organizations linked together by similar interests and geographic proximity can enter into learning relationships by sharing resources, creating mutually beneficial plans, and cooperating over time; network learning is measured by coordinated practices, and shared views (Knight 2002).

Gaps in programming and communication material create an opportunity for collaboration between Shoreview and the watershed districts to expand existing programs and create joint plans for innovative educational programming and community involvement. We found that there is potential for collaboration between Shoreview, the Environmental Quality Committee, watershed district and management organizations, Ramsey County, Sierra Green Communities, and other organized groups to create and support volunteer opportunities, educational programming, and multimedia outreach around wetland education. A network for resource sharing can be a great asset for these efforts, as Shoreview does not have any staff dedicated solely to environmental education and outreach.

From our publication assessment, we found areas where inter-organizational media connectivity could be improved. In order to navigate from Shoreview to the watershed districts' websites to retrieve information related to wetlands and storm water, users must navigate through multiple pages to find the links. Although the Shoreview Website does link to the websites of the local watershed district and management organizations, navigating to them is complicated. Additionally, as of November 18, 2009, the link to the RCWD website is broken.

Key Audiences

With limited human and material resources to devote to environmental education and communication in the city of Shoreview, purposeful identification of target audiences is an essential starting point for developing an effective action plan. We identified several key audiences after reviewing Shoreview's demographic data, our assessment of relevant publications, and our interviews with key informants. These audiences were considered important either because their decisions have a profound impact on wetlands and water quality or because they are underserved by current wetland education efforts in Shoreview. The key audiences include: homeowners, adults, seniors, organized volunteer groups, and townhome, condominium, homeowner, block, and lake associations.

Homeowners

Homeowners in the city of Shoreview make the decisions that most directly impact wetlands and water quality. Their decisions about lawn care, vegetation, gardening choices, water use, and buffer strips to name a few, provide the greatest potential for simple, low-cost interventions that will have a significant influence on wetlands and water quality. Officials from watershed districts and local nonprofits identified several groups of homeowners as important: new homeowners, homeowners adjacent to water bodies, and general homeowners. According to these key informants, these

groups of homeowners are not fully educated and engaged as they consider how their decisions affect water quality. They represent an opportunity to increase environmentally responsible behavior in Shoreview.

Adults

Adults were consistently identified in key informant interviews as an important underrepresented audience. The environmental education that does exist in Shoreview is largely targeted toward school-age children (“Shoreview Inventory,” e.g., substitute teacher program). While we do not advocate diverting resources from the education of youth, several key informants, from the watershed organizations and the city, identified adult education as a gap in current environmental programming for Shoreview.

Seniors

As people enter the later years of their lives, often unencumbered by jobs and young children, their potential to meaningfully contribute to their communities through service increases (Caro et al. 1997). Shoreview’s population has a large proportion of adults above the age of 35 suggesting an aging population, as well as a significant proportion of adults ages 55 and up (US Census Data 2005-2007) (Figure 5). However, currently organized groups of seniors that do exist in Shoreview do not regularly engage in volunteer activities related to watershed initiatives. Census data and our literature review suggest seniors as a key audience.

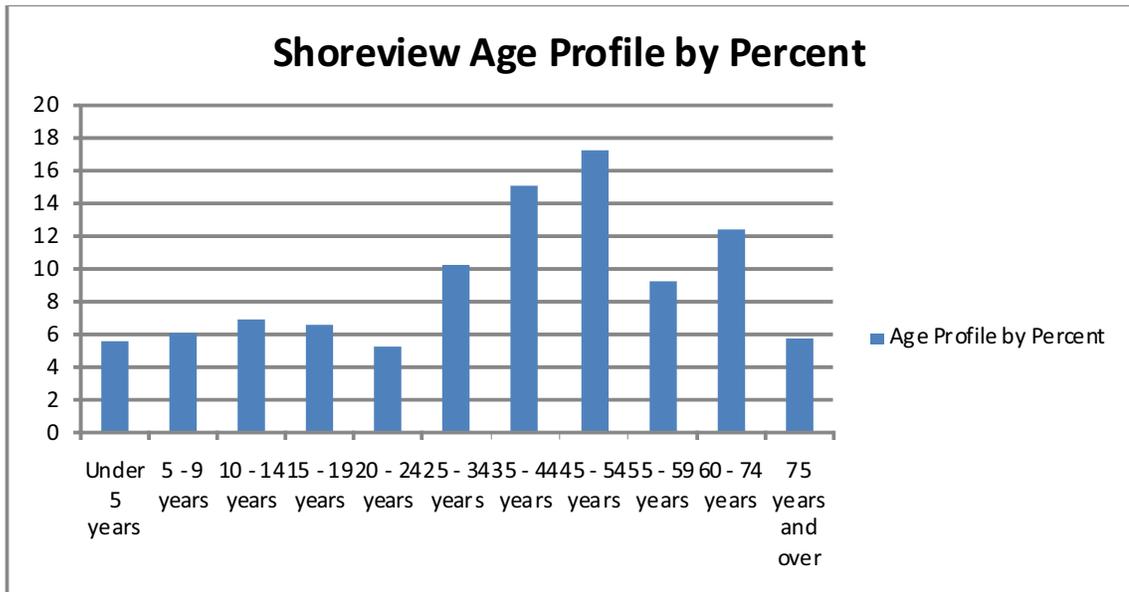


Figure 5. Shoreview population age profile (US Census Bureau 2005-2007).

Youth

As noted above, youth are currently served by some wetland educational programs in Shoreview, mostly through schools and the work of scout troops. Educating and empowering youth by expanding programming was consistently mentioned by our key audiences as important because young people are the future stewards of the land. Providing education and participation opportunities for youth is key in fostering eco-friendly values and good habits for active stewardship.

Organized Volunteer Groups

Engaging citizens involved with organized groups in water and watershed quality is a tactic recommended by Shoreview officials, as well as representatives of the RCWD and Grass Lake Watershed Management Organization. Attempting to connect existing groups that already engage in volunteer activities with opportunities to improve water quality and wetlands, eliminates the time-consuming process of organizing social groups that can help build communities that are engaged in long-term sustainable behavior change. Some of the organized volunteer groups identified in our research include: Scout troops, Shoreview Green Communities, church groups, and service learning students.

Townhome, Condominium, Homeowner, Block, and Lake Associations

Again, engaging citizen groups that are already organized and have forged connections with one another around other issues, is an effective tactic for encouraging environmental behavior change. The amount of education and outreach necessary for involving these groups is less than if one were to try to do it on an individual basis, and there is potential for engaging entire communities who will use informal social networks to reinforce positive behavior with respect to wetlands. Townhome and Condo Associations are particularly important targets because they often make decisions about issues that are important to water quality as groups: lawn care, landscaping, and water use. Representatives from Shoreview, the RCWD, the Grass Lake Watershed Management Organization, and Sierra Green Communities identified these groups as important target audiences.

Multimedia Education and Outreach

To understand how Shoreview communicates with residents, we inventoried current communication tools across their public media outlets, as well as surrounding cities and model cities across the country.

Online Media

Shoreview communicates with its residents through the city website, and approximately half of Shoreview residents have viewed the city's website (Decision Resources, Ltd. 2005). The site is easy to navigate with links to a variety of resources and information designed for residents. There is no link specific to information about wetlands. Though information about wetlands can be accessed on multiple pages, it requires navigation through multiple links to access the information. The links found on the Environmental Resources page are well organized and contain useful information that could help interested residents find information on wetlands, land management, and water resources. However, if a resident did not link to this page, they would not see these resources, as they are not mentioned elsewhere. For residents interested in learning more, they have the option to sign up for email alerts via the website on topics of their choosing.

We conducted publication assessments of websites for some of the cities surrounding Shoreview, as well as some model cities around the country. After compiling the assessments, we inventoried methods of communication through these websites regarding wetland and watershed information, and educational opportunities. Some common themes emerged as a result of the inventory. Blaine, North Oaks, and Little Canada have direct links to their watershed district websites (City of Blaine, City of North Oaks, and City of Little Canada). North Oaks and Blaine have a general information page with basic wetland information (City of North Oaks and City of Blaine).

Print Media

Shoreview residents receive a variety of print media such as community newsletters, mainly *Shore Views*, *Shoreview Bulletin*, *Shoreview Press*, *Shoreview-Arden Hills Bulletin*, and the *Shoreliner*. According to the Quality of Life Survey, 90% of respondents read *Shore Views*, and approximately 60% read the *Shoreview Bulletin* and *Shoreview Press* (Decision Resources, Ltd. 2005). *Shore Views* is distributed to residents and nonresidents, and it's available at the Community Center and City Hall. *Shore Views* is also available to residents as a PDF file through the Shoreview's website. *Shore Views* is a quarterly publication, in which the Park and Recreation Department publicizes upcoming programs and classes. Since 2007 *Shore Views* has published two articles related to water quality issues, and no articles have been published specifically related to wetlands. However, *Shore Views* periodically publishes articles related to household tips for the environment including information on fertilization and green cleaning products. The Environmental Quality Commission also uses the publication to publicize their programs. Key informants indicated the

need for increased use of television, newsletters, mailings and the Internet to communicate with residents.

In addition to the *Shore Views* newsletters, residents have access to a number of informational flyers found at Shoreview's City Hall and Community Center. Some of the flyers available to residents contain information on environmental topics such as water quality, but again none specifically related to wetlands.

Although Shoreview offers a number of publications to communicate with its residents, we found a need for a more encompassing communication and outreach techniques to address wetlands and water quality issues. An exemplary example of outreach strategies about wetlands is the *Protect Our Wetlands* program, presented by the award winning Isaac Walton League. This program suggests publicizing the need for wetland protection in local newspapers. Shoreview has implemented this strategy in the promotion of cleanup day events. In another example, Ramsey County has purchased ads in the *Pioneer Press*, a newspaper read by 60% of Shoreview respondents to the Quality of Life Survey (Decision Resources, Ltd. 2005), as well as ads in local bulletins and newspapers in order to promote upcoming programs and events.

Interpretive Signs

In addition to print media, interpretive signs offer a low-maintenance outreach tool to communicate with a variety of audiences. Shoreview has an elaborate trail system of nearly 60 miles within city limits. Many of these trails travel through or along the edge of wetlands or storm water ponds. During our fieldwork, we encountered many wetland sites along trails, none of which had interpretive signage on the subject of wetlands. Instead, there were typically signs at trailheads and along trails with a map of the Shoreview walking and biking trail system or basic information, such as park rules. In an analysis of the park and trail system and its users, one of our collaborating groups found that signs for navigation are few, and trail users often had difficulty navigating to and on many trails (Report 5/8).

Educational Programming

Among Shoreview residents, there is strong interest in city sponsored educational opportunities as documented by the ESPM 4041W Wetland Policy group. The citizen interviews carried out by this group found that of the 18 Shoreview residents they spoke with, 14 were interested in city suggested actions, education, and training (Report 3/8). Shoreview staff, watershed district and management organization representatives, and residents expressed interest in wetland educational

programming. Dawn Pape (RCWD) described the adult classes available through the RCWD, more specifically how there are no options for wetland education. Though offering a wide range of programs through the Community Center, Shoreview's Park and Recreation Department does not offer community education in regards to these issues. The main issues that need to be addressed through wetlands educational programming are native planting/rain gardens, residential wetland management, and storm ponds/storm water management; these three themes were repeatedly mentioned as critical during our key informant interviews.

Guided and Podcast Tours

During our inventory of model city and surrounding city programs, we found a great deal of support for guided tours of wetlands. For example, 60% of model city programs including the Izaak Walton League, Bloomington, Indiana, and West Eugene Wetlands in Oregon have guided tours of wetlands. Also, Shoreview's neighboring city of North Oaks has a guided tour program for residents.

A new idea for wetland education came up in our analysis of the Protect Our Wetlands program by the Izaak Walton League. They utilize podcasts to execute a program for guided wetland walking tours. By using downloadable podcasts, visitors to the wetlands receive a guided interpretive tour, but without the guide. In support of utilizing popular technology for exploration and education in the form of a guided tour are the many National Park Service sites that have also begun to produce podcast tours. Currently, 18 National Park Service sites are using podcasts to reach out to new and nontraditional audiences (Lewin 2008). Our local National Park, the Mississippi National River and Recreation Area uses podcast tours to reach local residents, providing a free downloadable walking tour with interpretive dialogue and directions for a four-mile loop near the river. They also make iPods with the podcast available for visitors to check out for free at their visitor center (Mississippi National River and Recreation Area 2008).

Educational Need: Lawn Care Choices

To help evaluate what the educational needs are in Shoreview in terms of fertilizer use, we examined questions from The Household Choices survey (Nelson et. al. 2007). The responses we analyzed demonstrated that a large percentage, (83%) of Shoreview respondents fertilized their lawns in 2007 (n=109) as compared to 72% in Ramsey and Anoka Counties (n=1300). Fewer intended to fertilize in 2008, but still a strong majority (Figure 6 and Figure 7). However, only 44% of respondents believe fertilization is harmful or vary harmful in regards to water pollution.

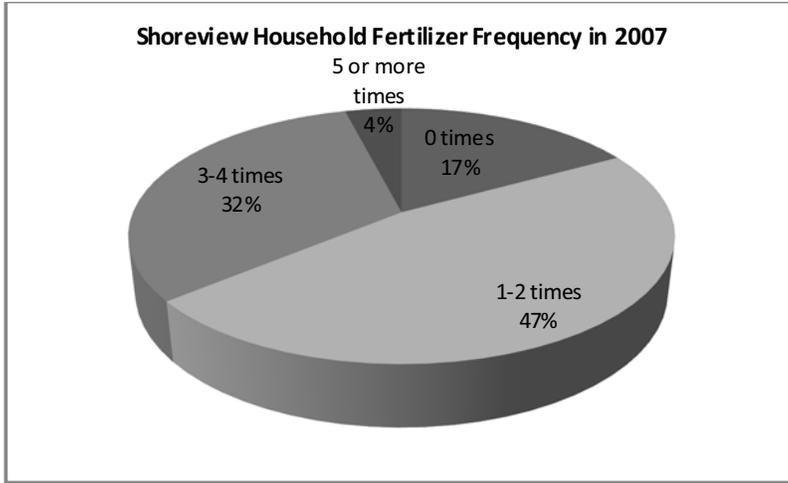


Figure 6. Responses to Shoreview Subset of Household Choices Survey Data (n=109) to the question: About how many times did you fertilize your lawn in 2007? (Nelson et al. 2008).

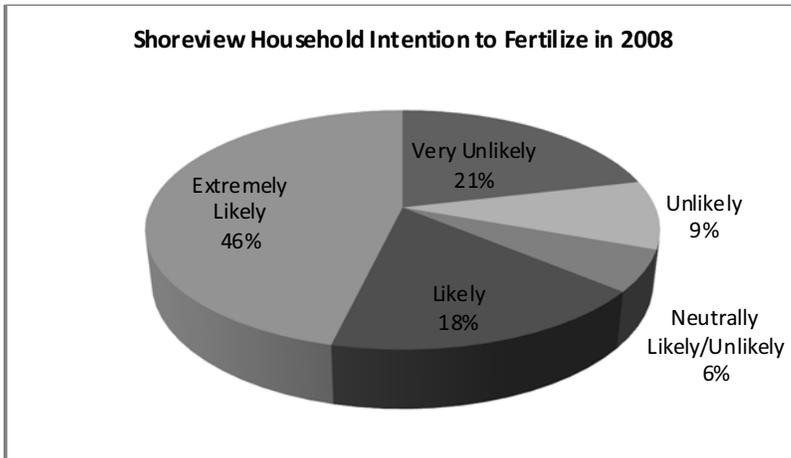


Figure 7. Responses to Shoreview Subset of Household Choices Survey Data (n=109) to the question: I intend to fertilize my lawn this year (scale: extremely unlikely 1 – extremely likely 5)? (Nelson et al. 2008).

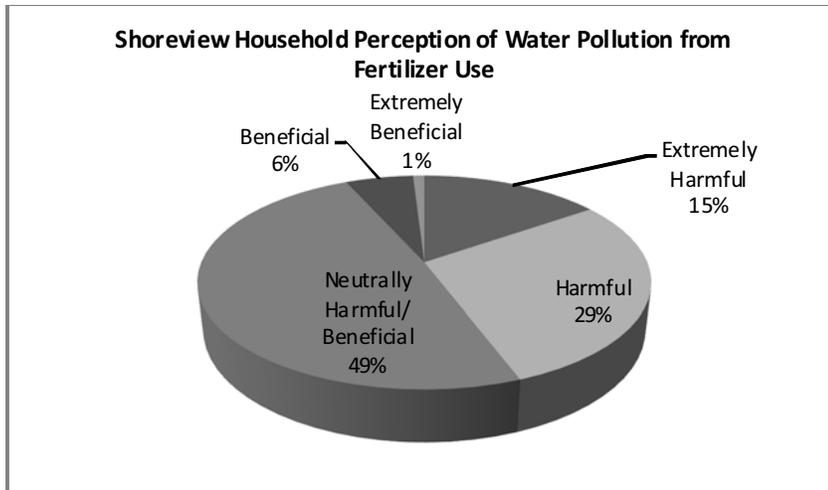


Figure 8. Responses to Shoreview Subset of Household Choices Survey Data (n=109) to the question: Water pollution from fertilizing my lawn this year is (scale: extremely harmful 1 – extremely beneficial 5)? (Nelson et al. 2008).

Volunteer Opportunities and Community Involvement

Shoreview has several existing opportunities for community involvement in water quality and wetlands protection. These opportunities are open to various age groups and audiences. For youth we found there have been scout troops and some service learners that volunteer to stencil storm water drains, to remind residents where the storm water goes and not to contaminate it. For adults, there are opportunities available through the Blue Thumb program (Blue Thumb 2009).

We found one church in particular, The Presbyterian Church of the Way (PCOTW) that has an environmental volunteer group for its congregation. This group publishes articles in their church newsletter about water issues. In addition, they have worked to manage storm water drainage, planted a rain garden at the church, and are monitoring the irrigation of their grounds.

Although Shoreview has some opportunities for community involvement and volunteer work, we found a gap in existing programs in the area of active wetland preservation and improvement. We identified this gap when it was mentioned in five of the interviews, and by attending meetings and assessing publications. We found that media publications like the Shoreview Community Center Website and the *Shoreliner* Newsletter could be used promote community involvement opportunities, but we found no existing opportunities to promote.

Recommendations

The following recommendations were developed based on our inventory of existing environmental education and wetlands conservation programs in Shoreview and our identification of potential for the expansion of these programs. In order to effectively address all the factors needed for inspiring and supporting long-term human behavioral change, we have formed our recommendations to address awareness and attitudes, social norms, and self-efficacy, factors discussed in the Theory of Planned Behavior (Ajzen 1991, Hungerford and Volk 1990). If implemented, our recommendations will help Shoreview educate about Best Management Practices (BMPs) and the impact that individual behavior has on water quality, encourage changes in social norms that support wetland health, and provide opportunities for people to directly improve wetland ecosystems through community service.

Recommendation 1: Strengthen Multimedia Communication to Increase Knowledge and Self-efficacy

Recommendations for Shoreview multimedia address the need to increase awareness, knowledge, and self-efficacy about wetland and storm water issues. During our assessment of model programs, as well as in our expert interviews, the importance of using different media to communicate messages about wetlands to Shoreview residents became clear, by expanding or improving existing communication tools within Shoreview and adding new types of communication, Shoreview has the potential to connect residents to resources and information about wetlands in order to increase their understanding of wetland functions and the impact of their own decisions on water quality.

Shoreview Wetlands Logo

Shoreview could use a thematic approach to promote a stewardship campaign among residents. We recommend using a branding campaign with a logo containing a simple message that would be included in all forms of communication and outreach around wetlands. We have designed a message with two logo forms, one in color and one that is black and white (Appendix B). We recommend this logo be made public in Shoreview throughout its diverse communication tools including the Shoreview Website, print materials, signage, and more. By communicating a simple message the campaign is able to capture residents' attention and complete the first step in the behavioral change process. According to McKenzie-Mohr and Smith, "all persuasion begins with capturing attention" (McKenzie-Mohr and Smith 1999).

Online Media: Shoreview's Website

The city of Shoreview can work to increase the awareness and knowledge of its residents by expanding the information and resources available on the city's website. The city website is a valuable resource when it comes to raising resident awareness; approximately 40% of residents report visiting the website making it an important tool for outreach. The Shoreview Website provides a method for reaching a variety of key audience groups with relatively low cost and maintenance.

Shoreview's website provides some information and resources related to wetlands; however, it does not convey a strong message regarding wetland stewardship without active searching by the user. We recommend utilizing space on the main page to promote a wetlands campaign with the Shoreview Wetlands Logo, providing a link to information and resources on other pages. The logo will attract the website visitor's attention, even those looking at the website for other reasons. A single link to a Shoreview wetlands and storm ponds page would unify scattered information and encourage residents to explore the topic of wetlands within their community and beyond. This page could include existing information from the Shoreview Website, as well as links to a new educational and informational sites (Appendix C includes some links we recommend using, as well as brief descriptions of what users will find at each website, which we also recommend including for easy navigation).

During the process of assessing web resources from surrounding communities and model cities, we identified several themes and ideas that could be replicated by the city of Shoreview. The *Protect Our Wetlands* program of the Isaac Walton League uses webcasts about wetlands. This idea could be used on the Shoreview site to appeal to the current trends in Internet use. The City of Shoreview could provide downloadable podcasts to its residents including city meetings and wetland programming.

Another possibility for the website, which supports resident education and involvement, involves connecting neighborhood groups by using the site. We recommend creating a space on the Shoreview Website, located within the Shoreview Wetlands link, for a bulletin board to connect residents with each other, allowing them to network and share resources. This page could provide a place for groups to post volunteer needs and opportunities, making it easier for residents to get involved. The page could also contain links to resources for new homeowners, homeowners adjacent to wetlands, teachers, residents, seniors, and youth. Teachers could access environmental education tools and curriculum on the topic of wetlands. The Shoreview Wetlands link could also include a page of games and information

designed for kids to learn about wetlands. Fun facts and trivia questions could be used to engage residents in learning more about wetlands, storm ponds, and water quality.

Podcast Walking Wetland Tours

From our understanding that Shoreview supports the idea of promoting programs using new media, we suggest creating a podcast walking tour of local wetlands to be made available for residents. In our inventory of model cities, 60% of those reviewed had guided walking tours of wetlands. The award winning Isaac Walton League *Protect Our Wetlands* program and many National Park Service sites across the country have been utilizing this new and popular media of downloadable podcasts in order to provide guided tours for visitors. We recommend that the City of Shoreview provide interested residents with podcasts that guide walking tours on the City's trail system about wetlands and other natural features. Podcasts that provide instructional and informational walking tours allow Shoreview to communicate and educate users about a number of natural resources and management goals.

Although the initial setup will require some costs to create podcast walks, once the tour is produced, few resources are required for upkeep of the program. The podcasts could be made available for download on the Shoreview Website, as well as on devices provided for loan by the city of Shoreview. Following the example of the *Healthy River Healthy You* podcast presented by the Mississippi National River and Recreation Area, it might also be beneficial to provide iPod or other MP3 devices for loan, as not all residents will have access to this technology. Having these tours available in this media allows residents to independently take part in this program based on their own schedule, solving an issue confirmed by 25% of residents that their reasons for not participating in programs is a lack of time (Decision Resources, Ltd. 2005). There is also an opportunity to create additional podcasts as resources present themselves in the future, by adding new tours and lessons to be made available for download.

Wetlands Information in Print Media

We recommend Shoreview use existing print media to communicate information about wetlands, storm ponds, and water quality. A high percentage of Shoreview residents read print materials in newsletter form. Currently, the communications regarding environmental issues are inconsistent and there is no specific area set aside for wetland resources and topics in any of the frequently read newsletters. We recommend Shoreview dedicate space in each *Shore Views* newsletter to wetlands, storm water, and water quality information. Featuring wetlands in each edition of the

newsletter will target the many residents who report consistently reading *Shore Views*, repeating the city's messages about the importance of wetlands, with a seasonally appropriate or unique topic each issue. Adding a wetland section to newsletters like *Shore Views* would be a simple and cost-effective way to reach an established audience that includes much of the Shoreview population.

Brochure

We recommend distributing an educational brochure with basic information on wetland functions, best management practices, simple tips, and opportunities for action and involvement to help Shoreview communicate its messages about wetlands and give residents ideas for actions to take to preserve them. We have included a brochure prototype that was developed with a turf specialist and pilot tested it with experts in environmental education and interpretation, as well as professional naturalists (Appendix D). This form of print media could be made available in a variety of places, and has the possibility of reaching a broad audience. By including the brochure as an insert in the package of information distributed to new homeowners, newsletters and resident guides, as well as displaying it in places of interest or those frequented by residents will provide residents with information and resources needed to preserve wetlands and water quality.

Interpretive Signs

We recommend the use of interpretive signage along trails to support the goal of communicating information about the importance of wetlands to residents on site. In a survey of residents, 50% said that they frequently used trails in Shoreview, and 25% use them sometimes. (Decision Resources, Ltd. 2005). In an effort to connect with audiences not reached through other media, interpretive signs could be very affective in communicating educational information to residents that use the trail system. Signs allow for communication of messages without personal interaction, and enable people to connect with a resource at their own pace (Widner Ward and Wilkinson 2006).

Interpretive signs are frequently used along trails and in parks, but appear to be underutilized in Shoreview parks. Existing signs are not focused on wetlands or stewardship, and provide only basic information. By adding interpretive signs at highly trafficked parks and trails near wetlands and storm ponds, residents could be targeted with a message while near or in wetlands.

We designed three interpretive sign prototypes to be used as templates for signs dealing with wetland topics that we recommend placing along trails (Appendix E).

These prototypes were evaluated by Shoreview park users (n=22) and professionals in the field of interpretation; all but one interviewee said the signs were attractive and that they would stop to look at the signs along wetland trails. In general, the people we spoke with enjoyed the real photos of local areas and wildlife. We suggest using these signs along trails with wetlands and storm water ponds in order to provide an interpretive and educational opportunity for residents and visitors make a connection and to raise awareness, which supports long-term behavior change.

Common Challenges

Some of the challenges inherent in our recommendation for multimedia outreach and education include the availability of resources to create, implement and maintain the various methods. Without a full-time staff member dedicated to environmental education in Shoreview, there are challenges with human resource limitation and time limitation. However, we have provided a strong foundation of the information, resources and prototypes necessary to begin implementing these recommendations. Undoubtedly, these recommendations require some financial investment, but these options are the most cost-effective multimedia outreach techniques. Many recommendations could be implemented based on preexisting efforts, and others require only an initial investment with low maintenance costs. Another way to evaluate the cost of these investments is to evaluate the environmental costs that will be reduced by effective implementation such as water treatment, pollution problems, and reduced storm pond maintenance. When viewed this way, the costs to implement these recommendations are minimal. Overall, Shoreview can see past the initial challenges of implementing these recommendations, and reinforce Shoreview as an environmental leader with a happy and healthy citizenry.

Recommendation 2: Utilize Educational Programming to Foster a Shift in Environmental Social Norms

To build on the messages of its multimedia efforts—which are largely designed for people to absorb as individuals—Shoreview could create new educational programming about wetlands that follows the next step, which works to shift environmental social norms about individual actions that impact wetland ecosystems. The idea is that bringing people from the community together to learn about these topics as groups will help increase informal social support and pressure around Best Management Practices (BMPs) for water quality. This programming would come in the form of workshops or classes for residents focused on improving wetland and water quality through private property management.

Collaborative Educational Programs and First Steps

We recommend creating and offering workshops and classes through the Shoreview Park and Recreation Department that are designed to educate residents about the importance and value of wetlands, as well as BMPs for proper maintenance of their property in regard to wetlands and water quality, while creating a community of individuals and groups who encourage one another to engage in these practices. We recommend using this opportunity to foster social ties and strong working relationships with local watershed organizations, environmental organizations, and other interested groups and individuals by collaborating on the creation of these workshops and classes. Initial workshop objectives can be to create an awareness and appreciation for wetlands in the community, while increasing participants' skill-sets and self-efficacy around the outcomes of their household and lawn care choices. We have provided a table of potential collaborators interested in being involved in the creation or implementation of a Shoreview wetlands and water quality workshop or class (Appendix F), as well as some possible program themes (Appendix G).

Challenges

These workshops and classes have several common challenges: they require time, a location, people, and money. First, staff time is needed to organize, coordinate and implement the program. There are many resources available, for example Clean Water Minnesota, which provides an entire educational toolkit about storm water management to be used to educate residents and city officials. Using pre-existing tools like this, will not only severely cut down on time needed to put a class together, but also, because it is free, will cut down on the cost.

Location is another challenge that can be fairly easily to overcome. Because the classes are hands-on, it makes the most sense to hold them outside. It is not necessary to take up room at the fully occupied Community Center, but instead hold them in city parks. The topic of the class could determine which park and/or other locations would be appropriate. For example, a class about storm ponds and storm water management could be held at McCullough Park or Shoreview Commons Park because of their proximity to storm ponds (Figure 2).

Another consideration is that there needs to be someone to lead each class. Though one of the trickier challenges to overcome, this is not going to be impossible. This is where networks and relationship building will be critical. Without a full-time staff member dedicated to environmental education, Shoreview needs collaboration and resource sharing to implement effective educational efforts. Taking a leadership role in initiating planning for environmental education will demonstrate Shoreview's

dedication to promoting and sustaining an environmentally responsible citizenry, and will help build lasting relationship with other organizations. In talking with watershed districts and management organizations, Blue Thumb, Clean Water Minnesota, and others, we developed several suggestions of people that would be willing to offer their time. We have created an initial contacts table with contact information for community members within Shoreview interested in planning and implementing environmental education (Appendix F).

Finally, these programs must fit within the constraints of the city budget. By taking into account the previously mentioned strategies for time, location, and people, cost is dramatically reduced. Money can be saved by taking advantage of free, pre-existing curriculum, by choosing a location on city property, and finding willing volunteers to lead the classes. Like other Park and Recreation classes, there could be a fee for the class to cover material costs (i.e., plants for a native planting class). At the start, costs could be reduced by combining classes. If the topics are related to each other, they could be blended. For example, a class could feasibly be taught about native planting and use of fertilizer. Or, a wetlands appreciation class could highlight the differences between natural wetlands and storm ponds, and the value of each.

This programming can provide residents the knowledge and practical skills to be able to affect positive environmental change on their own property, and Shoreview by extension. It will allow residents to come and learn together about the natural landscape of their city, and how to sustain it collectively and individually.

Recommendation 3: Provide Resources and Opportunities for Volunteer Participation and Community Involvement in Wetland Preservation and Restoration

Based on our findings we recommend the City of Shoreview provide resources and support to groups of people in the community interested in wetland preservation projects that incorporate community involvement. An important part of promoting sustainable behavior is supporting a community that is empowered and takes action. To promote sustainable behavior and support proactive residents, we recommend that initially Shoreview focus its efforts on existing volunteer initiatives, organized community groups, and youth groups. Below we discuss three possible programs Shoreview could offer to interested volunteers, the programs include: citizen water monitoring, shoreline restoration days, and an adopt-a-wetland program.

Existing Volunteer Initiatives

Since a few volunteer and community participation projects that work on wetland preservation and water quality already exist, we recommend the City of Shoreview reach out to these groups and offer them support. These groups of concerned individuals are a valuable resource, especially when initiating new programs. With Shoreview's involvement, interest, and support these group can provide valuable insights, ideas and connections that could be used to foster community involvement in sustainability. To increase support for these volunteer groups we recommend the City of Shoreview do the following:

- Offer small grants for wetlands and water quality projects, and
- Create free space on the city website or in city publications for these groups to advertise as well as to facilitate networking among groups.

The following programming options offer opportunities for residents to get involved in watershed management, take ownership of environmental issues in their community, and connect with others who share a common goal. The groups that we recommend initially targeting are organized community groups, as well as student service learning groups, scout groups, and youth groups.

Organized Community Groups

To initiate and sustain meaningful volunteer programming for residents, we recommend the city of Shoreview connect with groups that currently are not engaged in volunteer activities involving restoration projects, adopt-a-wetland opportunities, and citizen water monitoring programs. Organized community groups include block clubs, neighborhood groups, townhome associations, and the Shoreliner Senior Club. These organized groups can increase the capacity of programs such as community restoration days, an adopt-a-wetland program, and a wetland monitoring program (described below) with relatively low effort on Shoreview's part.

Student Service Learning, Scouts and Youth Group Volunteer Programs

The City of Shoreview could offer resources to scout troops and youth groups in order to encourage long term behavioral change around wetlands and water quality. The Shoreview City Council and Mayor routinely recognize young people who become Eagle Scouts with a plaque and a resolution outlining their achievements. In order to become an Eagle Scout a young person must carry out an Eagle Scout Service Project. Building on their existing relationship with scout organizations, the city could connect scouts looking for good projects with leadership roles in service

projects such as community restoration days, an adopt-a-wetland program, and a wetland monitoring program (described below).

Another way to encourage volunteer work would be to collaborate with scout leaders and watershed districts to create a thematic wetlands program in which scouts could earn badges while learning about and engaging in wetland preservation. This approach will give the scouts a well-rounded view of the complexity of the wetland ecosystem and provide an opportunity to do volunteer work for its preservation. In order to encourage personal connection with local water resources, scouts could be taught about these topics by using experiential and place-based learning techniques. The program could provide ideas and activities for teaching about water quality, wetland ecosystems, and provide assistance for initiating a service projects such as shoreline stabilization, rain garden planting, wetland monitoring, etc.

Beyond scouting programs, Shoreview can support existing service learning in schools and encourage more service learning opportunities by providing ideas and resources for teachers. We found that some schools have already done storm-water-drain stenciling as a service learning project. The fact that the school year takes place mostly during the winter months acts as something of a barrier to this recommendation. However, we recommend that interested teachers be encouraged to use the wetlands as a teaching tool for science classes early on in the school year and provide their students with a participatory learning experience through volunteer work on some of the projects described below.

Community Restoration Days

One relatively inexpensive way to connect a broad swath of residents with a direct service opportunity is to hold community restoration events periodically. This provides a chance for volunteers to get out and do some hands-on work in the community. The city could solicit donations (e.g., beverages or door prizes) from local businesses to encourage residents to participate. These types of events are typically held on weekend afternoons so the greatest number of people have an opportunity to participate. The restoration days can be advertised via newspaper, community newsletters, and Internet. Some ideas for these projects are community rain garden installation, wetland cleanup, shoreline restoration, or native planting projects. This is a project that would be enriched by collaboration with other organizations; there are cost share programs for native planting projects available through Blue Thumb, the Grass Lake WMO, and others.

Adopt-a-Wetland

After prioritizing wetland areas of concern, the city could facilitate an adopt-a-wetland program. This is an opportunity that a variety of groups could participate in, from homeowners who live adjacent to wetlands, to youth groups, to businesses. The program could provide technical expertise about shoreline restoration, water monitoring, as well as an opportunities for group clean-up efforts. This approach simultaneously educates residents, fosters connections among residents, and connects them with the opportunity to do practical work to improve wetland health. Some groups in Shoreview (e.g., Faith Communities) have experience doing buckthorn busts. An adopt-a-wetland program could use a similar model for organizing and implementing the events. The adopt-a-wetland program would give groups an opportunity to engage in ongoing service, building connections among group members and fostering personal connection with a particular wetland area.

Wetland Monitoring Program

Another opportunity for action is to design and implement a volunteer wetlands monitoring program. The program would send small groups of volunteers into the wetlands, seasonally or monthly, to collect data on physical, biological, or chemical properties of the wetland that could be uploaded to a database and available to the public (Overdeest 2004). The information could be used by the Minnesota Pollution Control Agency and other agencies, to conduct water quality research in the area. In the United States this type of water monitoring program in streams, rivers and other natural areas has been gaining popularity because it has a reputation for fostering learning and community involvement. A study in Wisconsin (2004), found that the real merit of this type of program is the fact that “participation does significantly increase the political participation, personal networks, and feelings of community connectedness among volunteers” (Overdeest 2004). Initiatives such as these have the potential to change the norms in the community regarding wetlands and enhance feelings of self-efficacy by giving residents a sense of ownership of the wetlands, and linking action to conservation. It also has the potential to be a gateway activity leading to other types of environmentally sustainable behavior. Findings from a variety of studies indicate that initial actions are likely to lead to larger subsequent actions (McKenzie-Mohr and Smith 1999). This is because when one performs an action, they are more likely to view themselves as someone “who cares about this type of issue,” which is in essence a transformation of personal identity (McKenzie-Mohr 1999). Involvement in this type of volunteer program may encourage citizens to take other actions such as organizing a neighborhood group or installing a rain garden on their own property.

We have identified several communities that are successfully implementing similar programs. Shoreview's neighbor North Oaks has a citizen's lake monitoring program. Volunteers gather water samples from nine lakes in their area and submit the samples to the Minnesota Pollution Control Agency for water quality testing (VLAMO website). In New York, a similar program through the Izaak Walton League Protect Our Wetlands Program, volunteers monitor insects, crustaceans, and the chemical and physical characteristics of a stream in order to determine the water quality (www.projectwatershed.org). These programs have successfully achieved their goals and can serve as models for a wetland monitoring program in Shoreview. We provided more information, budget estimates, contacts and initial steps for creating and implementing a wetland monitoring program in Shoreview through a partnership with the Minnesota Pollution Control Agency (Appendix H).

Challenges

One of the most significant challenges to any volunteer effort is the issue of participation. According to Sundeen, et al. (2007), the main barriers to participation in volunteerism are lack of time, lack of interest, and ill health. To combat lack of interest and we suggest the recommendations be implemented in the order in which they are presented, by attempting to change individual attitudes and then social norms around an issue, and finally offering opportunities for action. This logic is that interest and empowerment around preserving and improving wetland health will be fostered both on an individual and community basis. By beginning with providing support to groups that are already active in wetland restoration, there is an assurance that resources are being given to those who have an exhibited commitment to actions in the service of environment.

Senior citizens, service learners, and scouts often have time to set aside for volunteer opportunities, therefore the common problem of lack of time is somewhat mitigated by targeting these audiences. Opting not to volunteer by audiences such as senior citizen, service learners Work by Caro et al. (1997) indicates that the best time to reach out to seniors is in the immediate post-retirement period before they might have other obligations or begin to experience ill health. Shoreview has a large proportion of its population in this opportunistic age range (Figure 3), and this population could be targeted by the efforts discussed above. Service learners are in some ways a captive audience; working with schools to incorporate wetland service into curricula can be an important part of ensuring that there are enough hands to do the restoration or monitoring work.

Conclusions

By using effective education and outreach tools to engage and empower citizens to take action to restore and preserve wetlands, the city of Shoreview will make significant progress toward sustaining the water resources that are critical to the quality of life that Shoreview residents value so highly. By implementing our recommendations for Shoreview, the city can build upon its current efforts by providing volunteer opportunities that help citizens protect, renew, and improve wetland and water quality while fostering community connection; developing effective multimedia education and outreach tools; and quickly and easily connecting citizens with the resources that exist for these efforts. With Shoreview's dedication, an engaged and well-educated citizenry, along with homeowners, businesses, faith communities, and organized volunteer groups, Shoreview wetlands and water quality will continue to be a valuable community asset for generations to come.

References

- Ajzen, I. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50:179-211.
- Blue Thumb. *Blue Thumb Website*. Retrieved from <http://www.bluethumb.org/>. Sept 2009.
- Caro, F.G., and S.A. Bass. 1997. Receptivity to volunteering in the immediate postretirement period. *Journal of Applied Gerontology* 16 (4):427-441.
- Chawla, L., and D.F. Cushing. 2007. Education for strategic environmental behavior. *Environmental Education Research* 13(4):437-452.
- City of Blaine. *City of Blaine Website*. Retrieved from <http://www.ci.blaine.mn.us/>. October 2009.
- City of Little Canada. *City of Little Canada Website*. Retrieved from <http://www.ci.little-canada.mn.us/>. October 2009.
- City of North Oaks. *City of North Oaks Website*. Retrieved from <http://www.cityofnorth-oaks.com/>. October 2009.
- City of Shoreview. *City of Shoreview Website*. Retrieved from <http://www.ci.shoreview.mn.us/>. Sept 2009.
- City of Shoreview. *Demographics*. Retrieved from <http://www.ci.shoreview.mn.us/CityGovernment/Demographics.html>. 30 Nov 2009.

- City of Shoreview. *Wetland Inventory 2003*. Retrieved from <http://www.ci.shoreview.mn.us/publicworks/>. 28 Sept 2009.
- Corral-Verdugo, V., G. Carrus, M. Bonnes, G. Moser, and J.B.P. Sinha. 2008. Environmental beliefs and endorsement of sustainable development principles in water conservation. *Environment and Behavior* 40(5):703-725.
- Decision Resources, Ltd. 2005. *Shoreview Residential Quality of Life Survey*. Retrieved from <https://moodle.umn.edu/mod/resource/view.php?id=318159>. Sept 2009.
- Grass Lake Watershed Management Organization. *Grass Lake Watershed Management Organization Website*. Retrieved from <http://www.ci.shoreview.mn.us/GLWMO/index.htm>. Sept 2009.
- Hungerford, H., and T. Volk. 1990. Changing learner behavior through environmental education. *Journal of Environmental Education* 21(3):8-21.
- Knight, L. 2002. Network learning: Exploring learning by interorganizational networks. *Human Relations* 55(4):427-454.
- Kremen, C., and R.S. Ostfeld. 2005. A call to ecologists: Measuring, analyzing, and managing ecosystem services. *The Ecological Society of America* 3(10):540-548.
- Koehler, B., and T. Koontz. 2007. *Citizen Participation in Collaborative Watershed Partnerships*. Published online: 15 Nov. School of Environmental and Natural Resources, Ohio State University.
- Lewin, J. 2008. *18 Park Service Podcasts*. Retrieved from <http://www.podcastingnews.com/2008/07/29/18-park-service-podcasts/>. 30 Nov 2009.
- Nelson, K.C, S. Grayzeck, J. King, S. Hobbie, L. Baker, and J.P. McFadden. 2008. Our household choices in urban living survey, Twin Cities Household Ecosystem Project (TCHEP) University of Minnesota, St. Paul. PIs Baker, Hobbie, King, McFadden, and Nelson, supported by the National Science Foundation under Grant Nos. BCS-0709581 and DEB-0620652.
- Nelson, K.C., M.C. Monroe, J. Fingerman Johnson, and A. Bowers. 2004. Living with fire: Homeowner assessment of landscape values and defensible space in Minnesota and Florida, USA. *International Journal of Wildland Fire* 13:413-425.
- McKenzie-Mohr, D., and W. Smith. 1999. *Fostering Sustainable Behavior*. Gabriola Island, BC, Canada: New Society Publishers.
- Metropolitan Council. *Land Use Tables- Community Level* (Shoreview). Retrieved from <http://www.metrocouncil.org/metroarea/LandUse/Cities/RamseyCounty/Shoreview.pdf>
- Metropolitan Council. 2009. *Metropolitan Council Maps Website*. Retrieved from <http://gis.metc.state.mn.us/>. December 2009.

- Mississippi Nation River and Recreation Area. 2008. *Healthy River Healthy You*. Retrieved from <http://www.nps.gov/miss/hrhy.htm>. 30 Nov 2009.
- Overdeest, C., C.H. Orr, and K. Stepenuck. 2004. Volunteer stream monitoring and local participation in natural resource issues. *Human Ecology Review* 11(2):177-185.
- Rice Creek Watershed District. *Rice Creek Watershed District Website*. Retrieved from <http://ricecreek.org/>. Sept 2009.
- Shoreview Environmental Quality Committee. 2009. *2009 Shoreview Green Community Tour* (PDF/Adobe Acrobat). Retrieved from <http://www.shoreviewmn.gov/Communications/2009/GreenMap.pdf>
- Smetanka, M.J. 2009. Nature shapes the course of storm drainage. *Star Tribune*, pp. B1,B2, October 7.
- Sundeen, R.A., S.A. Raskoff, and M.C. Garcia. n.d. *Nonprofit Management and Leadership* 17(3):279-300
- Trumbo, G.W., and G.J. O'Keefe. 2001. Intention to conserve water: Environmental values, planned behavior, and information effects. A comparison of three communities sharing a watershed. *Society and Natural Resources* 14:889-899.
- US Census Bureau. *Population and Housing Narrative Profile 2005-2007*. Retrieved from http://factfinder.census.gov/servlet/NPTable?_bm=y&qv_name=ACS_2007_3YR_G0_NP01&-geo_id=16000US2759998&-gc_url=&-ds_name=&-_lang=en. Sept 2009.
- Vandnais Lake Area Water Management Organization. *Water Quality Monitoring Program*. Retrieved from <http://www.vlawmo.org/planning.cfm>. October 2009.
- Widner Ward, C., and A.E. Wilkinson. 2006. *Conducting meaningful interpretation; a field guide for success*. Golden, CO: Fulcrum Publishing.

Appendix A. Publications Assessment Questionnaire

The following questions were researched and evaluated for each publication we assessed:

1. Source:
2. Distribution method(s):
3. Advertisement method(s):
4. What other sources does the publication reference and how do they reference them?
5. What information, if any, is given about wetlands, water conservation, etc.?
6. Does it give information about actions to take or places to get involved? How is the information given?
7. Is there contact information to ask questions about information? How and where is the contact information given?
8. Additional notes:

Appendix B. Shoreview Wetlands Logo Prototypes

We designed a simple message to use in an educational wetlands campaign for Shoreview residents: Shoreview Wetlands, Our Water Our Future. The following are two logo prototypes for this campaign:



Logo 1. Color version of the Shoreview Wetlands logo prototype.



Logo 2. Black and white version of the Shoreview Wetlands logo prototype.

Appendix C. Recommended Links and Information for the Shoreview Website

The following links are appropriate for adults:

Blue Thumb

<http://www.bluethumb.org/>

The Blue Thumb Website is an excellent resource for anyone interested in helping to improve surface water quality. For property owners there is information about how to install native gardens, raingardens, and shoreline stabilization, as well as information about where to get the materials and plants. For everyone, Blue Thumb offers a variety of ways to get involved such as helping with a project, adopting a project, helping with public outreach, donating, and partnering.

Grass Lake Watershed Management Organization

<http://www.glwmo.org/>

The Grass Lake Watershed Management Organization Website offers information about the organization's plans, projects, upcoming meetings, and members, as well as links to other agencies' websites that are involved with water quality.

Minnesota DNR, Wetlands Page

<http://www.dnr.state.mn.us/wetlands/index.html>

The Minnesota DNR wetlands webpage describes what wetlands are, their benefits, Minnesota wetlands policy and regulation, and how to help wetlands.

Ramsey-Washington Metro Watershed District

<http://www.rwmwd.org/>

The Ramsey-Washington Metro Watershed District Website presents a wealth of information about their permit programs, educational programs, monitoring programs and cost share programs. The Website also offers information on their management plans, provides maps, and links to their Stormwater Pollution Prevention Plan.

Rice Creek Watershed District

<http://ricecreek.org/>

The Rice Creek Watershed District Website provides information on the watershed district's rules, permits, policies, and management, as well as information about grants and other resources available for installing and implementing Best Management Practices (BMPs) for surface water quality.

The University of Minnesota Extension Services, Minnesota Wetlands Page

<http://www.mnwetlands.umn.edu/>

The University of Minnesota Extension Services is charged with public outreach for a number of educational needs including wetlands and water resources. The Minnesota

Wetlands Website provides detailed information and education about wetlands facts, policy, managing agencies, and wetland delineation certification.

Vadnais Lake Area Water Management Organization

<http://www.vlawmo.org/>

The Vadnais Lake Area Water Management Organization Website gives information about wetland permits, maps, and current projects and planning. The Website also offers information about their programs including a water quality monitoring program and a cost share program for property owners that install raingardens or restore shoreline vegetation.

The following are fun and educational sites that are appropriate for kids:

The Bell Museum of Natural History, Bell LIVE!

<http://www.bellmuseum.org/distancelearning/watershed/watershed2.html>

Fun activities to learn about watersheds and actions you can do to protect our precious water resources!

Iowa State Wetlands Kids Page

<http://www.ag.iastate.edu/centers/iawetlands/About.html>

What is a wetland? Find out all about these remarkable ecosystems, find fun activities to learn about wetlands, and get the low-down on some good books about wetlands!

U.S. Environmental Protection Agency, Watersheds for Kids

<http://www.epa.gov/owow/kids.html>

Resources and links to fun wetland and watershed activities that help understand where our water comes from and how to protect it!

Appendix D. Wetland and Water Quality Brochure Prototype

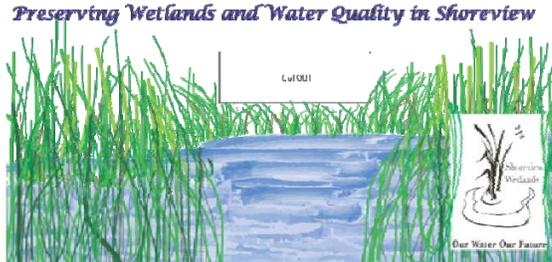


78% of Shoreview residents want to preserve the natural landscape.
 Shoreview's landscape is 21% wetlands and open water bodies and 46% residential development.
 82% of Shoreview households fertilize their lawns.**

Proper fertilization of your lawn can prevent degradation of water quality.

Steps for Preserving Wetlands and Water Quality Simple Steps Around Your Home...

- Lawn Care**
- 1. Fertilizing**
 Soil Test - This step is the most important part of the fertilization process.
 * Available at most home centers, lawn care and maintenance stores for \$15-\$20.
 * Ammonia to Acidity - Fertilizer application should be based on the results of a two-year lawn test.
 - 2. Mowing** - remove only the top 1/3 of grass.
 * Enables you to leave grass clippings on lawn, returning nutrients to soil.
 - 3. Watering** - apply only when needed.
 * Grasses lawns only require 1 inch of water per week.
 * Most lawn sprayers apply 1/4 to 1/2 inch of water per year.
- For more information about fertilizer practices, watering practices, and mowing practices that preserve water quality and save you time and money visit <http://www.waterqualitymn.com> and click the lawn link.



Taking Your Actions Further...

Native Gardens are 100% drought resistant and climate resilient.
 * Require less frequent watering and maintenance.
 * Require less fertilizer.

Rain Gardens slow surface water runoff, increase infiltration, and filter out nutrients.
 * Help reduce the amount of runoff from impervious surfaces.
Buffer or Riparian Strips stabilize shorelines, reduce the volume of surface water runoff, filter out nutrients, and filter out sediment entering the water.
 * Most effective at widths of 10 feet or greater.
 * Include plantings or natural vegetation growth.

For more information and resources for native gardens, rain gardens, and buffer strips including how to's and where to purchase the plants in your area visit <http://www.lawnand.org>

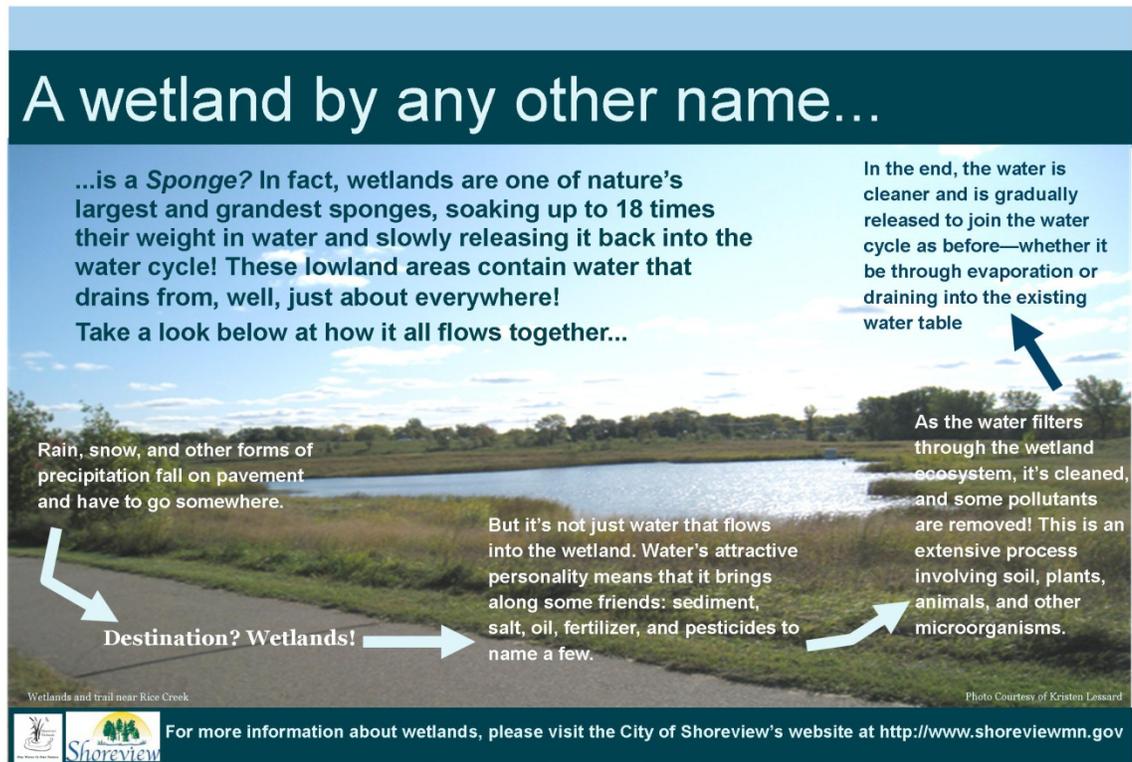
Prototype of the outside of the brochure (left). Prototype of the inside of the brochure (right).

Included in this report are hard copies of the brochure prototype (see report pocket) and editable files of the brochure prototype in Adobe Illustrator (see CD version with report files).

Appendix E. Interpretive Sign Prototypes

During our pilot test, all but one interviewee said the signs were attractive and that they would stop to look at the signs along wetland trails (n=22). In general, visitors enjoyed the real photos of local areas and wildlife. Some constructive feedback provided by residents included issues with readability of text, and we took this into consideration while making edits to the prototypes.

As experienced producers of interpretive materials knowledgeable in sign design techniques, we placed value on the opinions of National Park Service rangers working at the Mississippi National River and Recreation Area. Overall, the signs received positive feedback. The readability and layout of all three signs received only positive feedback, suggesting that the format of these prototypes would be an effective form of communication. Some of the rangers offered some constructive criticisms on word choice and content of the text. These suggestions included making the answer to the question “Is it a Storm Water Pond?” in the Storm Water Pond prototype (Sign 2), and to eliminate the use of first person language in the Wetland Wildlife prototype (Sign 3). We completed these edits and produced the following revised sign prototypes:



Sign 1. Interpretive Sign Prototype: Wetlands are Sponges.

Is it a Storm Water Pond?

Storm water ponds are manmade wetlands!
An important part of the watershed system, they catch storm water run-off and naturally filter out pollutants.

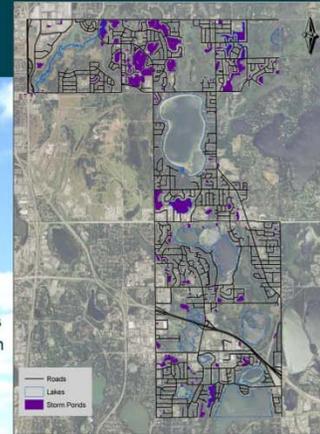
Why Storm Water Ponds?

Taking on the function of a natural wetland, storm water ponds collect water from storm drains and slowly release it back into the system. Common pollutants found in storm water include:

- Fertilizer
- Litter
- Pesticides
- Animal Waste
- Oil

Shoreview's Storm Water Ponds

In **purple** are the neighborhood ponds strategically placed in developed areas to soak up run-off



Storm Water Pond along Rice Creek Trail Corridor

Photo courtesy of Kristin Lazard



For more information about storm water ponds please visit: The City of Shoreview's website at <http://www.shoreviewmn.gov>

Sign 2. Interpretive Sign Prototype: Storm Water Ponds.

What's Living in Our Wetlands?

Wetlands are a great place to see wildlife!

It might look like a simple drainage spot, but this wetland is teeming with life! Animals living in and around wetlands depend on it for food, shelter, and nesting habitat. Discover the many plants and animals that call marsh ecosystems like this one home!



Cattails, staple of a wetland

Cattails are synonymous with wetland habitat. They provide creatures like muskrats and ducks with food and shelter, and are often home to fascinating creatures like redwing blackbirds! Cattails function as part of the wetland filter that purifies water by absorbing pollutants and preventing erosion!



Did you Know?

43% of threatened or endangered species in the U.S. depend on wetlands!



Want to learn more about Wetlands? Check out the City of Shoreview website at www.shoreviewmn.gov

Sign 3. Interpretive Sign Prototype: Wetland Wildlife (*Please note that the images and graphics used in third sign are not public domain).

Appendix F. Initial Connections for Collaborative Educational Programs

Contact Name and Information	Position, Organization	Possible Contribution
Chase Davies CCDavies@aol.com	Environmental Educator, Presbyterian Church of the Way	Lead Programs, promote events within organization
Karen Eckman kECKMAN@comcast.net 651-483-8460	Chair, Sierra Club Green Communities	Promote events within organization, provide material and volunteer resources
Dawn Flinn Dawn.Flinn@state.mn.us	DNR Education Coordinator Minnesota DNR	Lead Workshops, promote events within network, provide material and volunteer resources
Dawn Pape dpape@rice.org 651-774-2597	Environmental Educator, Rice Creek Watershed	Provide resource materials, promote Shoreview programs, possibly lead events
Scott Ramsey Sramsey@cityofrichfield.org 612-861-9342	Naturalist, Wood Lake Nature Center Shoreview Resident	Provide information and guidance on creating a class/workshop and possibly lead a component of a class/workshop. (Available weeknights only)
April Rust, April.rust@dnr.state.mn.us	Project WET coordinator	Provide resource materials, training to educators

Appendix G: Possible Workshop Themes

The following are possible educational workshop themes:

- Native planting and rain gardens: How to landscape to benefit water quality
- Fertilizer, Buffer zones, and Wetlands: How to improve wetland quality in your backyard
- Is it a storm pond? What are storm ponds and why do we have them?

Seeing as these are very practical topics, a hands-on, experiential learning approach would be best suited for these workshops.

The intention of a native planting workshop would be to help residents understand the importance of native landscapes for the larger wetland ecosystem and, more practically, how to incorporate native plantings in their own yards. This program would be aimed toward residents interested in their own impact on wetland quality, as there is already interest among homeowners in understanding their impacts. The workshop could manifest itself in many forms, there could be a variety of plants for residents to see, interact with, and ask questions about. The plants could be used for demonstrations of how and where to plant them, as in the model rain garden tour in Shoreview (Shoreview Green Community 2009).

Since homeowners with wetlands on or adjacent to their properties have been identified as a key audience, a workshop about fertilizer use and other land care issues could help them improve their landscaping behavior. On the theoretical level, this workshop would outline the big picture of how the private, residential lawn is a part of a larger drainage system. There are many misconceptions about how to best care for lawns, while maintaining an aesthetically pleasing look, and whether or not fertilizer is really harmful. This workshop would provide an opportunity to turn these misconceptions around, and show homeowners what fertilizer to use, where to get it, and how to use it. Other topics could include importance of buffer zones and taking care of lawn clipping and leaves.

The last class would provide an opportunity for residents to connect with the landscape they value so much in their city. This could be done as a nature walk, perhaps through one of the city parks and/or in the vicinity of one of the open space areas, to educate residents about what wetlands are and why they are valued for more than just aesthetics. The intention of this class would be no more than to simply increase appreciation for wetland ecosystems through understanding all the components of a healthy watershed.

Appendix H. Citizen Water Monitoring Program through the MPCA

The Minnesota Pollution Control Agency (MPCA) has a Wetland Health Evaluation Program (WHEP) which uses data collected by volunteers to assess the water quality of a wetland. The MNPCA has found the best indicator of wetland water quality to be the presence and abundance of certain invertebrates and plants. We spoke with Mark Gernes about the logistics of involving Shoreview with this program. Mark was able to give some insight on how Shoreview could get involved including what the program entails, costs, necessary equipment, trainings, and contact people.

Getting Involved:

- Currently WHEP works with volunteer teams in Dakota and Hennepin Counties but would like to expand to include other counties. Each county has a coordinator which works with cities, each with their own Teams of volunteers. Ramsey County does not yet have a coordinator. Shoreview could contact the Soil Water Conservation District and request that they employ someone to be the County coordinator. This may be more effective if Shoreview asked neighboring cities in the county if they also had an interest in the program.
- Another option is that Shoreview may have a leader that would coordinate the program. The leader could be a volunteer or be paid a small stipend of a few thousand dollars for their work. The leader is responsible for handling equipment, and locating a lab facility for invertebrate samples. The equipment for the teams is purchased by the county.

Contacts:

Name	Position/Agency	Phone Number
Mark Gernes	Minnesota Pollution Control Agency	651-757-2387
Mary Karius	Hennepin County Coordinator	612-596-9129
Paul Liepold	Dakota County Coordinator	952-891-7117

*Mark recommended that Mary and Paula would be good people to speak with while planning.

The Basics of WHEP:

- WHEP participants monitor six wetlands. Generally they monitor four wetlands in their immediate area and two in an outside community; this is so the PCA can compare the results of different teams.
- Teams are made up of 2-16 Volunteers who monitor plants and invertebrates. Samples are collected and analyzed, and a report is written and sent to the PCA. Some cities contract a private consultant to write the report.
- The MPCA holds field trainings in the spring; there is an Identification refresher course and intro to WHEP, a six hour Invertebrate ID course, a six hour plant identification course. These are volunteer trainings. Volunteers can choose to focus on plants, invertebrates or both depending on their interest and time frame. If a volunteer takes all trainings it is about a 17 hour commitment.
- The time involved in collecting the data if a volunteer goes on all collection trips is about 20-25 hours.
- Mark said that generally volunteers tend to continue working with the project for 2-3 years before moving on.

The following website is a great resource for more detailed information:

- WWW.mnwhep.org

Estimated Costs:

The cost of the program varies depending on the city's available resources. Mark was able to give a rough estimate for program costs.

Total cost of the program is estimated to be around \$10,000, however, this price is negotiable as some of the equipment can be homemade or the city may already have access to necessary resources.

The Total Price Includes:

- Team leader stipend
- Lab rental from high school with microscope access
- Hiring a consultant to make sure data was collected correctly and to write the reports

\$300-\$400 for invertebrate monitoring materials:

- Preserving alcohol (\$100)
- Sorting trays (possible to make)
- Waders and nets
- Invertebrate traps (possible to make)

\$50-\$100 for plant monitoring materials:

- (2) 15 yard tape measures
- (4) 8' garden stakes