

NATIVE SHORELAND BUFFER INCENTIVES (NSBI) PROJECT
FINAL REPORT- Social Research and Efficacy Outcomes

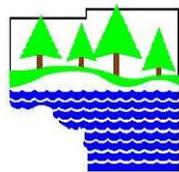
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EXECUTIVE SUMMARY

1. The Native Shoreland Buffer Incentives (NSBI) project was successfully completed in November 2011 by East Otter Tail and Itasca counties, with support from the Minnesota Department of Natural Resources and the University of Minnesota Water Resources Center (WRC). NSBI focused specifically on fostering the adoption of vegetative buffers on private shorelands. Core questions were: (a.) do financial incentives work to motivate adoption of shoreland buffers? And (b.) are financial incentives sustainable? The NSBI featured a social science research component to test the efficacy of different incentives and strategies to motivate property owners to adopt lake and wildlife-friendly practices and treatments. This report addresses the social science research and efficacy findings of the NSBI.

2. Social science research was used in the NSBI to test the core questions, including pre/post project knowledge, attitudes and practices (KAP) studies. These were not county-wide surveys, but sent to specific demographic samples in each case. We discovered that:

a. Lakeshore property owners have relatively high knowledge of water quality, and good understanding of the connections between their shoreland practices and lake condition. However, many did not perceive long-term trends in water quality in the first survey.

b. Lake stewardship values and concern about clean water are extremely important for property owners in both counties, as is a sense of legacy in East Otter Tail County, where the majority of properties have been held by families for several generations.

c. Lake associations are the most important source of water quality and shoreland information and are critical in conveying messages to property owners. They are clearly important vehicles for social networking, communicating conservation messages and practices, and for organizing outreach activities. Informal lake-based social networks were also seen as key to disseminating conservation messages on a neighbor-to-neighbor basis.

d. By project midpoint we had solid social research data that was used to design outreach messages and to identify potential participants. 2009 KAP study results found a strong preference for “high-touch” outreach, particularly for on-site technical support. Cost-shares were ranked as least important by property owners in motivating adoption of BMPs.

3. Prototype Tools:

The NSBI tested several innovative, people-centered engagement, education and evaluation tools. Most were based upon research on expressed local preferences and needs. The prototype tools included:

a. Social research and evaluation: pre/post KAP studies and other qualitative methods (the “boat-by;” a focus group; and key informant interviews);

b. The Itasca County Lake Challenge (ICLC);

c. The Otter Tail County Lakeshore Landscaping Manual;

d. Shoreland buffer design templates in Otter Tail County; and

e. Outreach approaches based on peer-to-peer messaging and social networks.

These prototype tools were largely successful in assisting shoreland professionals in project design (e.g. social science research/evaluation); engaging and motivating property owners (peer-to-peer messaging and social networks); and in delivering message content (ICLC; landscaping manual; design templates).

4. Efficacy Findings:

- a. Based upon the 2009 data, Itasca and Otter Tail counties offered a variety of incentives to lakeshore property owners in 2010 and 2011 to motivate them to adopt and maintain shoreland buffers. The incentives included financial incentives (cost-shares); non-financial incentives (planting materials, labor, technical advice); and a variety of education/outreach options (workshops, on-site technical support, guidebook, Itasca Lake Challenge, etc.).
- b. The project examined the efficacy of the various incentives in motivating lakeshore property owners to adopt and maintain natural shoreline buffers to improve water quality. The conventional wisdom is to offer incentives to motivate people to participate. It was conclusively shown in these two cases that financial incentives such as cost-shares do not motivate people to adopt shoreland conservation practices. Not one property owner adopted a shoreland best management practice as a result of being offered a financial incentive.
- c. The most effective means of motivating people to adopt and maintain a buffer in these two counties are the “medium” and especially “high touch” approaches, defined as direct and frequent contact with a natural resources professional. This was reinforced by peer-to-peer networks and activities that were focused on “our lake,” on the finding that property owners have a strong identify and affinity for a specific lake, and like to associate with others from that lake.
- d. Not enough time has passed to determine whether a high-touch engagement strategy is more sustainable than other options to which it can be compared.

5. Conclusions and Recommendations:

- a. We learned that medium to high touch engagement strategies; customized messaging based on expressed preferences; and peer-to-peer networking work best to motivate BMP adoption in the Itasca and Otter Tail demographic samples.
- b. Financial incentives were shown to be the *least* efficacious in motivating shoreland conservation practices in these two cases. Public resources intended to promote shoreland conservation practices may be more effective if invested in professional staff to interact directly with property owners, than if invested in cost-shares for these two demographic samples.
- c. We caution that we identified dissimilarities in the two pilot counties that warranted different approaches to education, outreach and incentives. This highlights the need for basic social science research on *local* audiences upon which to design customized messages to best meet *local* needs and preferences. One size does not fit all, and will not have uniform efficacy.
- d. The NSBI team has summarized the key elements needed to sustain the most efficacious shoreland conservation measures into the future, and have framed the basic elements for a follow-on program for DNR internal review.
- e. The NSBI uncovered several promising areas that warrant further investigation and research. These include testing of the NSBI prototype tools and approaches elsewhere in Minnesota; a wider exploration of owner constraints and barriers; owner perceptions of what constitutes a “natural” shoreline; and longer-term sustainability of the current NSBI activities.

ACRONYMS

BMP	Best management practice
CATA	Check-all-that-apply
COLA	Coalition of lake associations
COOR	Check-only-one-response
DNR	Minnesota Department of Natural Resources
EOT	East Otter Tail (County)
EOTSWCD	East Otter Tail Soil and Water Conservation District
EPA	United States Environmental Protection Agency
GD	General Development (lake class)
HLRI	Healthy Lakes and Rivers Initiative
ICC	Itasca Community College
ICOLA	Itasca Coalition of Lake Associations
KAP	Knowledge, Attitudes and Practices
KAXE	Grand Rapids-based public radio station
LCCMR	Legislative-Citizen Commission on Minnesota Resources
LGU	Local government unit
MNENRTF	Minnesota Environment and Natural Resources Trust Fund
OHWL	Ordinary high water line
OMB	Office of Management and Budget
<i>n</i>	number
NE	Natural Environment (lake class)
NSBI	Native Shoreland Buffer Incentives Project
Q	question
RD	Recreational Development (lake class)
SPA	University of Minnesota Sponsored Projects Administration
SWCD	Soil, water and conversation district
TMDL	Total maximum daily load
UMN	University of Minnesota
WRC	University of Minnesota Water Resources Center

I. INTRODUCTION

Minnesota's lakes are affected by shoreline development, in that recreational properties can increase the amount of runoff and pollutants entering that water body. This occurs when impervious surfaces (roofs, driveways, roads, patios) are created near-shore. Replacement of native vegetative cover along lake shorelines with lawns can also impair water quality by concentrating and directing untreated stormwater into the lake. The EPA National Lakes Assessment (http://water.epa.gov/type/lakes/lakessurvey_index.cfm) indicates that alteration of shoreland habitat (*i.e.*, "riparian buffers" or "filter strips") is the major stressor on lakes in the United States. How lakeshore property owners use and alter their shorelines can have a direct impact on water quality. Adopting and maintaining natural vegetative areas at the water's edge (sometimes called a "buffer") can contribute to water quality by trapping sediment and stormwater before it can enter the lake at the shoreline.

Recently, a great deal of attention has been given to promoting sustainable environmental behaviors through social marketing (or, "community-based social marketing"). The science of social marketing derives from the advertising and public health arenas, where market research and message framing has been used to promote healthy lifestyles (*e.g.*, smoking cessation programs, increased physical activity). Social marketing campaigns have been adopted by several local government units (LGUs) in Minnesota, Wisconsin and elsewhere to promote the adoption and maintenance of recommended best management practices (BMPs) for private shoreland areas. Other LGUs have used experiential or social learning approaches in working with lakeshore property owners. However, the reasons why property owners are either inclined or disinclined to adopt shoreland buffers are not well understood. Here we have begun to initiate trial programs in Minnesota to better understand the social dynamics and real or perceived barriers to maintaining or re-establishing native shoreland buffers. Broader underlying themes, such as the sustainability of financial incentives to motivate property owners to adopt a BMP, are also being examined by natural resources professionals.

II. THE NATIVE SHORELAND BUFFER INCENTIVES (NSBI) PROJECT

The Native Shoreland Buffer Incentives (NSBI) project was proposed in 2007 by the Minnesota Department of Natural Resources (DNR) to the Minnesota Natural Resources and Environmental Trust Fund (MENRTF). It was accepted by the Trust Fund Commission, which recommended the proposal to the Minnesota State Legislature, and funded in 2008 for \$225,000 as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR) and described in M.L. 2008, Chap. 367, Sec. 2, Subd. 4(f).

NSBI specifically targets lakeshore property owners who control the condition of their shoreline and septic systems. The primary objective of the project was to protect native vegetation buffers along Minnesota shorelines. The project goal was to develop, implement, and evaluate the efficacy of several substantially different LGU engagement models for incentivizing the adoption and maintenance of native shoreland buffers. The project scope combined both social

science and natural resources activities. The program has run for three years (July 2008 – June 2011).

Intended outcomes of the NSBI program were:

- 1) A workshop and ongoing consultation services to build capacity for prospective local governmental applicants on how to design incentive programs that elicit sustainable behavioral change;
- 2) Two trial buffer incentive programs models;
- 3) Interim and final reports on program efficacy; ¹
- 4) DNR technical and assessment support on the effectiveness of trial program buffers.

Measures of success:

This project would be considered successful if:

- Two buffer incentive programs (chosen by competitive process) are developed, implemented, and evaluated by June 2011;
- The MNRETF is satisfied with the final efficacy report, and the report is helpful to others considering incentive-based approaches to shoreland stewardship;
- Involved stakeholders have increased their skills and knowledge as a result of the project;
- The DNR and other interested parties can readily benefit from the lessons learned from the trial programs.

The project was led by the DNR, with a subcontract awarded to the University of Minnesota Water Resources Center (WRC) for the social research component. DNR entered into a two-year contract with the Sponsored Projects Administration (SPA) at the University of Minnesota (UMN), whereby WRC would provide professional and technical support services through Dr. Karlyn Eckman, a researcher with expertise in evaluation research and social impact assessment for non-point source pollution (and other environmental) projects.

A competitive grants process was organized by DNR, which led to the identification and selection of two LGUs with innovative ideas for testing the acceptability of shoreland buffers with property owners. Of the thirty-five LGUs that submitted letters of interest to the NSBI Program in September 2008, twenty-two attended (42 LGU staff in total) a pre-application workshop in October 2008. The workshop, called *Working with Your Target Audience*, was conducted by DNR in collaboration with the WRC. The workshop was developed on the basis of WRC's research documenting that 88% of water quality projects in Minnesota are never evaluated, because local project staff lack capacity and resources for evaluation, particularly in determining impacts on intended audiences (Eckman *et al* 2008). The workshop integrated group exercises, presentations and small group discussions about audience analysis, information needs and gaps, and practical social evaluation tools. Based on feedback from participant evaluations, the workshop was successful in helping applicants define information needs about their target audiences and in assisting LGUs lay out practical strategies for planning and evaluating their proposed incentive projects.

¹ This was later amended to a final report that addressed efficacy of the LGU incentives strategies.

Following the workshop, applications were submitted to the program in December 2008. A grant review committee evaluated the applications and chose Itasca and Otter Tail counties for pilot programs. The reviewers felt that the Itasca County and East Otter Tail County (EOT) proposals presented the highest likelihood of success based on their description of local capacity to carry out the program. To arrive at this conclusion, proposal reviewers ultimately participated in three meetings, sought clarifications in follow-up letters to applicants, and conducted two telephone interviews with the finalists. Reviewers also felt these two counties had the ability and openness to adapt their proposals based on the social science learning that would take place as a result of the pre-incentive social science research. While on the surface, both are “lakes areas” with high projected population growth, the underlying land use types are different—Otter Tail being more ag-based and Itasca being more mining/timber-based. The proposed scope of each program was different as well, with Itasca County choosing to focus its efforts on five target lakes and Otter Tail choosing to focus on a selected demographic/lot width throughout the entire county. Each trial program also had a different project management approach and preliminary incentive offerings.

In December 2008 the DNR awarded two \$75,000 NSBI grants to East Otter Tail and Itasca counties. These grants supported local governmental units² in their efforts to offer incentives to private landowners to maintain or restore native vegetative buffers along shorelands of lakes, rivers and streams. The program also offered technical and research assistance for the design, implementation and evaluation of the locally designed shoreland incentives programs. The program has since run for three years (July 2008 – June 2011), and included two field seasons for implementation and evaluation (spring 2009 through fall 2010). Due to the July 2011 state government shutdown and delays in contracting, the NSBI was extended through February 2012.

² LGU project leads in each county were Steve Henry, EOT Shoreland Specialist; and Dr. Mary Blickenderfer, MN Extension in Itasca County.

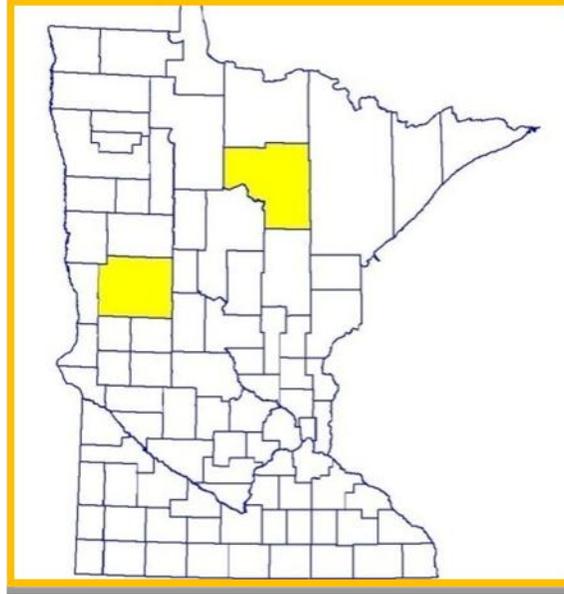


Figure 1: Location of Itasca and East Otter Tail Counties
(Itasca is in north-central Minnesota; East Otter Tail is in west-central Minnesota)

Each county stated its goals and objectives as follows:

Purpose of the Itasca NSBI project:

This project will compare the effectiveness of both 1) standard strategies (local media/direct mailing) vs. trained peer-messengers and 2) lake association vs. non-lake association influence for recruiting property owners to install/maintain buffers on 4 lakes: Turtle (RE) and Johnson, Horseshoe and Mike (all NE). Owners will select from tiered buffer strategies (natural, no-mow, hybrid, planted) and incentive options. Train-the-trainer workshops for Master Gardeners and ICC students will increase local capacity to assist shoreland owners with buffer design, installation and maintenance. Buffer research³ will evaluate efficacy of county shoreland buffer standards to reduce run-off (and pollutants) and increased biodiversity of shorelines. Project effectiveness will be measured by pre-and post-project knowledge, attitudes and practices (KAP) surveys and whole-lake shoreline assessments.

Purpose of the EOT project:

This project targets owners of larger lots (greater than 120 feet of shoreline) in the 50- to 70-year old age demographic with outreach materials and incentives to restore or maintain native shoreline buffers. Targeted shoreland homeowners will be invited to attend tours, open houses and workshops, and will be offered opportunities and incentives to establish large, attractive and sustainable shoreland buffers on their sites. The project will also document changes in public knowledge, attitudes and perceptions (KAP) through pre- and post-implementation research, evaluate established buffer quality, and disseminate all results and developed materials through the eotswcd.org web site.

³ This research was conducted by Itasca County and is summarized in the 2011 Itasca County NSBI Final Report.

For Deliverable 2 (model incentive program trials), contracts with work programs between the DNR and both county's Soil & Water Conservation Districts (SWCDs) were approved and signed after consulting with LCCMR staff on their content (Otter Tail, effective date 3/20/09; Itasca, effective date 4/9/09). Both counties also worked with DNR to test a lake-wide shoreland assessment tool as part of the program's commitment to evaluating efficacy of restorations and their incentives' programs. Both counties used GIS data to help identify both targeted landforms and specific characteristics of target audiences.

Both counties committed to a social research component that investigated the awareness and behaviors of lakeshore property owners. The project partners (DNR and WRC) provided technical assistance to LGUs in the design, administration, implementation and evaluation of the trial incentive programs. Barriers and constraints to adoption of shoreland buffers were also explored. One social research tool employed in both Itasca and East Otter Tail counties was the *knowledge, attitudes and practices (KAP) study* described in Eckman (2010 and 2011).

This final report (Deliverable 3) concerns the social research and efficacy aspects and social outcomes of the NSBI project, gives an overview of project accomplishments and lessons, and draws conclusions about the efficacy of the different strategies tested in each county. Each LGU has also submitted a separate final report detailing the deliverables and activities for Itasca and East Otter Tail counties.

It should be noted that unfortunate administrative delays in processing contracts in 2008, 2009 and 2010, combined with the 2011 state government shutdown, severely handicapped the social research elements of the NSBI. The administrative delays and work stoppages caused frequent interruptions in field work, leaving insufficient time for data analysis at the end of the grant. As a result, there has been limited time in which to prepare this report and the NSBI final/efficacy report. Nevertheless, valuable lessons and findings have been gained and are summarized in this report.

III. TESTING INCENTIVES MODELS IN THE NSBI

A. Why Evaluate Social Outcomes in Water Quality Projects?

The NSBI included a strong social evaluation component in each county, and from its beginnings was designed to be "evaluation-ready."⁴ There has been increased demand for social evaluation of water quality projects in recent years. In October 2009 the Office of Management and Budget (OMB) issued a policy directive to Federal agencies requiring social evaluation of Federal programs. Projects funded through Section 319 of the Clean Water Act may soon be required to evaluate social outcomes, and the Environmental Protection Agency and various Minnesota state agencies are preparing monitoring and evaluation indicators that include social metrics. The Minnesota State Legislature is demanding more accountability for public funds that are invested

⁴ An evaluation-ready project is designed at the outset to have clearly measurable outcomes, a schedule for collecting monitoring data, and a practical evaluation workplan and budget before the project is implemented.

in water quality efforts. Finally, there has been increased publicity in the past year on high-profile water quality projects funded with public resources. In sum, project managers and public agencies are under increasing pressure to demonstrate results in efforts to improve water quality in Minnesota. These results include the diffusion, adoption and maintenance of recommended practices.

What are “social outcomes?” There are of course a large number of possible social outcomes associated with any environmental project. It would be very time-consuming, expensive and probably not very fruitful to attempt to measure broadly-defined socio-economic issues associated with lake water quality. Therefore, the NSBI project has focused on the *minimum* social constructs necessary to document change in a positive or negative direction. Social science research is costly, and therefore we investigated only the following necessary and sufficient outcomes:

- Does an audience increase their *knowledge* about a particular water problem?
- Do their *attitudes and opinions* shift in a positive direction?
- Does the audience *adopt a recommended practice, and do they maintain that practice over time?*
- Are *barriers or constraints* to adoption (or project participation) addressed?

These basic changes in knowledge (K), attitudes (A) and practices (P) form the core elements or constructs for evaluating the outcomes of the NSBI project. These core elements are the main constructs evaluated in the knowledge, attitudes and practices (KAP) study method. We also investigated whether audience barriers and constraints to adoption existed, with a view to taking steps to address them.

One final question on social outcomes remains: Can social actions be linked to biophysical improvements in water quality? The state of evaluation research and of human dimensions research in water quality is still in its infancy, and some researchers are developing and testing new tools and methods to assess social outcomes. At this point in time it is difficult to link social outcomes with biophysical improvements in water quality, and much work remains to achieve this task.

B. Motivating the Adoption of BMPs: Strategies and Incentives

There are many social theories of human behavior (e.g. conscientization⁵, social cognitive theory⁶, social learning theory⁷, the theory of planned behavior⁸, etc.) that have been applied to the human dimensions of natural resources. Recently, a great deal of attention has been given to promoting sustainable behaviors through social marketing⁹ (or, “community-based social marketing”). The practice of social marketing originated in the advertising world and has been applied in the public health arena, where market research and message framing has been used to

⁵ Freire 1970.

⁶ Miller and Dollard 1941; Bandura 1977; McAlister *et al* 2008)

⁷ Bandura 1977.

⁸ Ajzen 1975.

⁹ McKenzie-Mohr 2011; Wilbur 2006.

promote healthy lifestyles (*e.g.*, smoking cessation programs, increased physical activity). Many policy-makers and project managers have introduced social marketing and incentives to induce a targeted audience or community to adopt a recommended best management practice (BMP).

This project was not designed to test these academic theories, but rather to contribute to identifying practical approaches and strategies that yield the most positive outcomes in the adoption of shoreland practices in two Minnesota counties. Specifically, the project examined the efficacy of various types of incentives in motivating lakeshore property owners to adopt and maintain natural shoreline buffers to improve water quality. Conventional wisdom is to offer incentives, especially financial incentives such as a cost-share, to motivate people to participate. However, some natural resources professionals question whether a financial incentive is the most effective and sustainable means of fostering adoption and maintenance of a recommended practice or behavior. It is thought that other types of incentives (planting materials, technical assistance or labor assistance, or social recognition, for example) might be as effective as a financial incentive.

Consequently, we explored the following over-arching questions in the NSBI:

- ▣ Do financial incentives work in the case of buffer adoption and maintenance? Does the recommended behavior cease when the financial incentive stops? Are other types of incentives more effective?
- ▣ How can we engage local stakeholders more effectively? (*e.g.* social marketing, neighbor-to-neighbor communication, etc.)
- ▣ What impact are we having on our target audiences? How do we know what that impact is? Do audiences improve their knowledge, shift their attitudes, and adopt and maintain new practices as a result of the project?

Fundamentally, we wanted to learn whether outreach strategies (or “touch”) with frequent and direct contact with their audiences would have greater impact than strategies with less frequent and less direct contact. We also wanted to learn which incentives were more effective, and why. We hoped to identify those incentives with the best potential to stimulate adoption and maintenance of shoreland buffers. Therefore, the NSBI compared the relative acceptability of the various incentives being provided to property owners to install and maintain shoreland buffers. The NSBI timeframe is not long enough to assess whether buffer maintenance relative to various incentives is sustainable.



*Photo 1: Different perceptions of what a shoreline should look like on adjoining properties
(Newly-installed shoreland buffer at left; sand blanket on the right)*

On another level, we also considered whether the NSBI incentive and outreach model can be sustained by the counties in the future. Efficacy and cost-effectiveness are critical considerations given the current economic climate of reduced resources to local governments.

C. Strategies and Incentives in the NSBI: Which were tried and why?

We recognized that Otter Tail and Itasca counties had different characteristics, and that the populations targeted by NSBI also differed (see Table 1 below):

Table 1: Comparing the EOT and Itasca NSBI Projects

Otter Tail County (EOT)	Itasca County
LGU-based	Partner-based
Main local expert: County shoreland technician	Main local experts: MN Extension and Master Gardeners
Scope: County-wide	Scope: Five lakes
Demographic: 44-70 age; frontages >120 feet	Demographic: Non-specific but targeted properties with \$10,000 in improvements
Land type: Transitional eco-region	Land type: Forested eco-region
Lake class: All lake classes	Lake class: RD and NE lakes
Approach: high, medium and low touch; peer-to-peer; training of trainers	Approach: high, medium and low touch with tiered incentives; peer-to-peer; training of trainers
Project cost: \$75,000	Project cost: \$75,000

We noted that these populations and regions were not uniform, and their demographic characteristics were different. We also noted that LGU staff might need to customize their approaches depending upon local audience preferences and priorities. To better understand these audiences, the first stage of social research was carried out using the KAP study method (described below) to identify specific audiences, to determine local barriers and constraints, identify incentives, and evaluate social outcomes.

East Otter Tail County preferred a lake-specific program with five to eight key locals. EOT staff also developed a buffer template plan where owners could select a buffer style that appealed to their tastes and lifestyle (including the amount of maintenance required). The EOT program “piggybacked” on the Healthy Lakes and Rivers Partnership (HLRI) of the Initiative Foundation, setting up a workshop series for residents on Pickle, East and West Battle lakes (the later two through HLRI). Additionally, EOT targeted owners who had already done shoreline restoration.

Table 2: East Otter Tail County Program Elements

- * Template-based buffer designs
- * Shoreland buffer guidebook based upon KAP #1 findings (*Otter Tail County Lakeshore Landscaping Manual*)
- * High touch: workshops and on-site visits to properties
- * Medium-touch: workshops
- * Low touch: newsletter mailings and guidebooks
- * Peer-to-peer communication
- * Collaboration with lakeshore associations
- * Evaluation/social research (Pre/post KAP studies; participant interviews)



Photo 2: Steve Henry with a “high-touch” property owner in EOT County

Itasca County expanded the number of local experts (SWCD, Master Gardeners, peer-to-peer) available to assist lakeshore property owners. Although Master Gardeners were proficient in

gardening, most did not understand the functions and design of shoreland buffers and needed to be trained in buffer design and shoreland installations.

Table 3: Itasca County Program Elements:

- * Itasca County Lake Challenge (template and website)
- * Lake Challenge workbooks (tested by Master Gardeners and students)
- * Lake Challenge activities (workshops and citizen research)
- * Public workshops (fish, frog, etc.)
- * Peer messengers
- * Collaboration with lakeshore associations
- * *Landscaping for Your Lake: A Guide to Protecting Water Quality with Perennial Plantings*
- * Social marketing advice from Action Media
- * Evaluation/social research (Pre/post KAP studies; participant interviews; focus group; boat-by)

Itasca County used a social marketing approach and consulted with Action Media, Inc. on developing a social marketing approach based upon the first-round KAP data. Action Media recommended that “all communications be organized to emphasize: 1) that property owners can make their shoreline even better than it is by making it more natural, in several different ways; 2) that doing so will protect water quality, which is in everyone’s interest; and 3) that their neighbors around the lake are committed to making the lake’s shoreline a state model for best practices in this regard.”

Action Media provided the following advice on phasing of the NSBI in Itasca County:

“In Phase I, the primary audience should be seasonal property owners, with year-round property owners as the secondary audience. The primary medium of communication should be direct contact from trained lakeshore property owners speaking as peers. The key content for this phase should be focused on how to do it, in multiple media, including technical support from Master Gardeners et al.

In Phase II, the primary audience is lakeshore property owners throughout the County. The key media will be newspapers, radio, and lake shore associations. The key content for this phase is that Itasca County is a leader in best shoreland practices, and that all property owners can make their shoreline even better than it is.” (Action Media 2010)



Photo 3: Mary Blickenderfer at a “high touch” property in Itasca County

The first-round KAP studies done in 2009 helped the staff in Otter Tail and Itasca counties to fine-tune their projects to the preferences and needs of local stakeholders. At project midpoint, we had solid social research data that was used to design outreach messages, identify potential participants, and to select specific incentives. The 2009 KAP data gave an indication about which incentives were preferred by different types of property owners. 2009 KAP study results found a strong preference in both counties for “high-touch” outreach, particularly on-site technical support.

Based upon the 2009 data, Itasca and Otter Tail counties offered a variety of incentives to lakeshore property owners in 2010 and 2011 to motivate them to adopt and maintain shoreland buffers (see Table 2 below).. The incentives included financial cost-shares, and a variety of education/outreach options (workshops, on-site technical support, brochures, handbook, website, etc.). Education and outreach options were also based on “high-touch,” “medium-touch,” and “low-touch” approaches, referring to the amount of time invested per landowner by the NSBI shoreland staff. “High-touch” contact necessarily was more costly and time-consuming as efforts were concentrated on fewer people; “medium-touch” approaches delivered information to groups of landowners; and “low-touch” relied primarily on indirect or distance extension strategies (newsletters, mailings, communication through lakeshore associations, etc.). Financial incentives were available to all participants.

Table 4: Comparing “Touches”

County/lake:	High (frequent contact)	Medium (occasional contact)	Low (minimal contact)
Itasca incentives	Turtle Lake; South Johnson	North Johnson	Mike Lake; Horseshoe Lake
	Buffers	Site visits Buffer	Newsletter only
	Lake Challenge	Lake Challenge -> Runoff research	
	MN Extension and Master Gardener visits		
East Otter Tail incentives	Pickle; East and West Battle (with HLRI)	County-wide	County-wide
	Buffer templates	Buffer templates	Buffer templates
	Workshops	Mailings	Mailings
	Site visits to properties		

The KAP studies were repeated in mid-to-late 2011 in both counties, to provide insights into efficacy of the incentive strategies, and to provide second-round comparative data for project evaluation.

D. How did we test the models?

As noted, the NSBI project utilized the KAP study method as a planning and evaluation tool to determine social outcomes. KAP studies are short, narrowly focused surveys that measure changes in human knowledge, attitudes and practices as the result of a specific initiative or project (Eckman *et al* 2008, 2011 and 2012). KAP studies are relatively unknown in the United States, but have been widely used since the 1930s in international public health, water supply and sanitation, education and agricultural programs.

KAP studies tend to be more cost-effective than other watershed-based social research methods¹⁰ because they are very limited in scope, and generally cost less to implement. A typical KAP survey contains between ten and twenty-five questions developed by local project staff, and is tailor-made for that specific project. While standard social surveys may explore a broad range of social values and activities, the KAP method focuses specifically on changes in knowledge, attitudes and practices for a particular natural resource problem or issue. A KAP study usually begins with a gap exercise that identifies what local project staff ought to know about their audience, but doesn't. The gap exercise is the basis for developing the KAP questionnaire.

KAP studies are generally done twice: before a project is started, and at project completion. Data from the KAP study enables project managers to directly measure outcomes by comparing the ex ante and ex post (or “pre/post”) differences between the two studies and data sets. KAP studies provide evidence that people have adopted or maintained a new practice, that their knowledge has increased, and that their attitudes and values have changed. KAP studies tell us what people know about certain things, how they feel, and how they behave. Each study is unique to a particular setting and is designed for a specific project. The results help program staff determine whether a particular community has adopted a recommended practice, whether that practice is maintained, and if attitudes and knowledge have changed as a result. KAP study results have been well-accepted at community workshops because participants believe that their views have been taken into consideration.

Other qualitative social research methods were used to test the incentive models and verify the information learned in the KAP studies. These methods included a focus group, key informant interviews, and unobtrusive observation (including an experimental “boat-by”).

E. Social Research Methodology

The NSBI social research methods are characterized as purposive, deductive and exploratory in nature. These methods were chosen in part because LGU staff would be closely involved in their use, and staff members were not accustomed to conducting social science research. The NSBI was intended in part to build the capacity of local staff, and we began with basic, practical

KAP study uses and applications:

- * Baseline survey*
- * Project planning*
- * Designing education and outreach*
- * Informing engagement activities*
- * Identifying incentives*
- * Implementation*
- * Evaluation and impact assessment*

- * NSBI used KAP studies for all of these elements*

¹⁰ For example, the Illinois Social Profile (McDermaid and Barnstable 2001) or the Social Indicators Planning and Evaluation System (Genskow and Prokopy 2008).

sociological tools and methods that would not be overly burdensome in terms of time, learning curve and resources. Coaching in these methods was provided by WRC staff (Karlyn Eckman).

Even though the baseline EOT KAP sample was intended to be a random probability sample, the second-round response rates were not large enough to enable more sophisticated data analysis. The analysis, therefore, is based upon a comparison of descriptive statistics (frequencies and percentages) for the two EOT data sets. These quantitative findings were contrasted with the qualitative data gained from key informant interviews and the simple observational methods.

Sampling

Sampling in both counties was determined by the population demographic (audience) selected by project staff. The EOT KAP study sample was based on its intended audience of lakeshore property owners between fifty and seventy years of age, and having shoreland frontages greater than 120 feet. Lake class was not a consideration for EOT in defining their sample. In 2009 there were 1,500 property owners county-wide that met these criteria, which was sufficient for a random probability sample. Of these, 665 owned property on the designated NSBI pilot lakes. To obtain a 55% response rate, a minimum of 366 respondents would be required. 383 questionnaires were returned, for a response rate of 58% in the first KAP study (2009).

EOT's sample targeted lakeshore property owners between 50-70 years of age, and with shoreland frontages greater than 120 feet. Itasca's sample was drawn from five lakes and targeted properties with \$10,000 in improvements.

The Itasca KAP study sample was a smaller sample, nonrandom in nature and can therefore be characterized as a purposive (judgement) sample. Nonrandom samples are generally not representative of the general population from which they are drawn. Sampling error (bias) is assumed to be greater in nonrandom samples. The Itasca sample was based upon the LGU's decision to draw comparisons between lakeshore property owners on diverse lake classes (NE, RD and GD). This contrasted with EOT's decision to target a specific demographic (age, shoreline length), yielding a larger sample size that could enable a random probability sample.

The four lakes identified by the Itasca project are of very different sizes, with Turtle Lake being largest and having the most lakeshore property owners ($n = 204$) dispersed in many bays; followed by Johnson South ($n = 63$); Johnson North ($n = 33$); Horseshoe Lake ($n = 26$); and Mike Lake (an NE class lake with only five property owners). The Itasca County demographic (audience) was non-specific but targeted properties with \$10,000 in improvements. This criterion was suggested by the county as a reasonable minimum value for a "livable" structure. Using this value eliminated people with bare land or uninhabitable structures, leaving the survey sample of those with rustic cabins as well as "McMansions." The first Itasca KAP study returned 225 questionnaires, for a 66% response rate (2009).

For the smaller Itasca sample, descriptive statistics are appropriate and probability-based analysis is not possible. One complication for the 2011 second-round KAP studies is that the pre/post

We define efficacy as the capacity for beneficial change of a given intervention. If efficacy is established, an intervention is likely to be at least as good as other available interventions to which it is compared.

sample sizes for the two counties are of different sizes. Random samples for multiple data sets can be adjusted by various methods (comparison of only matching individuals for both data sets; adjustment by ratio, t test, Tukey range test, etc.), which are appropriate only for the EOT data sets and not the Itasca data sets. We conclude that the data for the

two counties are directly comparable only by descriptive statistics. A full presentation of all four data sets for the two counties can be found in the accompanying reports (Eckman 2012a and b).

F. What Constitutes Efficacy?

NSBI focused specifically on installing vegetative buffers on private shorelands. This project tested a variety of approaches and incentives to determine which are most practical and cost-effective in changing social behavior. We define efficacy as *the capacity for beneficial change of a given intervention* (that is, do incentives work?). If efficacy is established, an intervention is likely to be at least as good as other available interventions, to which it will have been compared (that is, which incentives work better than others, and under what circumstances?).

The conventional practice is to offer financial incentives in the form of a cost-share to motivate people to adopt a recommended practice. Along with the conventional practice comes uncertainty about the sustainability of cash-based incentive programs: will people still adopt and maintain when the financial incentive stops? Our grant required that we examine the long-term economic efficacy of the NSBI program for the LGU, that is:

1. Has the program measureably changed awareness, attitudes and behaviors; and if so, are those changes durable (or, are they dependent upon continued incentives)?
2. Can the local unit of government sustain the program into the future?

If a pilot project is successful in motivating behavior change (*e.g.* adoption and maintenance of a BMP), how can that effort be scaled up to reach more people? Can this be done in a cost-effective manner, given the resource constraints of local governments? Can a “one-size-fits-all model be effective? We will return to these questions in the discussion and conclusions sections below.

IV. EFFICACY FINDINGS: ITASCA COUNTY

This section synthesizes the social science research findings for the Itasca County NSBI trial program. Findings are drawn from the pre/post KAP data; the 2009 focus group in Marcell Minnesota; participant interviews; and input from key project staff. Portions of this section are drawn from the Itasca NSBI social research report (Eckman 2012a). The reader is referred to Eckman 2012a for a full description of the data.

What motivated people to participate in the Itasca NSBI and Itasca Lake Challenge?

With regard to incentives, the first-round KAP findings did not support the notion that financial incentives would be needed to motivate the adoption of recommended practices. Financial incentives ranked only fifth among respondents, behind “detailed information and instruction,” “labor assistance,” “a ‘how-to’ workshop,” and “input on their site design.” In fact, *the availability of technical expertise in the form of human interaction was clearly more important and valued by respondents than the opportunity for a financial incentive. These first-round KAP findings challenged the conventional wisdom that people need a financial incentive to adopt a new behavior.* Direct access to knowledge and information from a trained natural resources professional was clearly much more important and motivating to lakeshore property owners.

Motivation was clearly related to an individual’s sense of stewardship. Most property owners already had a buffer; were aware of its link to clear water; and liked what they saw. Those individuals influenced a few other neighbors to adopt, demonstrating that neighbor-to neighbor connections were important. One family had an erosion problem and wanted to do the “right thing.” All five buffer installation projects were based on sense of stewardship.

Were financial incentives the most important factor motivating participation and adoption in Itasca County?

Clearly not, and the evidence from KAP data, key informant interviews and focus groups served to verify this finding. The KAP study data found that financial incentives (such as a cost-share) ranked only as fifth in importance. Only 3% ($n = 2$) of respondents reported that for them the motivating factor was receiving a cost-share and/or assistance with their activity. The most important motivating factor was the opportunity to interact directly with a natural resources professional, and to gain technical advice, support and information.

The Marcell focus group reinforced and verified the results gained in the first-round KAP study. Focus group participants said they needed a trained “warm body” to interact with, and to “tell us what to do on our lot.” Participants expressed the need for somewhat customized information and recommendations. People said “we need more practical, hands-on information, and we need more informational resources” (*e.g.* lists of plants; plant sources; speaker at lake association meeting). Focus group participants were mostly retired people, possibly reflecting the demographic trends for recreational property in the county. Many already had printed information and literature, but this was not sufficient for them.



Photo 4: NSBI team members talking with a landowner on Johnson Lake (North)

Comments from key informant interviews (June 2011) confirmed the importance and value to property owners of “high-touch” technical advice provided by a natural resources professional, as well as labor assistance:

- ✓ “We got good technical advice from our local specialist; they know what they’re doing. Technical support was the most valuable aspect to us.”

- ✓ “I really like the help with shoreline plans and plantings...I liked the technical advice that was customized for our lot. The cost-share helped, but the technical advice was much more important.”

- ✓ “Cost was not so important to us; we needed help with what to do and how to plan it.”

- ✓ “The most valuable part for us was labor and trees. And we actively seek technical support and information.

- ✓ “What helped the most? Labor assistance.”

How can education and outreach strategies be designed for better impact?

The social science research methods used in the Itasca NSBI contributed to the design of incentives (especially non-financial incentives), and helped staff to customize education messages and outreach efforts. The research findings put to rest some preconceived notions, including the assumption that people go to the DNR and MN Extension for primary sources of information. Rather it was learned that lake associations was the most commonly sought and preferred resource, with county, SWCD and state agencies well behind.

The social research also laid to rest the assumption that it is seasonal people from the metro area and “snowbirds” that are “bad” stewards, and that weekenders and snowbirds are causing environmental problems. In fact, weekenders also had a very strong stewardship ethic, and demonstrated somewhat higher knowledge and awareness of water quality. Snowbirds and weekenders also preferred the natural shoreline in higher numbers than did permanent residents, which was ground-truthed by enumerators during the KAP field work. More weekenders than permanent residents were willing to consider a natural buffer.

The social research also contributed to the design of education and outreach strategies. As the existing level and content of respondent knowledge became known, specific gaps in respondent knowledge and awareness were identified. This enabled the team to customize educational messages and craft them at an appropriate level. The NSBI effort “piggybacked” on a popular weekly radio program about phenology by John Latimer on KAXE, with both delivering complementary environmental messages. It was also recognized that while people were generally knowledgeable and concerned, there was potential to enhance their knowledge about water quality, habitat and lake condition/trend. That extra “touch” enabled those property owners to take the next step and adopt new practices. KAP results also helped to identify times when seasonal owners would be most likely to attend educational activities.

How do we know what impact the NSBI project had on lakeshore property owners? What are the social outcomes?

In general the social research aided in understanding of adoption patterns, and actual outcomes have been measured in this project through comparison of pre/post data from the KAP study. Eighty percent of KAP study respondents in the Itasca sample reported in 2009 that they already had a natural shoreline (or 180 of 225 respondents). Summarizing the outcomes of the high, medium and low touch strategies in Itasca County from 2009 to 2011, the following patterns of adoption and maintenance took place:

“High-touch” (frequent and direct on-site contact by shoreland specialists, with multiple shoreland activity options, buffer installations, multiple messengers, site visits, joint installations, and peer-to-peer contact).

Adoption rate (percentage that adopted a shoreland-friendly practice):

Turtle Lake (204 parcels): 4%
South Johnson Lake (63 parcels): 6%

“Medium-touch” (less frequent contact, but with some site visits, joint installation, and peer-to-peer contact).

Adoption rate (percentage that adopted a shoreland-friendly practice):

North Johnson (33 parcels): 27%

“Low-touch” (no direct contact with the property owner, who received a newsletter only).

Adoption rate (percentage that adopted a shoreland-friendly practice)

Mike Lake (5 parcels): 0

Horseshoe Lake (26 parcels): 0

Other “low-touch: lakes:

Wabana: (0)

Deer: 3 took the Lake Challenge

Pokegama: 4 took the Lake Challenge



Photo 5: Buffer installation on “medium-touch” Johnson Lake (North)

In this case the “medium touch” approach had a higher rate of adoption than the “high touch.” The “low-touch” approach was not effective in motivating adoption and maintenance. It should be noted that Wabana, Deer and Pokegama lakes were not part of the original NSBI and did not

take part in the KAP study. Property owners at these lakes did, however, take part in Itasca Lake Challenge activities.

The second-round KAP study provided additional information about adoption. First, eighty percent of NSBI KAP study respondents stated that they already have a natural shoreline, so their buffer adoption potential was much lower than those with altered shoreland areas. For those with altered shorelines, fifty-five owners installed shoreland plants or allowed native plants to grow back (55%); Twenty-one people raised the blade on their lawn mower (24%); fifty owners left the ice ridge in place (57%); five owners removed hard surfaces (6%); seven owners moved their fire rings away from the lake (8%); two installed a rain barrel or rain garden (2%); and a few attended workshops or conducted runoff research.

Property owners were motivated to adopt other lake and wildlife-friendly behaviors (such as the Itasca Lake Challenge, or an associated activity such as runoff research), even if they did not install a new buffer (the majority reported already having a natural shoreline).



Photo 6: Simple materials and processes were used in run-off research on lakeshore property owners' parcels

The outcome of the first-round KAP and boat-by was a sampling and assessment of four lakes with multiple avenues of social research. We discovered that people generally know what to do and do the right thing, but could be doing more. The majority of property owners clearly had very high stewardship values, and a lot of knowledge but to a certain extent. Knowledge was mostly gained from each other through peer or neighbor-to-neighbor contact. Lake associations were instrumental in disseminating information. Even those that do the “right” thing need some catalyst or incentive to take action. We learned that “high touch” contact combined with community building and peer incentives works best. With those already doing the correct behavior it is a matter of awareness combined with “how-to” high touch experience. We learned that *“it’s a community thing, where people start to do things – peer pressure, social networks, it raised our level of awareness.”*

Indeed, the combination of non-monetary incentives (technical advice, labor, planting materials, etc.), peer-to-peer contact, and social networks may have been mutually reinforcing, spreading positive conservation messages through multiple avenues and messengers (neighbors, radio, lakeshore associations, and shoreland experts). In the case of North Johnson Lake (which does not have a lake association), an informal lake group had rallied around a beaver dam/lake level issue. This issue brought people together about condition of the lake, and provided an opportunity to disseminate messages and information through informal social networks.

Financial incentives may not meet the needs of elderly property owners, who may not be able to do as much physical work. One example comes from Johnson Lake (North), where an elderly woman property owner stated that the most valuable incentive that motivated her to adopt a buffer was labor provided by the project.

The social research was insightful to staff, contributing hard data and evidence that resolved uncertainty and disproved some assumptions. It was determined to be worthwhile to undertake, and provided many insights about how to best invest staff time to obtain better results. Staff agreed that social research enables natural resources professionals to become more effective in their efforts.

V. EFFICACY FINDINGS: EAST OTTER TAIL COUNTY

This section synthesizes the social science research findings for the East Otter Tail County NSBI trial program. Findings are drawn from the pre/post KAP data, participant (key informant) interviews, and include input from key project staff. Portions of this section are drawn from the East Otter Tail NSBI social research report.

● What motivates people to adopt and maintain a recommended practice? Why are some individuals inclined and others disinclined to adopt?

In the case of the East Otter Tail County NSBI project, we found that public concern for water resources and knowledge about water quality is very high. We understand from qualitative research and the KAP studies that local lakes are special to people, and property owners frequently have a multi-generational association and deep affection for “our” lake. These values and expressed concern for lakes and water quality appear to motivate many to take action. There is also a sense of stewardship and a conservation ethic for many that may be reinforced by long-term family “legacy” of the majority of lakeshore property owners in the EOT sample. About half of property owners surveyed have been associated with Otter Tail County lakes for thirty years or more. While all property owners were offered cost shares, not one property owner adopted a treatment solely on the basis of being offered a financial incentive.

Why are people not inclined to adopt? Of those that did *not* adopt a buffer, seventy percent reported already having a natural shoreline, or cited other reasons. Some had already tried various erosion control measures such as riprap (35%), a retaining wall (9%) or vegetation (18%). However, these measures were not performing as expected, although performance was reported to be higher for riprap and vegetation. Reasons given in 2009 for not installing a buffer included “I don’t like the appearance” (31%); expense (29%); not sure how to design a shoreland buffer (27%); physical ability (23%); no perceived benefit (23%); neighbors or family might disagree (16%); don’t know (17%); not sure where to get plants or materials (16%); lack of time (13%); and “other” (27%). A number of respondents said that issues with their lot dimensions or topography (bluff) prevented them from installing a buffer.

● How do we know what impact the NSBI project had on property owners? What are the social impacts, results and outcomes?

Summarizing the outcomes of the high, medium and low touch strategies in East Otter Tail County, the following patterns of adoption and maintenance took place:

“High-touch” (frequent and direct on-site contact by shoreland specialists, with multiple options for adoption including buffer installations, free labor and other options, guidebooks, multiple messengers, site visits, joint installations, and peer to peer contact).

Sites: Lake Seven (14 adoptees of 70 parcels; 11 are awaiting cost share through Clean Water).

Adoption rate (percentage that adopted the BMP): 20%

“Medium-touch” (less frequent contact, but with some site visits, joint installation, guidebooks at site visits, and peer to peer contact).

Sites: Pickerel Lake (11 adoptees of 250 parcels)

Adoption rate (percentage that adopted the BMP): 4%

“**Low-touch**” (no direct contact with the property owner, who received a newsletter only. Property owners were given guidebook and asked to contact their neighbors (peer to peer).

Sites: West Battle (2 adoptees of 490)

Adoption rate (percentage that adopted the BMP): .004%

The “high touch” strategy clearly demands more time and resources on the part of County staff. The high-touch strategy was most effective in East Otter Tail County, with a 20% adoption rate. The medium-touch approach was more effective than the low-touch approach, but had a considerably lower adoption rate (4%) than the high-touch strategy. We conclude that the low-touch approach was least effective, with an adoption rate of less than 1%. As noted above, while all property owners were offered cost shares, not one property owner adopted a treatment solely on the basis of being offered a financial incentive.

Property owners will almost always accept a financial incentive, but they will readily adopt without it.

● Are the customary financial incentives offered by state and local agencies sustainable? Do people maintain the practice after the incentives end?

The KAP research illuminated many issues and opportunities that prompted EOT staff to elaborate a response structure that met respondent needs. However, the County had a capacity gap in that there are hundreds of lakeshore property owners in the defined demographic and only one full-time shoreland professional to meet their needs. Financial incentives such as cost-shares are somewhat burdensome to administer, and compete for staff time used in education and outreach activities. It was necessary to strike a balance between staff capacity and the need to provide outreach and education to a large number of dispersed clients on multiple lakes. In addition, the same staff member was responsible for several other grants and projects taking place simultaneously. The NSBI tested the resource limits of the EOT staff, which responded by:

1. Adopting the Itasca County community model (described in the Itasca County NSBI report) based on peer-to-peer communication to spread shoreland conservation messages; and
2. Maximizing personal contact per technical service hour on the ground by:
 - b. Working with groups in workshops, and small group site visits. This also builds community connections.
 - a. The initial property owner contacted was asked to convey message among groups of neighbors.

There are many other Minnesota counties with similarly limited resources. Given the adoption rates noted above, the customary model of offering financial incentives to foster adoption should

be questioned. Property owners will almost always accept a financial incentive, but they will readily adopt without it. We see financial incentives as an unnecessary and ineffective opportunity cost that could be used in a more efficacious way if invested in the mechanism shown to be most effective (direct contact with a natural resources professional).

The higher-touch models tested in the NSBI have been shown to be more effective in terms of improving respondent knowledge, and in terms of adoption of recommended practices and treatments. In this light, resources dedicated to cost-shares might be better utilized if invested in trained natural resources professionals who can interact directly with property owners. The opportunity costs and overall cost-effectiveness of this recommendation should be further explored.

● How can education and outreach strategies be designed for better impact?

The question has been raised about “what does a healthy shoreline give back to landowners?” Focusing on what ‘services’ and benefits a healthy shoreland area provides can significantly change the traditional education piece. EOT landowners reported that their property was particularly valuable to them because of its clean water (98%) and scenic nature (94%). Of somewhat lesser importance was affordability (81%), good fishing (73%), and family ties to the area (40%).

The most valuable part of the social research for EOT staff was uncovering dimensions that lakeshore property owners would respond to, and that shoreland staff had previously not known. Previously, there was a tendency to “tell everyone everything about buffers” and that staff would give a lot of extraneous information without knowing what those concerns were. For example, previously educational messages might state that “buffers will attract bees and butterflies,” but the owner might be allergic to bees or dislike bugs. Staff was repeating the same information and presentation with every encounter, without customizing the content to meet the interests and needs of the property owner.

The new approach puts the property owner and his/her perspective at the forefront of the encounter, and centers on a listening-responding form of communication.

Since doing the social research, staff members now approach such encounters differently. First, staff ask about concerns, then respond with situation-appropriate information. Staff members have the ability to tailor content and messages to address concerns. They now refine how they work with people on site, and tailor the message according to expressed concerns and interests. Before, the SWCD was not addressing expressed

concerns. “Our outreach was not designed to reach respondents; it was built around OUR values and perceptions of plants.” This new approach puts the property owner and his/her perspective at the forefront of the encounter, and centers on a listening-responding form of communication.

“Don’t just drum everything out, but rather customize the message. This results in a greater rate of adoption.”

Steve Henry, EOT Shoreland Specialist

The EOT social research uncovered negative impressions about shoreland buffers often held by property owners, in that buffers might affect lake access and view, followed by a number of lesser concerns (buffers might harbor mosquitoes and ticks, etc.). Images and photos of buffers used by staff in 2008 showed a “wall of vegetation” that unwittingly played to concerns about weeds, bugs, and loss of view of the lake (see photos 7 and 8 below).



Photo 7: Pre-NSBI outreach message showing a “wall of vegetation.”

For example, KAP data and key informant interviews highlighted that the photographic images on educational materials were not appealing to property owners. EOT staff realized that the photos used to illustrate buffers ignored concerns for access and view, and caused staff to take new photos of shoreland installations. There was an unexpected negative reaction to the images of restored buffers that were presented to respondents that showed a “wall of vegetation” accompanied by a discussion that described the wonderful wildlife habitat and water quality benefits that it created. From their perspective, however, a tangled weed patch blocking the view of the lake that was full of bugs, bees and maybe skunks is not something that helped to sell a shoreline restoration.



Photo 8: Pre-NSBI outreach message showing blocked view of lake



Photo 9: Post KAP photo showing uninterrupted lake view and access

The KAP information enabled EOT staff to customize and tailor its marketing about buffers to address those concerns of property owners. This “customization” of information to address concerns, coupled with positive water quality messages, helped property owners to overcome their disinclination to adopt (see photos 9 and 10 below). The data identified those property owners who were willing to adopt (e.g. interested in installing a buffer), and identify the variance between the two groups (inclined v. disinclined).



Photo 10: Post KAP photo showing improved access for grandkids and better sightlines for safety

KAP data revealed the need to change the promotional materials and formats, including the photos used to illustrate shorelands, lakes and buffers. EOT staff replaced vegetation-centered photos (photos 7 and 8 above) with broad views of the lake, with sky, lake and horizon increased to 60% of the frame (photo 9 above). The old photos had no variation in plant height, and were focused entirely on a “wall of vegetation” with no image of water or shore. The new photos show docks, shoreline, wave height, sky, children’s access, improved sight lines and other features that property owners said were important to them.

EOT staff also began offering different types of buffer options (cottage garden, prairie style). The change in image style and content gave property owners a choice in the buffer style, height of vegetation, degree of lake access and other aspects. When presented with images showing a lower profile, and a colorful “tamed” native buffer restoration, that they could imagine more like a garden (78% of Itasca respondents enjoyed gardening), there was a much more eager response -- or at least a less negative one!



Photo 11: Prairie-style buffer

The social research on preferred sources of information clearly showed a strong preference for a shoreland buffer guidebook, website and personal contact with a shoreland professional. EOT responded to these preferences by preparing a new guidebook, posting the new educational materials on the EOT website, and by creating a new engagement structure (based on degree of “touch”) to facilitate direct contact with property owners.

VI. Prototype Approaches and Tools in the NSBI

The original scope of work of the NSBI project concerned the efficacy of monetary and non-monetary incentives to motivate the adoption of shoreland buffers. The NSBI also afforded an opportunity to test some prototype approaches and tools in the process. Some of the tools were intended to support project monitoring and evaluation (boat-by; KAP studies). Others were intended to contribute to motivating the adoption of buffers, either through a novel engagement strategy (peer-to-peer messaging; Itasca County Lake Challenge) or through the development of education and outreach messages and materials (Otter Tail Lakeshore Landscaping Manual; shoreland templates). The prototype approaches and tools were developed for the most part in the later half of the project and most have not yet been assessed for efficacy (which was not part of the NSBI original scope of work). Nevertheless, some tentative findings and lessons can be drawn, although it is still too soon to fully assess their efficacy.

Social Science Research

The great majority of water quality projects in Minnesota are never evaluated, and most project managers cannot determine with any degree of certainty the impact of a project on the intended audience (Eckman and Walker 2008). Since most water quality project staff members are trained in the biophysical sciences, it is not surprising that they do not have the capacity to do social research on people living in their watersheds. Most LGU staff lack even a basic understanding of local audiences and their behaviors influencing water quality, and do not know what education or outreach messages would lead to adoption of a BMP (IBID).

The U of M Water Resources Center initially piloted the KAP study approach in 2008 with the Minnesota Pollution Control Agency, conducting studies with Dakota County snowplow drivers on road salt reduction (Eckman, Fortin, Nuckles and Were 2011); and urban residents in Duluth on stormwater runoff to Amity Creek (Eckman, Schomberg, Brady and Were 2011 a and b). Since then WRC has successfully tested the KAP method on nearly twenty diverse water resources projects. In the NSBI project, WRC introduced the KAP study and other methods to LGU staff at an introductory workshop called “Working with Your Target Audience” on October 17 2008 at the Initiative Foundation.

The NSBI project utilized several basic social science research tools in both counties, with the guidance of the WRC.¹¹ The tools included focus groups, unobtrusive observation (“boat-by”), key informant interviews, and pre/post KAP studies. KAP studies are significantly different from other standard social science research methods because they are smaller in scope, somewhat easier to administer, and very focused on local issues. The KAP study method is also a useful tool for project evaluation. Each KAP study is customized for a specific location and natural resource issue. While KAP studies are much more economical than standard social surveys, they still require time to prepare and administer, and typically cost between \$2,500 and \$10,000 depending on how they are administered.¹² Staff may also need training, support and guidance in data analysis and interpretation. However, as we have seen in the NSBI, the payoff comes with a much deeper understanding of audience needs, priorities, concerns, constraints, and preferences, and the ability to quantify outcomes and impacts. When compared with other available baseline study methods for watershed social research (EPA’s social indicators planning and evaluation system described in Genskow and Prokopy 2008; Illinois social profile described in McDermaid and Barnstable 2001), we conclude that the KAP study method is less resource-intensive and yields more locally-specific information. WRC is currently working on a meta-analysis of the KAP studies conducted in Minnesota.

¹¹ WRC was granted a Human Subjects Research exemption by the University of Minnesota Office of the Vice President for Research to conduct the research associated with KAP studies.

¹² Surveys that must be printed and mailed can be significantly more expensive than one administered at a community workshop, for example.

The KAP study data was used in both counties to identify new participants; to design and customize and re-frame education and outreach messages; and to evaluate end-of-project changes in knowledge, attitudes and practices. In each case, positive gains were documented in terms of improved water quality knowledge, and evidence of adoption of BMPs. For further information on the KAP study method, see Eckman (2011 and 2012) or contact the author. A training manual on the KAP study method is in preparation.

The KAP study method was the most important social research tool used, yielding useful quantitative data. It was supplemented by other qualitative methods, including key informant interviews and a focus group. Key informant interviews were informal interviews with project participants at various points during project implementation. To conduct the interviews, a short line of inquiry (checklist of interview questions) was prepared in advance to guide the individual interviews. Field notes were taken during the interviews, and were used to help interpret the constraints and outcomes experienced by participants in the project. The key informant interview method was generally guided by Babbie (2000) and Slim and Thompson (1994).

The focus group was conducted by Itasca County and DNR staff in Marcell, Minnesota in 2009, and served to inform the education and outreach aspects of the NSBI. The focus group methodology was generally guided by Krueger and Casey (2000).



Photo 12: Testing the boat-by assessment technique

The experimental “boat-by” study (total lake survey) was useful because it allowed us to ground-truth the mail-in surveys. The “boat-by” methodology was designed by Dr. Mary Blickenderfer, assisted by Erika Rivers (DNR) and Karlyn Eckman (WRC). It also allowed us to confirm that a large percentage of owners already had natural shorelines or were already doing several things right (maintaining buffers). The boat-by was used to triangulate and to verify self-reported practices. This observational method was tested in 2010. However, it was determined to be too labor-intensive and not quantitative enough for the purposes of assessing shoreline changes. Nor could it quantify changes longitudinally with accuracy. Nonetheless it was useful because it allowed staff to ground-truth self-reported practices from KAP questionnaires. The boat-by information was consistent with the self-reported KAP data, confirming that the majority of owners already had natural shorelines or were doing the “correct” things (maintaining buffers). The boat-by also enabled us to determine that even those parcels with buffers were likely contributing to water quality problems via practices other than buffers (*e.g.* access to the lake via

footpath; inappropriate boat access and footpath designs; storage of boats and water toys; breaching ice ridges, fire rings close to water's edge, etc.).



Photo 13: Testing the boat-by shoreland assessment technique

A “take-home” message is that basic social research tools can greatly assist natural resources professionals to fine-tune their education and engagement strategies, overcome participant barriers and constraints, and to evaluate project outcomes. KAP data provides clear evidence of behavior change, and particularly BMP adoption and maintenance. We conclude that training and capacity-building for LGU staff in basic social science research techniques would enable natural resources professionals to be more effective in working with their audiences.

Itasca County Lake Challenge

The Itasca County Lake Challenge (ICLC) to date has been piloted with a small number of lakes and residents.

The ICLC was designed by Mary Blickenderfer of Minnesota Extension. The idea emerged from the Minnesota Energy Challenge (<http://www.mnenergychallenge.org/>) and piloted through the experimental Turtle Lake Challenge in 2010. It provides a worksheet for property owners to assess their own shoreline, and is accompanied by a number of “fun for family” activities (frog count, fish count, etc.). The ICLC differs from the “Score Your Shore” tool

(<http://www.dnr.state.mn.us/scoreyourshore/index.html>) in that it is somewhat simpler, oriented toward family activities and engagement, and has a positive motivating theme. The ICLC template provides a number of options (or “challenges”) to adopt lake and wildlife-friendly activities. Property owners have responded well to this pilot tool, as evidenced by the following comments:

“We would not have adopted without the Itasca County Lake Challenge.”

“The picture and photos were motivating; we also learned what *not* to do.”

There was evidence from the key informant interviews that neighbors influenced each other to become engaged and to try new practices introduced by the Challenge. The Challenge activities have appeared to foster more involvement and participation in various environmental activities including buffers; citizen research (runoff); and training/citizen monitoring of frogs and fish. Frog workshop participants expressed a sense of curiosity; some wanted to get their children interested in the natural world. Children “loved” the frog workshop. The template is attached to this report as a pdf.

Shoreland templates

East Otter Tail County developed several shoreland buffer “templates,” or buffer types that participants could choose from. The templates were based upon the preferences expressed by survey respondents, and included “cottage” and “prairie” style gardens. EOT staff then developed its brief, informative Lakeshore Landscaping Manual (Henry 2010), again based upon preferences expressed in the first-round KAP study.

The EOT NSBI educational materials and content were designed using information from the KAP data (*e.g.* common concerns, view, cost, appearance, access, etc.). The new buffer guidebook was designed with phased information and timelines, and the adage “read it, write it, say it.” The guidebook cover featured images of clean water and scenic environment, corresponding to values of legacy, stewardship and future generations. The educational information in itself may not be sufficient; it needs to be delivered by a respected professional, and reinforced with peer-to-peer messaging. The manual is attached to this report as a pdf file.

Outreach Approaches

What do we communicate? How do we communicate? What is the applicability and transferability of the NSBI elsewhere (not only for shoreland efforts, but for conservation measures in general?). These questions are a matter of active discussion among many state and local agencies, and several are making strides with new models and approaches. This is especially the case for watershed planning and the TMDL process.

The NSBI project has shown that the use of basic social science research tools can contribute to the design of engagement strategies, and to the understanding of public preferences, concerns and needs. The social research data from the first KAP study was used to design and refine education and outreach strategies that were tailored to expressed local needs. The KAP study data provided the NSBI team with social information that was useful in identifying constraints, motivating property owners, highlighting preferences (especially for treatments that people might dislike), and selecting likely options and venues for public participation. Because people were already knowledgeable about water quality, educational messages had to build on what people already knew. However, such knowledge reaches a certain level beyond which respondents need (and request) additional technical support and guidance. Their strong preference, as already noted, is not for a financial incentive but rather direct, in-person interaction. The KAP data helped to define the appearance and content of educational materials, and provided staff with insights into what property owners would most likely respond to.

East Otter Tail County modified its outreach materials and messaging based upon information gained from the first-round KAP study data. Photos 7, 8, 9 and 10 above demonstrate the visual presentation in promotional materials that were made by EOT shoreland staff. According to EOT staff, these changes resulted in better understanding and adoption by property owners, because they were able to allay concerns about view, access, and “bugs.”

Most residents self-reported that they already had a natural shoreline (verified by observational methods), and reported doing some level of environmental activity. We learned that a strong environmental stewardship is nearly universal, and that stewardship binds lakeshore property owners together socially. We learned that there are existing social networks present on most lakes, and that lakeshore associations are trusted and important sources of information. Collectively, these are essential building blocks for any successful program effort. Indeed, this extends beyond shoreland conservation and water quality efforts, and could be utilized for more comprehensive environmental efforts (habitat conservation, fisheries, nongame or migratory species, etc.). With a better understanding of the priorities and concerns of property owners, NSBI team members were able to change their engagement approach from a top-down conventional delivery system to be much more responsive, people-centered model.

The outcome of the first-round KAP and the boat-by in Itasca County was confirmation that people generally know what to do and want to do the right thing, but they could be doing more. While almost all respondents (99%) consider themselves to be stewards, some expressed uncertainty as to what to do. Many felt that they had inadequate resources/information to take the next step, and needed technical information and guidance to take action. Access to a natural resources professional and experiential learning-by-doing seemed to be a motivating factor, which resulted in neighbor-to-neighbor dissemination.

In Itasca County, staff recommended taking small steps, and promoting the installation of a minimum buffer. The Itasca strategy was to capture additional interest with frog workshops, fish egg counts, and pontoon boat tours of neighbors' buffers. Buffer activities were linked to a local garden club. Social behavior, general awareness and concern of lake water quality were critical elements. Adding a wildlife component gets at more hunter/fisher types than those who care about water quality.

Many social marketing campaigns assume that people lack knowledge – this was not the case in Itasca or Otter Tail Counties. People were knowledgeable about lake water quality.

There was a strong preference on the part of property owners for information and advice from trained specialists, which was shown to be the most effective way to motivate the adoption of buffers. Face to face contact with a trained, trusted professional was critical. There was clearly an element of trust and personal contact that was “huge” for NSBI participants. In Itasca County it was noted that residents met students and shoreland experts, got to know them, and felt that doing work together was very motivating. Owners appreciated the planting assistance, and older residents with extensive buffers would not have adopted without the student labor provided as an incentive by the Itasca NSBI project. Younger residents lacked time and wouldn't have adopted without labor and technical landscape design, planting advice and coordination. Finally, a “one-size-fits-all” buffer design wasn't used, and people appreciated that buffers were customized for their property.

Peer-to-peer communication

Social reinforcement and networking that is lake-focused (*e.g* “our” lake), and that features neighbor-to-neighbor activities and lake associations, was well-received by property owners in this Itasca County sample. Smaller lakes seem to have more social cohesiveness and possibly a greater sense of community (even North Johnson Lake, which has no lake association). Neighbor-to-neighbor (peer-to-peer) communication and group-centered activities may aid in the dissemination and adoption of lakeshore-friendly practices. Directly engaging property owners and lake associations in knowledge dissemination was also an important step that helped to maximize scarce resources while fostering civic engagement.



Photo 14: Buffer installation on “medium-touch” North Johnson Lake

In both counties people had a relatively high level of knowledge and awareness about water quality and lake health in both counties. Knowledge was mostly gained from each other and through lake associations. The social research confirmed that lake associations are the obvious conduit and most significant entry point to lakeshore property owners.

It was found that informal communication networks were major transmitters of information among property owners. For example, a group of property owners at Birchwood Shores on Pickerel Lake all go to the same church. Information about the NSBI buffer project circulated informally in this group as “comments around the edges.” Similarly property owners at East and West Silent Lake socialize with “coffee talk” after church. There may be a type of “moral peer pressure” occurring, that aligns group members along the same conservation goal or ethic. Buffers and shoreline gardens at these sites on individual lots have enlarged and merged together over time, eliminating gaps between lots. The informal communication network among property owners who attend the Silent Lake church was confirmed by an EOT SWCD staff member who attends the same church. It was said that “even if you’re not that way when you move here, you will be in a few years.” This informal communication appears to translate into dissemination and adoption of environmental practices, which in turn translates into more demand for EOT staff assistance.

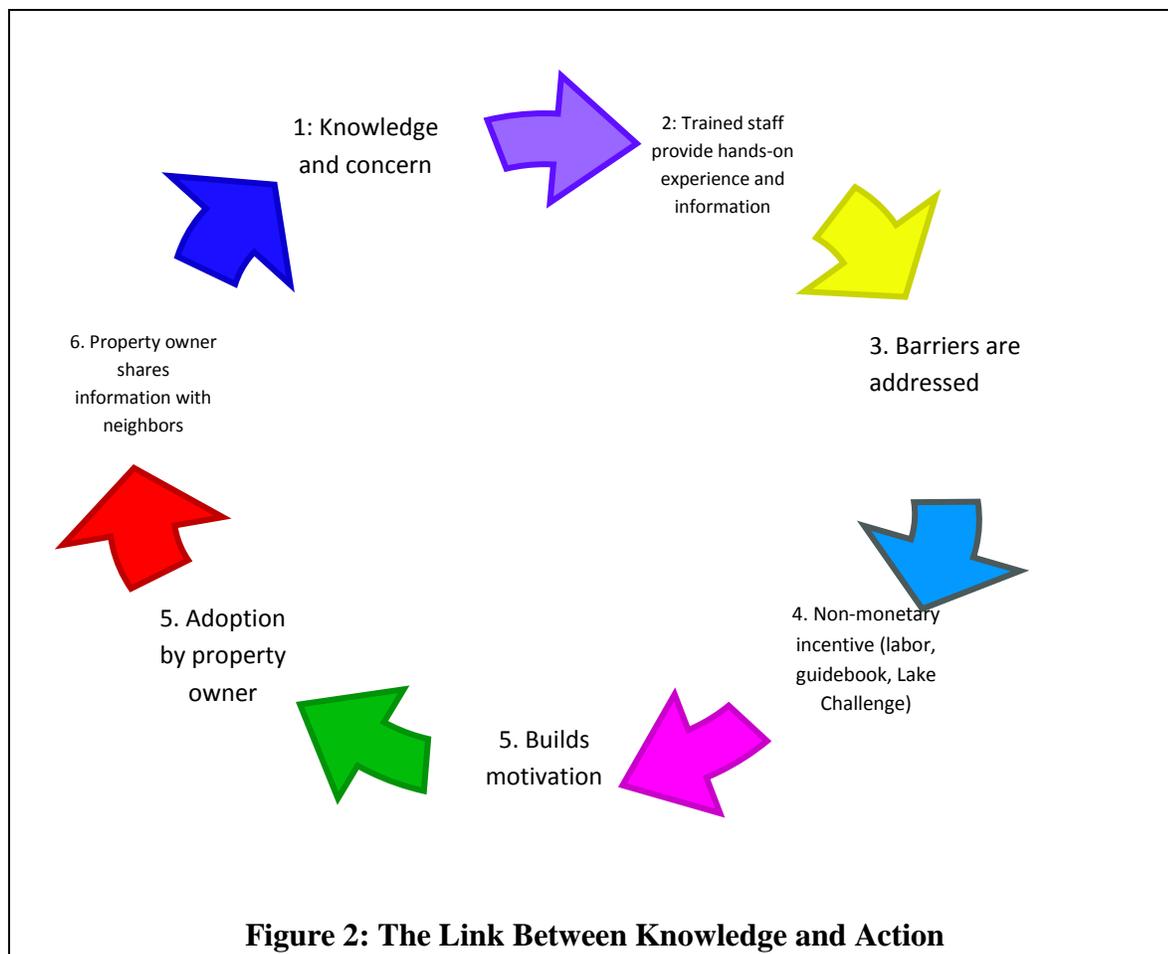
Pickerel Lake (EOT) has seen peer-to-peer diffusion. The gaps in shoreline buffers on Pickerel Lake are disappearing, apparently through peer-to-peer adoption. By the end of the NSBI (September 2011) homeowners on nonparticipating properties actively sought out the county shoreland specialist when he visited Pickerel Lake, expressing their interest in participating.

For both EOT and Itasca, the KAP data show that people's knowledge about water quality is relatively high (but could be improved). Both audiences express very high concern for water quality, and appear to have very high levels of environmental stewardship. In both cases respondents did not express the need to have a financial incentive. Neither cost nor time were constraints. Rather, they were more likely to be motivated by better access to knowledge, information and expertise. Appealing to property owners' stewardship ethics and concern for clean water was seen to be a more compelling reason to participate in the NSBI.

The NSBI attempted to build awareness, and to reach people through an interest of theirs and allow them to become more knowledgeable about their own lake. People showed that they already have high

knowledge and concern, as already noted. But our research showed there is a disconnect between a high knowledge level and actually doing something, a difference between knowledge and actually taking action. We showed that experiential learning with a knowledgeable person who can facilitate this link resulted in adoption of beneficial activities. This "high touch" approach can provide the synergistic link between knowledge and action, as shown in Figure 2 below:

By the end of the NSBI (September 2011) homeowners on nonparticipating properties actively sought out the county shoreland specialist when he visited Pickerel Lake, expressing their interest in participating.



For those already doing the “right thing” it is also a matter of awareness. A cluster of elements seems to reinforce citizen behavior: a sense of community; a sense of caring about “our” lake; peer pressure and social networks; and informal networking all appear to contribute to the spread of conservation messages among lakeshore property owners. One property owner commented that an informal lake group had rallied around the removal of a beaver dam. Individual property owners had previously had very different opinions and values, but that issue brought people together about the condition of the lake.



Photo 15: Sand blanket (rear) and shoreland restoration (foreground), East Otter Tail County

VII. CONCLUSIONS

A number of “big picture” questions were explored in both the East Otter Tail and Itasca NSBI cases. The answers to these questions undoubtedly vary from one location to another, and depend upon demographics (age, education, income, etc), predominant cultural norms and many other factors. The social research methods used were customized specifically for Itasca and EOT counties (especially the KAP studies), and the samples was not representative. Therefore, caution must be used in drawing conclusions and inferring representativeness or broader patterns. Nevertheless, some insights were gained and are summarized here.

Why is the NSBI project unique?

As the Itasca team noted, NSBI is more a social than a natural science program. A social effect (behavioral change and adoption) is more difficult to achieve than biophysical effects. The NSBI builds on social communication, social research and networking. It identified ways to get people to adopt even though it has a biophysical goal. NSBI’s unique feature was to match people (lakeshore property owners) with experts who could interact with them about shoreland treatments, provide technical advice, and link them with additional resources (*e.g.* Master Gardeners, sources of native plants, etc.).

“NSBI is way more than just buffers, which are a small part of the project. It’s about social and local organization, peer-to-peer networking and community-building around a conservation issue. NSBI is about connecting property owners with outside people (NSBI team members) who are concerned about “our” lake. There is a positive social exchange, and it pulls neighbors, especially young people or students, together around a cause.”

NSBI is not prescribed downward and is not top-down. It represents a change from a delivery-based system to a “people-centered,” audience-based system. The messaging content, packaging and delivery system were based on lakeshore property owner’s KAP responses, preferences, and expressed barriers. Staff members were able to customize photographic images and messages in a manner that would appeal to audiences. The NSBI approach led to an engaged audience that disseminated conservation messages to their neighbors. Staff developed a framework and message that appeared to be effective, then allocated resources accordingly. In the case of EOT this made three other grants more effective too. The social science research results helped to define messaging scope and to conserve staff time. EOT staff commented that this “strategically expanded our resources, and led to coordinated community conservation. Previously we expanded resources on demand, which only led to random conservation.”

The more “people-centered” NSBI approach is in contrast to conventional message delivery systems, which are often formulated by technical staff in an office. As East Otter Tail County staff remarked, “We found out how often we missed the mark before.” EOT might apply this approach to new audiences, especially to property owners with shoreland bluffs and steep slopes. Messaging and engagement is more challenging for this refined audience. Shoreland bluff message content might focus on what *not* to include (ex: plant height). However, only a few respondents were owners of bluff property, and more information is needed about their specific priorities and issues.

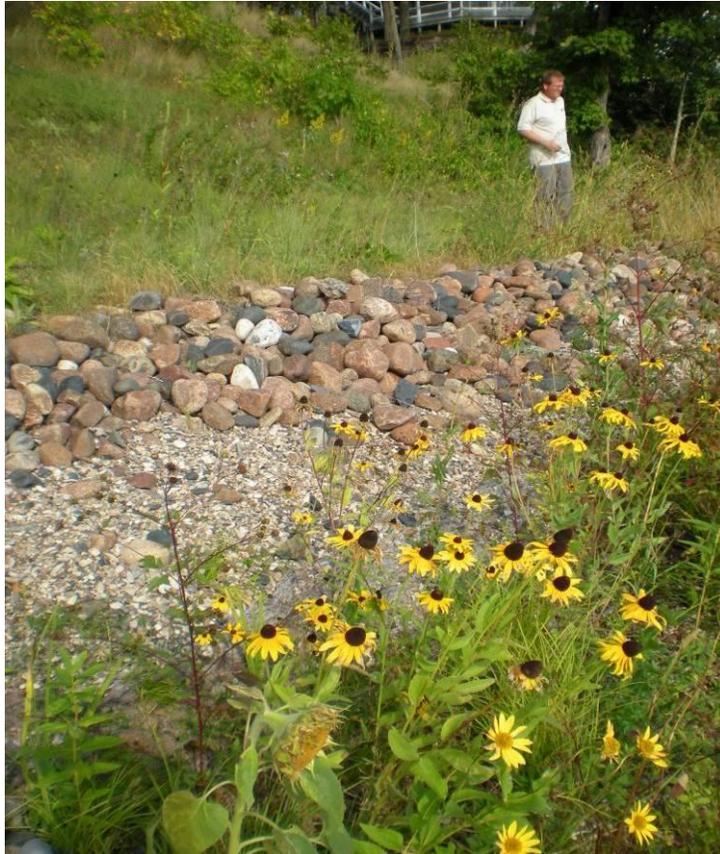


Photo 16: EOT shoreland restoration, 2010

Scaling up and out

We conclude that the NSBI had a number of positive outcomes in terms of new prototype approaches and tools, as well as certain research findings about audience behavior and BMP adoption. While the project timetable has been too short to explore the longer-term sustainability of some project outcomes, we conclude that a number of the outcomes merit scaling up and scaling out.

There are many counties in Minnesota with limited resources. County staff often find themselves in a position of doing more with less. Clearly, county staff must organize their time and resources to reach the maximum number of people, and collaborating with lakeshore associations, volunteers and peer-to-peer networks are important means of doing so. We conclude that the NSBI has shown that resources dedicated to shoreland conservation can potentially be used more efficaciously. Budgetary resources that currently are dedicated to financial incentives (such as cost-shares) should be reconsidered because cost-shares were shown in this case to be ineffective.

The KAP study data show that audiences differ in their preferences, needs, priorities, and access to buffer materials and information. Therefore, when scaling up and out, a standardized “cookie

cutter” approach is not likely to be as efficacious as an approach that is customized to meet local needs.

While some Itasca property owners accepted financial incentives, there appear to be very few (if any) that adopted a shoreland-friendly practice *only* because of the cost-share. The customary model of offering financial incentives to foster adoption should be questioned. Property owners will almost always accept a financial incentive, but they will readily adopt without it. Financial incentives may be an ineffective opportunity cost that could be used in a more efficacious way if invested in the mechanism shown to be more effective (direct contact with a natural resources professional, paired with peer-to-peer engagement). In this light, resources dedicated to cost-shares might be better utilized if invested in civic engagement and outreach efforts, and in trained professionals who can interact directly with property owners. The opportunity costs and overall cost-effectiveness of this recommendation should be further explored in other contexts and locations.

The medium and higher-touch models tested in the NSBI have been shown to be more effective in terms of improving respondent knowledge. However, in Itasca County, not many property owners installed new buffers. In part, this is because the majority already had a naturalized shoreline. Still, there are many other practices that property owners could potentially adopt that are “beyond” buffer adoption. For example, reducing or redirecting impervious surfaces, improving trail and footpath installations, moving fire rings, reducing dock areas, and certain beach practices could potentially bring improvements in water quality and habitat. Property owners were receptive to such “lake and wildlife friendly” activities, particularly those associated with the Itasca Lake Challenge, and participated in run-off research, frog and fish workshops, and other activities.

What would it take to expand the lessons learned in the NSBI? How can the best elements of the NSBI be scaled up and out? At this point preliminary discussions have been held by NSBI team members, with a view to developing new proposals to support an NSBI-like program. We conclude that the following program elements would be needed:

- Resources above and beyond the project; as well as pre-project resources to support planning.
- Skilled professional staff who can communicate directly with lakeshore property owners.
- An umbrella coordinator in each county. This person should coordinate buffers and Lake Challenge.
- Clear goals, messages, content, and multiple reinforcing complementary messages from multiple agencies (not just DNR or the SWCD).
- Social science research (KAP study and other tools) to support education and engagement, and to report results back to participants.
- A project “road map” to correctly convey a plan to participants, so that they understand future activities.

- An outreach program with regular events (frog walks, fish identification, beachcomber training, welcome aboard events for new property owners, pontoon tours, etc.).
- A willing local community group (church, lake association), and building a sense of community, especially sense of neighborhood.
- Peer-to-peer communication which is not connected to enforcement (emphasize the positive).
- Need to develop on-the ground connections and resources, for example, sources of good quality plants.
- Coordination of plant materials and logistics (pick-up dates /coordination). There needs to be a source of plants throughout the summer. If there is a delay, people can't wait.
- Trained landscape designers that can be hired to do the designs, plant selection, and have the vision as to type of buffer. Master Gardeners would need buffer-specific training. Master gardeners and other volunteers would likely be the main people to do the Lake Challenge site visits.
- A “one-stop” website to enter and store Lake Challenge data, and contact information for staff/participants. The website should be the host and main resource for the Challenge, and have a rustic, “cabiny” feel. The website would emphasize that everything is local; “own your own project.”
- Three-ring binder cabin journal with beachcomber activities, phenological records, etc. The Burnett County cabin journal could serve as a model (adult version of kids' journal).
- Promotional and outreach materials (radio interviews, newsletters, newspapers, signage).

Can LGUs sustain the NSBI? Both counties have limited staff (essentially one shoreland professional per county) to reach large numbers of lakeshore property owners. Staff identified mechanisms to maximize their reach and resources, as already noted. However, additional trained natural resources professionals would complement the efforts already underway. Inadequate funding and inability to obtain funding in a timely manner (e.g. contracting issues) serve to undermine project efforts.

Current and Future Challenges

The NSBI project encountered a number of challenges that we note here. First, the state government shutdown (July 2011), combined with administrative contracting delays among state agencies, negatively impacted the momentum of project activities. The U of M WRC experienced an eight-month delay in renewing its contract, followed almost immediately by the state shutdown.

Second, there is clearly a need for public resources to support ongoing shoreland restoration and community-building efforts that are ultimately designed to improve water quality.

Third, there is a need for state and county agencies to work more closely together on shoreland issues. We encountered situations where various agencies did not agree on a common approach.

This makes it difficult for local communities and agency staff to collaborate and complement each other's efforts.

Fourth, we note a widespread lack of awareness and understanding about shoreland ordinances. There is a need for simpler shoreland ordinance rules, and more concise ways to portray them pictorially. The many rule exceptions appear to be confusing to the public. Currently, rules posted on county websites are difficult to find. Counties need to develop accessible means of informing new lakeshore property owners of ordinances.

Fifth, we observed that many respondents in both counties did not perceive changes over time in their lake's water quality, especially in the first-round KAP study. Many of the lakes, especially in Itasca County, have not yet been listed for impairments and are generally perceived as being clean. There may be a need for messaging around the potential for future water quality threats or risks, otherwise property owners won't perceive that there is a need to adopt shoreland buffers.

Finally, we encourage longer-term support for carrying out shoreland research (including social research), and to disseminate and share results widely. We see that applied interdisciplinary research yields positive results in terms of adoption, building knowledge, and civic engagement.

Efficacy questions

We conclude that audiences in both counties improved their knowledge about water quality and shoreland buffers; shifted their attitudes in a positive direction; and adopted recommended practices. In this sense we conclude that the NSBI was successful in meeting its objectives.

Revisiting the overarching efficacy questions posed in Section III:

1. Has the program measurably changed awareness, attitudes and behaviors; and if so, are those changes durable (or, are they dependent upon continued incentives)?
2. Can the local unit of government sustain the program into the future?

We conclude that yes, in fact the NSBI measurably changed awareness, attitudes and behaviors in both counties, as documented by comparing pre/post KAP study data. We learned that shoreland behaviors and preferences are not the same for these counties, and that there are differences in the ways that property owners respond to program initiatives. Nevertheless, one constant is that behavioral changes are *not* dependent upon continued financial incentives such as cost-shares, since the knowledge changes and adoption of buffers are attributed primarily to "high" touch interaction with shoreland professionals. While most residents took the cost-share, this was not the reason that people adopted and maintained a new practice. ***Not one person installed a buffer on the basis of being offered a cost- share or financial incentive***, according to EOT SWCD staff. ***Concern for water quality and clean water were the motivating factors for the majority of owners***. The opposite approach would be to charge property owners to conserve (*e.g.* conservation easements).

As noted in Section VI above, the NSBI also tested several new prototype approaches and tools, which were not part of the original scope of work. Not enough time has passed to thoroughly assess each in detail, or to determine the longer-term sustainability/durability of these prototypes. Table 3 summarizes the relative efficacy ranking each incentive or prototype approach or tool piloted in the NSBI project.

Table4: Efficacy of NSBI Incentives and Prototype Approaches

Incentive	Location	Potential utility and impact (High, medium, low)
Financial incentive (cost share)	EOT and Itasca counties	Low to nil
Non-monetary incentive	EOT and Itasca counties	High
Technical advice	EOT and Itasca counties	Very high
Labor	EOT and Itasca counties	High
Planting materials	Itasca County	Undetermined
High touch	Itasca	Medium
Medium touch	Itasca	High
Low touch	Itasca	Low
High touch	EOT	High
Medium touch	EOT	Medium
Low touch	EOT	Low to nil
Prototype approach or tool		
KAP study	EOT and Itasca counties	High
Boat-by	Itasca County	Medium
Landscape manual	EOT County	High
Shoreland templates	EOT County	High
Itasca Lake Challenge	Itasca County	High
Peer-to-peer messaging	EOT and Itasca counties	High

When comparing the experiences of property owners in East Otter Tail and Itasca counties, circumstances and outcomes are very different in the two cases. East Otter Tail reported the highest rates of adoption using its “high touch” engagement strategy, while Itasca reported that its “medium touch” approach was more successful. Nevertheless, for both, some level of medium or high “touch” was clearly more effective than offering a cost-share to stimulate adoption.

We conclude that *contact with professional staff is more efficacious than investments in financial incentives (which also take time to administer) in motivating adoption in these two cases*. In recruiting new lakeshore property owners, the answer is more social than financial. It

may be more efficacious to organize such efforts with multiple agencies and partners (local) and coordinated technical support in training natural resources professionals. New efforts should build on social networks and civic engagement.

Are the customary financial incentives offered by state and local agencies sustainable? Do people maintain the practice after the incentives end? Findings from both counties in the NSBI pilot project indicate that customary financial incentives are *not* effective in inducing adoption of shoreland BMPs, especially when compared with other incentive mechanisms (direct contact with a shoreland professional, landscaping or design assistance, guidebook, planting materials, etc.). In this sense ***financial incentives are not sustainable***. Not enough time has passed to assess whether people are maintaining the BMP after the incentives end.

At this point we do not know whether the changes are durable, because time has been too short in this project to evaluate sustainability. Whether the LGUs are able to sustain the program into the future depends upon programmatic and policy priorities at higher levels, and whether funding is allocated to support LGU efforts (particularly human resources) in the future.

Moving the “maybes”

The EOT NSBI experience suggests that the best way to move the “maybes” (those individuals that say they might be interested in participating) is a combination of the following:

- a. Medium to high-touch presence and contact with shoreland professionals, who first listen and then respond after hearing the concerns of property owners.
- b. Redesign of education and outreach materials that presents a variety of appealing treatment options and choices identified through the KAP study data, and that allays concerns about the negative aspects of buffers (insects, view, lake access).
- c. Social reinforcement and networking that is lake-focused (“*our*” lake), and that features neighbor-to-neighbor activities and lake associations.

It was learned, especially at Lake Seven, that social interaction and “touch” encourages people to keep participating. In general the more “touch” the better, but how can this be facilitated with limited staff resources? How can incipient civic engagement be fostered with so few staff persons available? How can one EOT shoreland specialist work with so many lakeshore property owners? EOT staff observed that it takes a minimum of three to five social interactions with a group to start a project, including face-to-face contact with a shoreland professional or Master Gardener. Working with groups, clubs, churches, and lake associations are a way to maximize staff time, as are “deputizing” trained volunteers and Master Gardeners.

The low-touch incentives resulted in a very low adoption rate (< 1%). The incentives included only a newsletter and (for some) a guidebook. In EOT the medium touch approach resulted in a

4% adoption rate, and the high touch approach resulted in a 20% adoption rate. We conclude that neither low-touch incentives nor financial incentives (cost shares) are effective in moving the “maybes” in Otter Tail County. In Itasca County, the medium touch approach worked best. In general, resources invested in low-touch incentives would be better utilized if invested instead in a heightened engagement effort (trained staff and outreach/education).

Paying attention to the local context is also important. We noted the clear differences in respondent priorities and preferences between the two counties. Designing location-appropriate messages and engagement strategies will likely contribute to BMP adoption.

Evaluation

Not to evaluate project outcomes for environmental and social impacts is no longer an option, given the mandates to demonstrate results and outcomes from state and federal agencies.

Social impact evaluation has lagged behind the assessment of biophysical outcomes for a variety of reasons (Eckman 2011). We found

Local context matters! Avoid “cookie cutter” approaches and messages.

that the KAP study method not only provided key data for planning, but that could also be used as evidence for outcome evaluation. The KAP studies gave us the ability to resample and test for changes in knowledge, attitudes and practices, or the effectiveness of various messages. This means that not only can you build an educational message in an entirely different way, you can also measure what components of your strategy are successful. By knowing how people might respond to message, we knew how to package it in a targeted way to maximize staff time and capacity.

We recognize that change takes time, especially when it comes to human behavior. It also takes time for buffer installations to grow and become established. It takes time for neighbor-to-neighbor messages and “buzz” about a project to disseminate. For these reasons we suggest that evaluation be kept simple and flexible, and that inspections be done approximately every five to ten years. When scaling up the NSBI, it will take time to observe both social and biophysical changes. Finally, it will take time to build LGU staff capacity in these new methods.

VIII. RECOMMENDATIONS

Consider a follow-on initiative to scale-up/scale-out the successful NSBI project elements and to continue following the efficacy questions posed earlier.

Call to re-examine and test conventional tools used to motivate adoption (especially the sustainability of financial incentives). We recommend testing efficacy in shoreland projects elsewhere in Minnesota, as well as in other natural resources efforts.

Need for capacity-building in basic social research and evaluation for LGU staff.

A “take-home” message is that basic social research tools can greatly assist natural resources professionals to fine-tune their education and engagement strategies, address audience barriers and constraints, and evaluate project outcomes. KAP data can provide clear evidence of behavioral change, particularly BMP adoption and maintenance. We conclude that training and capacity-building for LGU staff in basic social science research and evaluation techniques would enable natural resources professionals to be more effective in working with their audiences.

Need to improve public awareness of shoreland ordinances, and make information more accessible. Our KAP data showed that few property owners understand shoreland ordinances, and finding ordinance information on county websites can be challenging.

Need for accountability and evaluation of project outcomes. The majority of publically-funded water quality projects in Minnesota are never evaluated (Eckman, Walker, Nuckles and Bouapao 2008). We recommend that future projects be designed to be “evaluation-ready,” with a monitoring and evaluation plan and budget in place at the outset.

Future research needs. There are several areas where further exploration may be needed, and where our understanding remains limited. The NSBI timeframe has not been long enough to determine the longer-term durability of the incentives. We do not yet know whether maintenance of the shoreland buffers adopted by participants (some as recently as the summer of 2011) will be sustained into the future. Areas needing further exploration and research include:

1. The KAP study approach to learning about “target” audiences and evaluating project outcomes is still under development, although it appears to be fairly promising. To date, WRC has completed about twenty pre/post KAP studies on water quality and other natural resources projects in Minnesota. Currently a meta-analysis of these Minnesota-based studies is underway, and there are plans to develop training modules and activities so that LGUs can conduct their own studies. Although the KAP method has a very long history internationally, it is relatively unknown in the United States and has only been applied to natural resources projects in Minnesota. We do not yet know how KAP studies may apply to other lakes/counties and other states, or its ability to transfer to other contexts.
2. It is unclear how the social engagement pieces created in NSBI will work in other regions of the State with different lake classes, land use characteristics, demographics, and development pressures.
3. Our hypothesis is that people need an easy entry-level civic engagement piece. Will the NSBI engagement elements (fish, frog surveys) transfer to buffer creation in the future?

Will the current engagement strategies continue to motivate people to participate three, five and ten years from now? There is not enough time in current grant to assess these outcomes. We suggest that follow-up of the current NSBI participants take place in the future to better understand longer-term patterns of adoption and maintenance.

4. Understanding wider constraints/barriers for property owners of all demographics and lake classes is currently unknown. The NSBI KAP data apply only to the audiences on the lakes studied in two counties, and is not necessarily representative of all Minnesota lakeshore property owners. A wider exploration of barriers and constraints to adopting recommended practices could be very helpful to planners.

5. Whether financial incentives are sustainable is being questioned by many natural resources professionals. Re-visiting the efficacy question posed earlier (Do financial incentives work? Does the recommended behavior cease when the financial incentive stops?), more research is needed on this issue, and in other circumstances and demographics.

6. The KAP study raised the possibility that property owners do not share a common understanding or perception of a natural shoreline. It is likely that this situation is widespread, and we recommend that further exploration be done on people's perceptions about natural shorelines.

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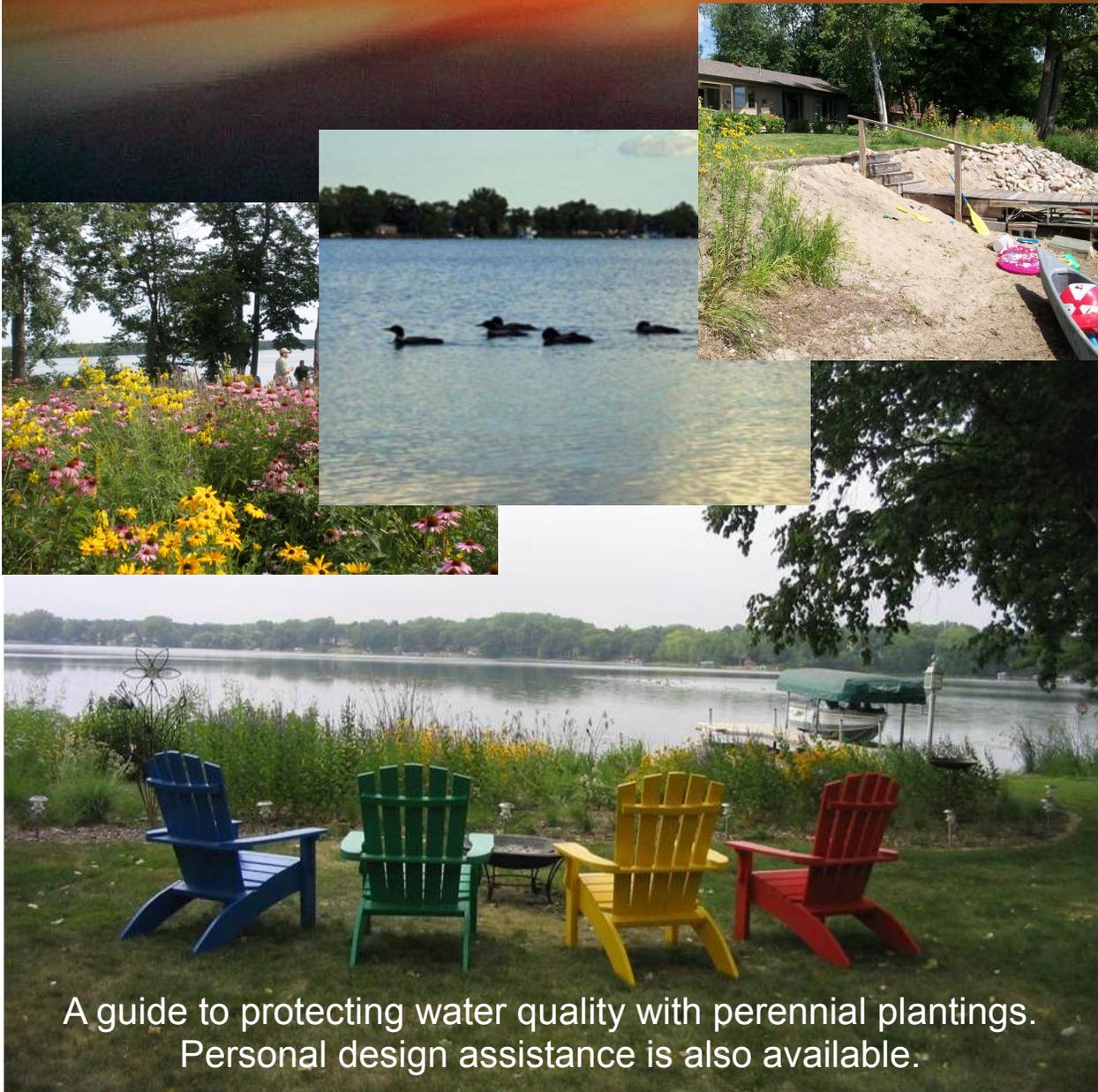
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Attachments:

EOT Lakeshore Landscaping Manual

Itasca Lakes Challenge

Otter Tail County Lakeshore Landscaping Manual



A guide to protecting water quality with perennial plantings.
Personal design assistance is also available.

Partial funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

We are fortunate here in Otter tail County to enjoy lakes with good water quality and scenic views. Growing up with bountiful resources of water, fish, and wildlife is a blessing many of us enjoyed and hope to preserve for future generations. This guidebook is intended to help you design and install native wildflower plantings to protect and improve water quality in your lake, stream, or neighborhood. Deep rooted native vegetation absorbs and purifies both surface runoff and shallow groundwater reducing the amount runoff reaching the lake and the pollutants the runoff carries..

Nutrients carried from residential areas to Otter Tail County lakes have increased significantly from 1993 to 2009 . www.land.umn.edu 2.

Picking the Right Spot

Plantings that catch downspout discharge or surface runoff have a direct impact on water quality. These plantings can be in road ditches, between buildings, or on slopes.

The deep roots of native plants capture, purify, and utilize large amounts of water.

Converting natural areas to lawn has been shown to more than triple annual runoff. 3.



Lakeshore plantings attract and support fish, birds, and butterflies by providing food and cover. Deep roots stabilize the soil while absorbing and purifying rainfall. Plantings on slopes near the lake combine both benefits and eliminate hard to manage areas. Naturally screened areas of your shoreline are excellent locations for native wildflowers.

Contact the Shoreland Specialist at (218)-346-4260 ext.3

Pick a Garden Style

The style of garden you prefer has a large influence your planting. Plant choices, height layouts, site preparation, and annual maintenance vary based on garden type. Height profile is also a personal preference that can be built into a planting.



o Cottage Garden

- Groupings of flowers in a mulch base with accent and border grasses.
- Requires weeding and mulch replenishment .
- Can be very structured.
- Easier to manage for a planned result.

o Prairie Garden

- Mixed or clustered flowers in a short grass base with border grasses.
- Good site preparation is necessary.
- Weeding can be reduced to an annual mowing and removal of perennial weeds.
- Better for water quality.



Pick Your Plant Heights

- | | | | |
|---------|--------|----------------|--------|
| o Knee | 2 feet | o Belly button | 4 feet |
| o Thigh | 3 feet | o Shoulder | 5 feet |

If you have room taller plants add structure to your planting attracting more wildlife. Many taller plants are vigorous bloomers and don't reach full height till after mid-summer. Shrubs often have early blossoms, berries, and excellent fall colors.

Building height into your planting adds visual impact from

Contact the Shoreland Specialist at (218)-346-4260 ext.3

Costs

Native plantings generally cost around \$2.00 per square foot. Bluff plantings can cost an extra \$0.50 per square foot. Shoreline plantings can cost an extra \$5 to \$15 per foot of shoreline.

Cost share funding may be available; typically 75% of a projects eligible cost can be reimbursed to the homeowner after completion of their project.

Cost sharing requires a signed and approved contract prior to project installation to be eligible for funding. Funds may be available from a variety of grants, projects include Raingardens, Shoreline Plantings, and Sealing Abandoned Wells.

Typical Timeline

July	Select your planting area. Develop your design template.
August	Attend an Open House or call the County Shoreland Specialist
October	Submit your project for cost sharing.
January	Receive a letter indicating your cost share status.
February	Submit your plant and material orders.
Early April	Pick a planting day, make arrangements for labor assistance.
Late April	Mark your planting area.
Early May	Apply herbicide to the area.
Late May	Re-apply herbicide to the area.
Early June	Rake the area, seed, install erosion controls, place plants and install. Projects typically take 3 people one day to install.
Late June	Submit "Paid" receipts and volunteer time voucher for cost sharing.
Late July	Receive cost share check.

"Landowner's have been very interested in having Conservation Corps Young Adult Crews come to prepare and install their project. It's a win-win for the homeowner and the crew."

Permits

Your project may require permitting.

Otter Tail County Land & Resource permits are required if any soil will be moved within 100' of the lake. Contact (218)-998-8095

MN DNR permits are required to plant aquatic vegetation or spray herbicides on aquatic vegetation Contact DNR Aquatic Plant Management at (218)-755-3959 for more information. Other permitting agencies include but are not limited to City, Township, or Watershed District.

Vegetation conversion alone usually does not require permit but always check before beginning any projects.

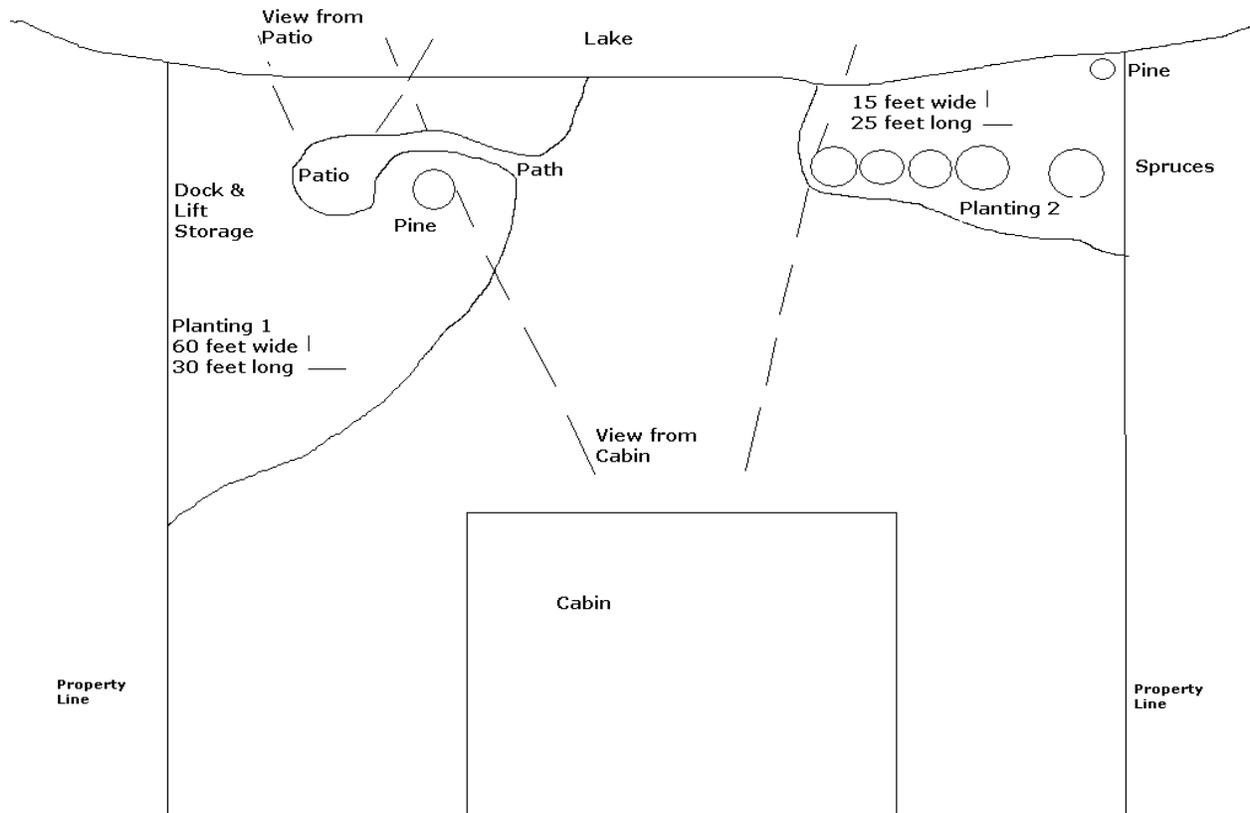
Contact the Shoreland Specialist at (218)-346-4260 ext.3

Choose Your Elements

- Dock or lift storage area
- Sitting Area
- Privacy Screen
- Birdhouse/Birdbath
- Rock feature
- Lake Access Area
- Path
- Sand Area
- Accent Planting
- Shrub Planting

Start Your Sketch

Sketching your lot on a sheet of paper will allow you to visualize how your elements and varied plant heights fit into your landscape. Sketches can be simple or take considerable time. Marking areas of excessively wet or dry soils, steep slopes, viewing lines, and shade on your sketch simplifies the plant selection process.



Now with your sketch you can:

Select your own plants and materials.

Attend a local Design Openhouse

Contact OT Shoreland Specialist for personal assistance.

For more info visit www.eotswcd.org or call (218)-346-4260 ext3

Contact the Shoreland Specialist at (218)-346-4260 ext.3

Site Preparation

Preparing your site is similar to preparing any perennial bed. In general all existing vegetation must be killed before re-establishing native flowers and grasses. Applying a lake friendly Roundup formulation (Eraser AQ, Killz All Aquatic, Rodeo) is most effective and doesn't harm water quality if label directions are followed. Two applications ten days apart are very effective. Wait a minimum of seven days before disturbing the site. For Cottage gardens spread a layer mulch four inches thick on top of the dead vegetation. For Prairie gardens rake the site vigorously immediately before scattering the short grass seeds then cover with an erosion control blanket. Erosion control blankets retain moisture improving germination and growth.

Maintenance

First Two Years

Water immediately following seeding and planting. Watering seeds and small seedlings after sprouting is critical in sandy soils. Plan to water 1/2 inch daily, preferably in the morning, for the first few days or until plants are germinating and growing well. Once plants are established water is only needed if prolonged dry periods occur.

80% of the first year's growth in your planting will be root growth!

Perennial natives will eventually out-compete annual weeds that sprout from seed.

The best method is to repeatedly trim weedy vegetation to 6 to 8 inches with a weed-whacker. This should be done every few weeks or when the weed species reach 10-12 inches in height.

Remove clippings immediately if they cover the native seedlings. This will discourage weed growth, remove shade, and allow native seedlings to grow.

Year Three and Beyond

No watering or weeding should be necessary except for extreme drought conditions or stubborn invasive weed problems. Leave vegetation in place in the fall and through the winter months.

Disclaimer

These instructions are for plantings in areas with gentle slopes and no active erosion. Projects that include work on steep slopes, eroding areas, or shoreline plantings require professional assistance. Design assistance is available from a variety of sources including local individuals, County Soil and Water Conservation Districts, the University of Minnesota Extension, and Minnesota DNR.

Contact the Shoreland Specialist at (218)-346-4260 ext.3

Otter Tail County Favorites by the Otter Tail County Shoreland Specialist
 All of the flowers and grasses listed tolerate dry soils, except those labeled Wet.

	Bloom	Season	and	Color		
	May	June	July	August	Sept	Oct
Short 1-2feet						
Pasque Flower	x					
Prairie Onion			x	x		
Dotted Blazing			x	x	x	
Prairie Pussytoes	x	x				
Thimbleweed		x	x			
Prairie Blue-eyed Grass	x	x				
Harebell		x	x	x	x	
Prairie Smoke	x	x				
Prairie Alumroot	x	x	x			
Hoary Puccoon	x	x				

Short Spreading

Prairie Spiderwort	x	x	x			
Canada Anemone	x	x	x			
Upland White Aster		x	x	x	x	
Golden Aster		x	x	x		

Medium 2-3 feet

Lg. Flw. Beardstongue	x	x				
Larkspur		x	x			
Lead Plant		x	x	x		
Button Blazing Star			x	x	x	x
N. Leaf Coneflower		x	x			
Purple Prairie Clover		x	x	x		
Butterfly Milkweed		x	x	x		
White Prairie clover		x	x	x	x	
Whorled Milkweed			x	x	x	
Heart-leaf Golden Alex.	x	x				
Long Head Coneflower		x	x	x		
Showy Goldenrod				x	x	x

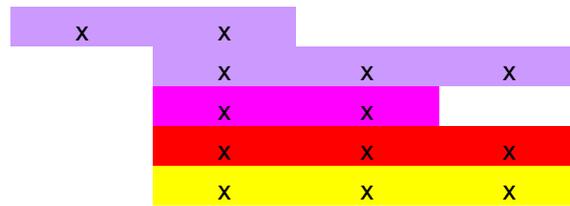
Medium Spreading

Prairie Phlox	x	x	x			
Hoary Vervain		x	x	x	x	
Silky Aster					x	x
Bedstraw		x	x			
Prairie sage		x	x	x		
Prairie Coreopsis		x	x	x		
Old Field Goldenrod				x	x	x

Contact the Shoreland Specialist at (218)-346-4260 ext.3

Tall Clumps 4-5 feet

- [P. Purple Coneflower](#)
- [Prairie Blazing star](#)
- [Showy Tick Trefoil](#)
- [Bergamot](#)
- [Yellow Coneflower](#)



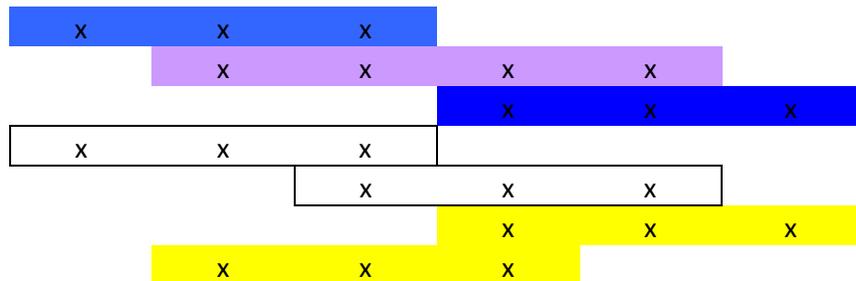
Tall Spreading

- [Smooth Blue Aster](#)
- [Sky Blue Aster](#)
- [Mountain Mint](#)
- [Heath Aster](#)
- [Stiff Goldenrod](#)



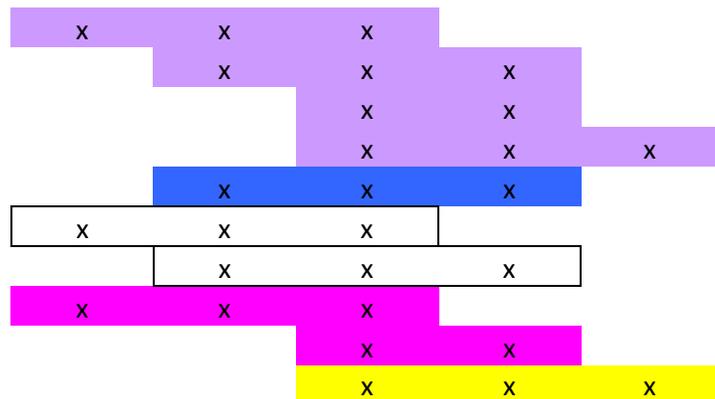
Wet Short

- [Blue flag Iris](#)
- [Monkey Flower](#)
- [Bottle gentian](#)
- [Canada Anemone](#)
- [Wild Mint](#)
- [Marsh Marigold](#)
- [Fringed Loosestrife](#)



Wet Tall

- [Joe Pye weed](#)
- [Common Ironweed](#)
- [Meadow Blazing star](#)
- [New England Aster](#)
- [Blue Vervain](#)
- [Culvers Root](#)
- [Boneset](#)
- [Swamp Milkweed](#)
- [Obedient plant](#)
- [Sneezeweed](#)



Grasses

- [Blue gramma](#)
- [June Grass](#)
- [Side-oats gramma](#)
- [Little Bluestem](#)
- [Green Needle](#)
- [Northern Drop-seed](#)
- [Switch grass](#)

Ht.

1'	Lawn Alternative, can form a sod, very short. General Base Grass.
1.5'	Comes up early, forms nice seed head display. Good for edging.
1.5'	Comes up rapidly, short loose bunches. General Base Grass.
2'	Very Good stabilizer for dry soils, excellent summer & fall color. Edging species.
2'	Greens up early. Common in our area especially on bluffs with Side Oat's Grama.
2.5'	Beautiful flowing mounds. Greens up early. Great for edging.
4'	Very strong root system. Interesting seed heads.

Contact the Shoreland Specialist at (218)-346-4260 ext.3

Indian grass	4'	Forms a loose sod. Generally a co-dominant grass.
Big Bluestem	4'	Very Good stabilizer for semi-moist soils, bunch grass.
Shrubs	Ht.	
Red Osier Dogwood	6'	Very strong stabilizer in sandy to dark soils.
Gray Dogwood	4'+	
Meadow Sweet	4'+	
New Jersey Tea	3'	
Ninebark	6'+	
False Indigo	4'	Excellent Stabilizer for Gravelly, Sandy Banks. Delicate leaves on an open
High Bush Cranberry	6'+	Nice winter berries, great bird shrub. Early bloomer, variegated leaves.
Black Chokeberry	5'	Produces many edible berries.

Resources

Visit the DNR maintained list for current information in your area.
<http://www.dnr.state.mn.us/gardens/nativeplants/suppliers.html>

Erosion Control Products

Brock White Company www.brockwhite.com (800)-487-9256
 Natural Shore Technologies www.naturalshore.com (612)-703-7581

Native Plant Nurseries

Morning Sky Greenery www.morningskygreenery.com (320)-795-6234
 Prairie Moon www.prairiemoon.com (866)-417-8156
 Prairie Restorations www.prairieresto.com (763)-383-4342

Design Assistance

Otter Tail County Shoreland Specialist www.eotswcd.org (218)-346-4260 x3
 MN DNR Shoreland Habitat Program www.dnr.state.mn.us (320)-634-4573
 MN Extension www.extension.umn.edu (218)998-5787

Visit www.BlueThumb.org for a comprehensive listing of additional resources.

Other great resources

Lakescaping for Wildlife and Water Quality (C.L. Henderson, C.J. Dindorf, F.J. Rozumalski, 1999 MN DNR) is a book showing techniques to prevent shoreline erosion and restore wildlife, habitat, wildflowers and clean water. **Retail Price: 19.95**

Restore Your Shore (2002, MN DNR) is a sequel to the lakescaping book. This instructional CD-ROM presents ideas to use in protecting and restoring natural shorelands. 400 native plants on a searchable database. Visit the Restore Your Shore website at <http://www.dnr.state.mn.us/restoreyourshore/index.html>

Step 1: Take a closer look at your site. **Step 2:** Note items circled in these two grey columns. **Step 3:** Consider the corresponding *Challenge(s)* in this column. **Step 4:** Go for it!

1	2		2		3	4					
In the Water From the water's edge lakeward	Circle your responses				If you circle items in these two columns, consider a <i>Challenge</i>	→	In the Water <i>Challenge Menu</i>	Lake and Human Benefits	Relative Cost	Time-Effort	<i>I'll take this Challenge*</i>
What is the width of the recreation area where aquatic plants have been removed?	No water use	About 10 feet	About 20 feet	About 30 feet	More than 40 feet	→	A Smaller Footprint Where aquatic plants were removed, allow them to grow back.	Fish, frogs, and other wildlife use plants for nesting, cover and food. Aquatic plants protect your shore from erosion. Native aquatic plants can minimize invasive plants.	0	None	
				Go Fish! Replant aquatic plants (MN DNR no-fee permit required).	\$-\$\$	Some to Moderate	**				
Are there downed trees ("fish sticks") in the water?	Abundant fish sticks		Some fish sticks		No fish sticks	→	Fish Sticks Let fallen trees and branches remain along the shore and in the water.	Fish, turtles, water birds and mammals use downed trees for shelter, resting, hunting and food.	0	None	
How many accessories (docks+boats+other) are in the water?	0	1-2	3	4	More than 4	→	Ships Ahoy! Store on land the water accessories you don't often use.	Increase fish habitat (otherwise limited by water accessories).	0	None	

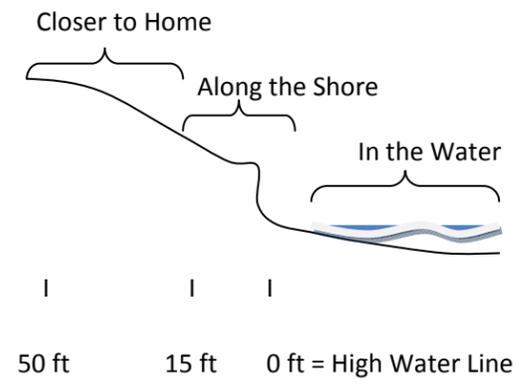
Along the Shore From water's edge to 15 ft landward of the high water line	Circle your responses				If you circle items in these two columns, consider a <i>Challenge</i>	→	Along the Shore <i>Challenge Menu</i>	Lake and Human Benefits	Relative Cost	Time-Effort	<i>I'll take this Challenge*</i>
What width of your shoreline has been altered for lake access, view, recreation, other?	Little or none	About 10 feet	About 20 feet	About 30 feet	More than 40 feet	→	A Smaller Footprint Reduce this area to a smaller footprint with the following option(s).	80 percent of wildlife in MN depends upon a shoreland of native plants for their survival.	0 - \$\$\$	None to Moderate	**
Within this area:											
a. Describe the tree/shrub cover.	Dense	Many	Some	A few	None	→	Hedge Your Edge Plant native trees and shrubs along your shore.	Deep roots of native plants resist erosion from ice and wave action. Native plants also filter soil and pollutants from rainwater run-off.	\$ - \$\$	Moderate	**
b. What part is lawn or sand blanket?	None	About one quarter	About half	About three quarters	All or nearly all	→	Green Armor Your Shore Plant native grasses and grass-like plants.		\$ - \$\$	Moderate	**
c. What part is mowed or weed-whipped?	None	Only enough for a path	Some	Most	All	→	Bye-Bye Geese Stop mowing and weed-whipping. Geese avoid tall plants where predators may be lurking.	1.5 pounds of poop per goose per day will not land on your lawn and wash into the lake.	Saves you \$\$	None	
d. What part is armored with rock?	None	About one quarter	About half	About three quarters	All or nearly all	→	Soft Rock Install native plants into existing rock.	Plants soften the appearance, filter run-off and provide wildlife habitat.	\$ - \$\$	Moderate	**
e. What other hard surfaces exist? (Circle all that exist.)	None		Other?	Boat(s) Sidewalk Dirt path	Road Building Patio	→	Stop the Drop Remove unnecessary hard surfaces and replant or install pervious surfaces, berms, etc. to capture and filter rainwater.	Reduce rainwater run-off (carrying soil, nutrients and other pollutants) entering the lake by over 80%, and reduce algae in the lake, too!	\$ - \$\$	Moderate	**
f. Is there a fire ring or area?	None				Yes	→	Ring of Fire Move fires and fire rings away from the lake (25 to 50 feet is recommended).	Reduce the phosphorous- and nitrogen-rich ashes carried into the lake by rainwater and wind.	0	Some	
g. What portion of the shore has an ice ridge?	All – Ridge not breached	Part – Ridge not breached	None – Natural slope	All/Part – Ridge breached	All – Ridge regraded	→	No Water Over This Dam Leave ice ridge in place and create an access over it. Plant a rain garden behind it for added beauty and filter.	An ice ridge across your entire shoreline can capture and filter up to 100% of soil, nutrients and other pollutants in rainwater run-off.	0	None	
h. What length of shoreline is eroding? (continued on back side)	Little to none	About 10 feet	About 20 feet	About 30 feet	More than 40 feet	→	Shore Up Your Shore Consult with Itasca SWCD to determine which erosion control method is best for your	For a 100-ft lot, this can reduce the soil entering the lake by about 360 pounds per year and result in about	\$ - \$\$\$	Some to Great	**

Closer to Home 50 feet landward of the high water line (excluding the Along the Shore area)		Circle your responses				If you circle items in these two columns, consider a <i>Challenge</i>	→	Closer to Home Challenge Menu	Lake and Human Benefits	Relative Cost	Time-Effort	<i>I'll take this Challenge*</i>
What average width of this upland area has been altered for access, recreation, view, other?		Little to none	About 10 feet	About 20 feet	About 30 feet	More than 40 feet	→	A Smaller Footprint Reduce this area to a smaller footprint with the following option(s).	80 percent of wildlife in MN depends upon a shoreland of native plants for their survival.	0 - \$\$\$	None to Great	**
In this area							→	Super Filter Plant native trees, shrubs, ferns, vines, flowers, grasses and/or grass-like plants. They filter run-off, minimize erosion and provide food, shelter and nesting sites for songbirds and other wildlife.	For a 100-ft lot, replacing lawn with a 50-ft forested filter can reduce the soil entering the lake by about 360 pounds per year and result in about 90 pounds less algae in the lake.	\$ - \$\$\$	Some to Great	**
a. Describe the amount of trees.		Dense	Many	Some	A few	None	→					
b. Describe the amount of shrubs.		Dense	Many	Some	A few	None	→					
c. What part is covered by lawn or bare soil?		None	About one quarter	About half	About three quarters	All or nearly all	→	No Mow-Let It Grow! Stop mowing and allow plants to grow back. Set Your Sights High Raise the blade on your mower to 3 inches.	Taller grasses will better filter run-off from your property. A longer lawn will also better tolerate stress and limit weeds.	Saves you \$300/acre/yr	None	
d. What part is mowed or weed-whipped?		None	Only enough for a path	Some	Most	All	→			0	None	
e. Is erosion or runoff related to the following? (Circle all that apply.)		Little or None	Stairs Lift	Other?	Sidewalk Path Steps	Road Building Patio/Deck Wall	→	Step it Up! Modify your foot access to filter rather than funnel rainwater directly to the lake.	Reduce rainwater run-off (as well as the soil, nutrients and other pollutants it carries) entering the lake by over 80%. This will reduce the algae in the lake, too!	0 - \$\$\$	Some to Great	**
								Get with the Flow! Modify hard surfaces with water bar, berm, etc. to redirect rainwater to filter into soil rather than flow directly into lake.		0 - \$\$\$	Some to Great	**
								Who'll Stop the Rain? Install rain barrel, rain garden, drip trench, etc. to capture and use rainwater.		\$ - \$\$\$	Some to Great	**

Extra Credit Challenges	(Circle those that interest you.)				<i>I'll take this Challenge*</i>
Pass It On!	Help a neighbor with a Challenge Project Plant a filter, make a water bar, survey for frogs, etc.	Lake Cache Establish a control points around the lake for youth activity	Tell several neighbors about the Lake Challenge Host a boat tour or back yard party	Start a "Welcome Aboard" Program Tell new lake neighbors about the <i>Lake Challenge</i>	

To enroll or seek more information on the
Itasca Lake Challenge,
Contact: Mary Blickenderfer, University of MN Extension
blick002@umn.edu 218-244-7996

Family Fun	Shoreland Scientist See what's in your rainwater run-off! <i>Equipment and training provided. Time: 15 min following each rain event. **</i>	Fish Count <i>Training provided. Time: 1 hour per year</i>	Frog and Toad Count <i>Training provided. Time: 1 hour per year</i>	Beachcomber Program Monitor your shore for aquatic invasive plants. <i>Training provided. Time: 5-15 minutes several times per year</i>	
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** or indicate if you've already met this challenge*

**** Cost-share available through June 2011**

Notes: