MOVING THE MAYBES: HOW WE USED SOCIAL DATA TO BUILD SUCCESSFUL EDUCATIONAL AND ENGAGEMENT STRATEGIES

2012 Minnesota Waters Conference

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Presentation outline:

- The Native Shoreland Buffer Incentives (NSBI) project
- The NSBI social research tools – KAP studies
- How we applied the social data
- Results
- Discussion

Native Shoreland Buffer Incentives (NSBI) Project Basics

- **Lead agency: MN DNR**
- **LCCMR funding for $225,000 (2008-2011)**
- **Goal: "*to test the efficacy of different strategies to incentivize and motivate the adoption of shoreland buffers*"**
- **Two counties: East Otter Tail and Itasca**

NSBI incentives structure:

- **Financial incentives:**
  - **Cost-shares**

- **Non-monetary incentives:**
  - **Technical support and advice**
  - **Labor**
  - **Planting materials**
  - **Social networking and communication**

Core questions

- Do financial incentives motivate people to adopt shoreland buffers?
- If not, what does motivate people?
- How can we engage lakeshore property owners more effectively?
- Are we having an impact on our audiences?

Engagement approaches

We tested the efficacy of different engagement approaches ("touches") in each county:

- **High touch – direct one-to-one contact with a NR professional**
- **Medium touch – group contact with a NR professional**
- **Low touch – brochures, mailings**

"What's going on with my audience?

- Am I having any impact?
- Did they adopt my BMP?
- Did they increase their knowledge?

- How can I measure these core social outcomes?

What are core social outcomes?

- Does audience *knowledge* increase about a particular water problem?
- Do their *attitudes* about the problem change in a positive direction?
- Do people *adopt a recommended practice* to remedy the problem?
- Is that *practice maintained* over time?

These are minimum core constructs for project evaluation

So…we experimented with a KAP study…

What's a KAP study?

A KAP study is a social research method (survey) that measures changes in *knowledge, attitudes and practices* in response to a specific project activity, usually education or outreach.

KAP studies emerged as a public health evaluation method in the 1930s in developing countries

KAP study basics…

- Limited focus on three constructs:
  - Knowledge about X
  - Attitudes toward X
  - Practices related to X
- Two (pre/post) surveys
- Each KAP study is unique
- Flexible method (door-to-door; mail; phone; community workshop; etc).

What can a KAP study do?

- Collect data for planning
- Help to design education and outreach activities
- Measure attitudes about a specific issue
- Identify constraints (why people don't adopt and maintain a BMP)
- Quantify outcomes by comparing pre/post data

KAP tool: the gap exercise

- Brainstorm about the gaps in your team's knowledge about your audience (what *don't we know, but should?)*
- Can existing data address any of those gaps?
- What is your theory of change? What do you expect people to do? How will you know if they do it?

Itasca County NSBI social research

- KAP study
  - First-round 2009
  - Second-round 2011
- Focus group
- Key informant interviews
- “Boat-by”

Boat-by (total lake survey)

Itasca first-round KAP findings

- High knowledge of water quality
- High stewardship values
- Most already have a natural shoreline
- Financial incentive not important
- Preferences
- Barriers

Itasca first-round KAP findings

What would motivate people?

Detailed information and instruction (64%)

Technical support (51%)

“How-to” workshop (48%)

Input on design (48%)

Financial support (42%)

Labor assistance (37%)

How were the Itasca social science findings used?

Engagement: local experts

- MN Extension
- ICC students
- Master Gardeners
- Informed volunteers

People-centered engagement

- **Provide opportunities for citizen-science:**
  - **Run-off plots**
  - **Frog and toad counts**
  - **Kid's fish habitat workshops**
  - **Beachcombing workshops**

Dock signage

- Gives recognition that property owner is a lake steward
- Emphasizes association with “our lake”

Itasca County Lake Challenge

The Itasca County Lake Challenge Lake _____ Property Owner _____ Property # _____ Property Width ____ ft. Date _____

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!

In the Water From the water's edge lakeward	Circle your responses (1)			If you circle items in these two columns, consider a *Challenge* (2)	(2)		In the Water *Challenge* Menu (3)	Lake and Human Benefits	Relative Cost	Time-Effort	*I'll take this Challenge** (4)
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 *Challenge*			Along the Shore *Challenge* Menu	Lake and Human Benefits	Relative Cost	Time-Effort	*I'll take this Challenge**
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?	No				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 breeched	Part – Ridge not breeched	None – Natural slope	All/Part – Ridge breeched	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	**

East Otter Tail NSBI social research

- KAP study
  - First round 2008
  - Second round 2011
- Key informant interviews
- Unobtrusive observation

Otter Tail County KAP findings

- **Very high stewardship values and concern for clean water**
- **Strong sense of legacy**
- **High knowledge levels**
- **70% already have natural shorelines**
- **Lake associations are best link to owners**

How were the East Otter Tail KAP findings used?

Key finding:

- People didn't require cost-share to adopt
- They willingly adopted without a financial incentive
- Motivating factor was their concern for "their" lake and for clean water
- Preference for high-to-medium "touch"

People-centered engagement

- Listen first, then respond
- Don’t just “drum everything out”
- Don’t assume that everyone needs or wants the same information or incentive
- Customize the message based on the owner’s issues

Steve Henry, EOT SWCD

Peer-to-peer messaging

- **EOT relied on existing social networks (lake associations, churches, garden clubs) for moving messages**
- **Group-based buffer tours**

Offer landscaping choices to respond to people's preferences

How did we use the KAP data?

- We reviewed our outreach strategies
- We reviewed educational materials and images for content
- We redesigned these to better align with respondent values
- For example…

Otter Tail County Pre-KAP messaging (2008)

View of lake is blocked

Audience perceives a "wall of vegetation"

Post-KAP messaging (2011)

Clear views of sky and water

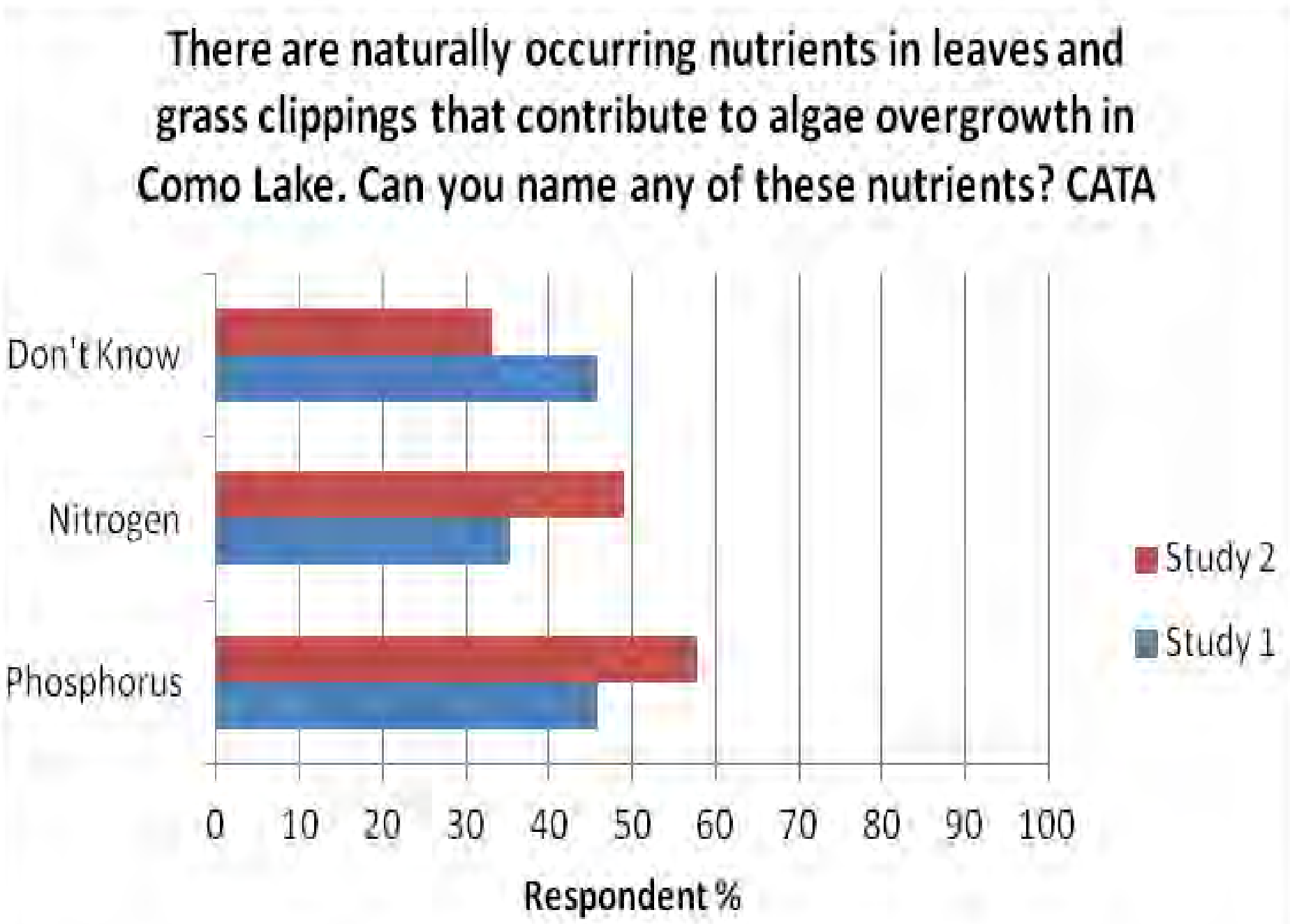
Good sightlines for children (safety)

Evidence of NSBI success (comparison of pre/post KAP data)

- **Knowledge values increased**
- **Attitudes values shifted in a positive direction**
- **Practices: Of those without natural shorelines, there was satisfactory adoption in the "medium" and "high" touch groups**
- **Constraints: Staff overcame constraints with better messaging and by providing appropriate incentives (labor, planting materials)**

Another example: Como Lake

- KAP study showed that assumptions about people's behavior were not accurate
- Data helped staff to reframe messages based on stewardship, not scolding
- KAP data was evidence for evaluating outcomes of the Community Clean-up for Water Quality


There are naturally occurring nutrients in leaves and grass clippings that contribute to algae overgrowth in Como Lake. Can you name any of these nutrients? CATA
Don't Know
Nitrogen
Phosphorus
0
10
20
30
40
50
60
70
80
90
100
Respondent %
Study 2
Study 1

Como Lake TMDL:

- **Strong participation in leaf clean-ups**
- **KAP data proved that people were already doing the correct practices**
- **Many "good Samaritans" helping their neighbors**
- **Recruitment**

Summing up…

- KAP data can help to reframe educational content
- KAP data can help to identify an outreach strategy that gets people involved
- KAP studies provide evidence of outcomes for evaluation

- KAP training modules in preparation

For more information:

http://www.dnr.state.mn.us/staging/nsbi/index.html

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Acknowledgements

- Minnesota Environment and Natural Resources Trust Fund
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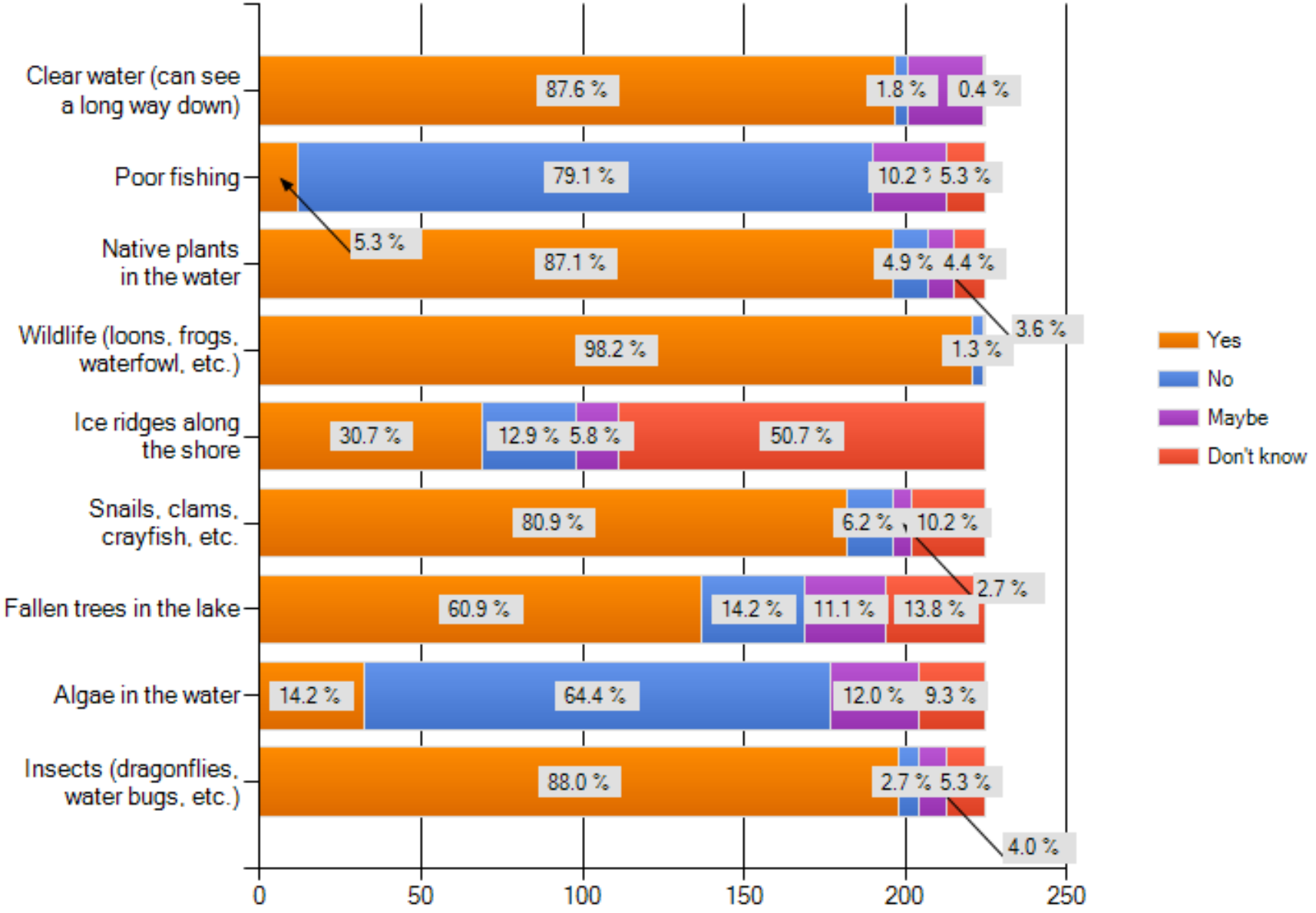
- University of Minnesota Water Resources Center
- East Otter Tail County SWCD
- Itasca County SWCD
- MN Extension
- Initiative Foundation
- Itasca Coalition of Lake Associations
- *Special thanks to Erika Rivers, DNR*

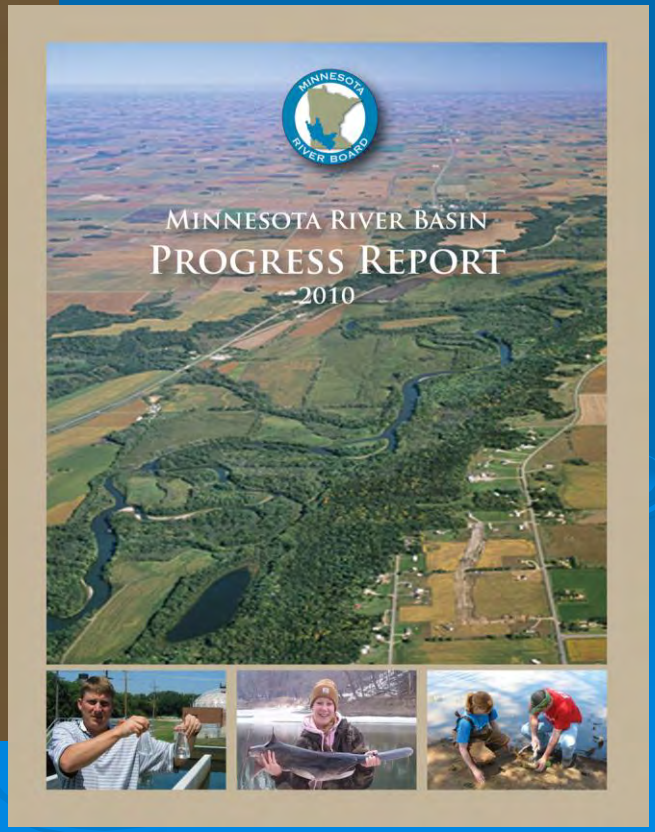
I'm going to read a list of characteristics. Tell me whether you think each is a sign of a healthy lake.



An educational field trip online

Minnesota River Basin

Minnesota River Basin Reports



The Minnesota River at Upper Sioux Agency State Park near Granite Falls

Inspiration

Experts in the Field

Experts (examples)

Carrie Jennings: Geologist, Minnesota Department of Natural Resources

Pat Baskfield: Hydrologist, Minnesota Pollution Control Agency

Mike Davis: Ecologist/Malacologist, Minnesota Department of Natural Resources

Chris Domeier: Fisheries Biologist, Minnesota Department of Natural Resources

Tom Kalahar: District Technician, Renville Soil and Water Conservation District

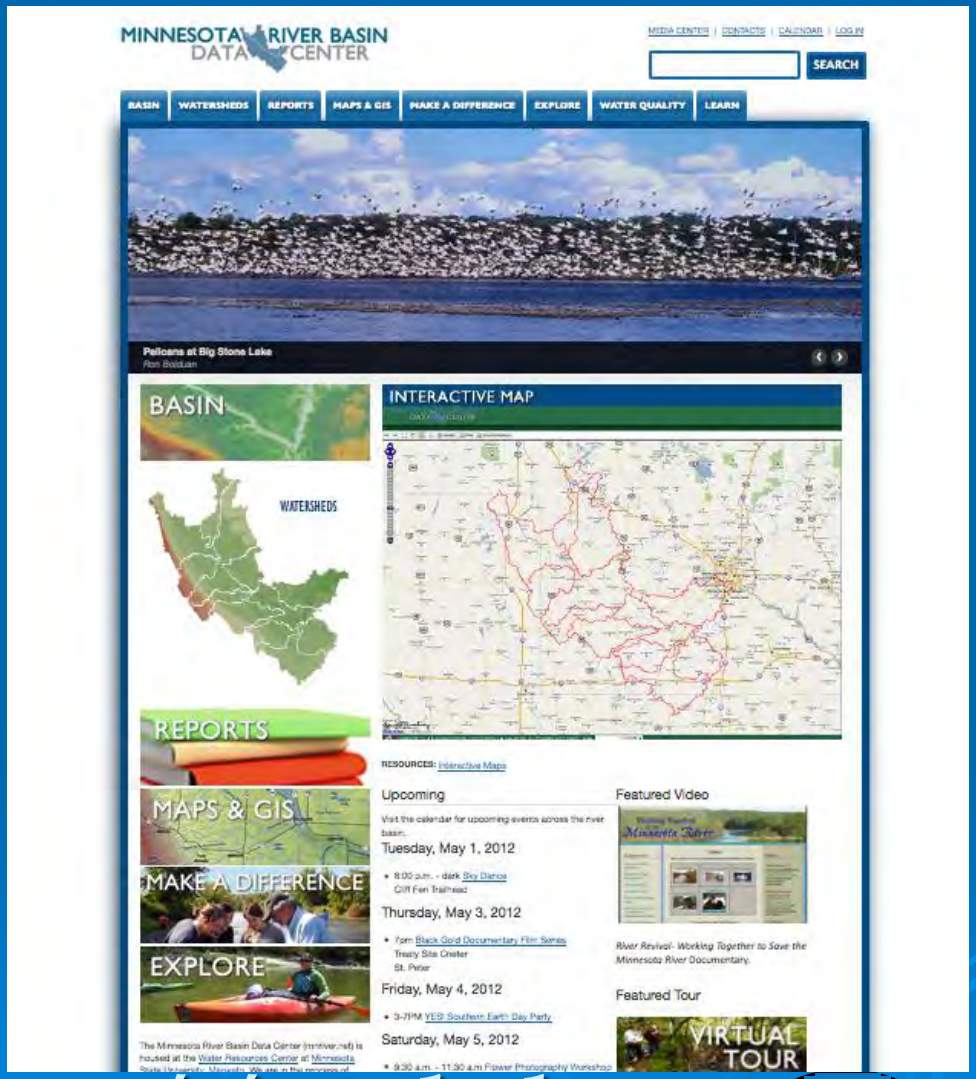
Funding

THE McKNIGHT FOUNDATION

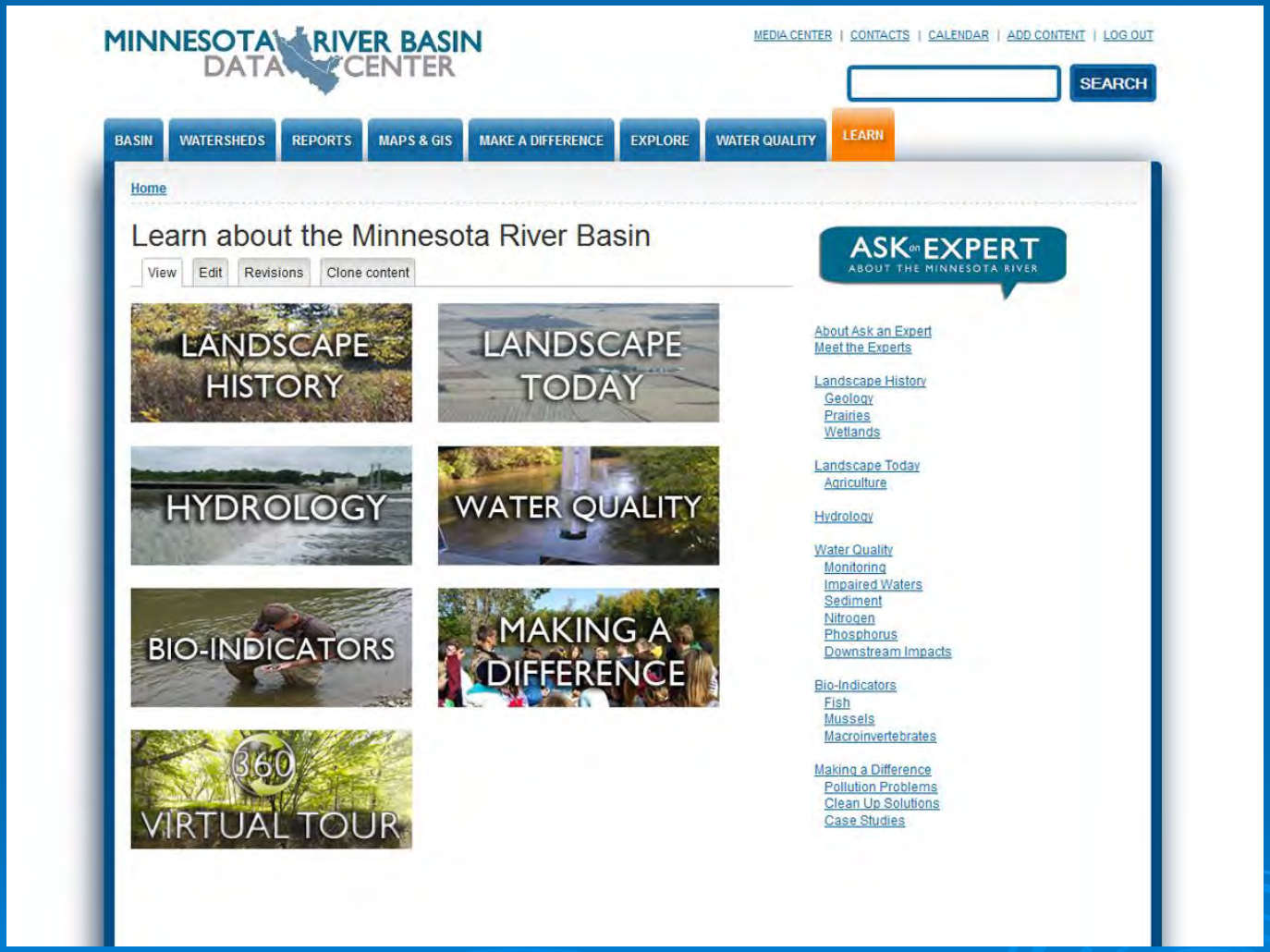
The Process

- Convened Advisory Group
- Developed Themes and Key Questions
- Identified Experts
- Conducted Interviews
- Developed Web Site and Kiosks
- Performed Outreach & Education

Minnesota River Basin Data Center



http://mrbdc.mnsu.edu



http://mrbdc.mnsu.edu/learn

MINNESOTA RIVER BASIN DATA CENTER

MEDIA CENTER | CONTACTS | CALENDAR | ADD CONTENT | LOG OUT

SEARCH

BASIN | WATERSHEDS | REPORTS | MAPS & GIS | MAKE A DIFFERENCE | EXPLORE | WATER QUALITY | LEARN

Home » Learn » Landscape History

Geology

View | Edit | Revisions | Clone content

GEOLOGY VIDEOS

What is the story of Lake Agassiz and the River Warren? (02:02 minutes)

How does geology play a role in understanding our river and water quality today? (02:07 minutes)

What is a knick point and how does it relate to water quality in the Basin? (01:59 minutes)

What is the story of the River Warren Falls in the Minnesota River Basin? (01:37 minutes)

Are there some of the oldest rocks on Earth in the Minnesota River Basin? (01:47 minutes)

Why are there so many waterfalls in the Minnesota River Basin? (00:58 minutes)

What are some of the unique geologic features in the Minnesota River Basin? (02:04 minutes)

What is a glacial moraine? (02:14 minutes)

Why does the Minnesota River Valley bend and head north at Mankato? (02:34 minutes)

MEET THE EXPERT

Dr. Carrie Jennings, Geologist, Minnesota Department of Natural Resources

ASK an EXPERT ABOUT THE MINNESOTA RIVER

FACT SHEETS

FEATURES & MEDIA

360 Panoramic Tour - Geology

Slideshow

ANIMATIONS (Requires Flash Player)

Glaciation Animation (0.5 mb)

Valley Formation & River Warren Animation (0.5 mb)

MEET THE EXPERT

Dr. Carrie Jennings, Minnesota Department of Natural Resources

RESOURCES

Geology of Minnesota River Basin (MDNR Excerpt - 1.3 mb pdf)

Minnesota Geological Survey

Minnesota's Geology (MDNR web link)

Division of Lands and Minerals (MDNR web link)

Interview Clips

Watch experts in the field explain the latest river research and observations.

Educational Materials

Learn from fact sheets, field guides, presentations and slideshows.

360° Virtual Tours

Launch panoramic images with embedded videos and photos.

Interview Clip: Geology

Carrie Jennings

Glacial Geologist

Minnesota Department of Natural Resources

http://mrbdc.mnsu.edu/geology-0

Interview Clip: Mussels

Mike Davis

Ecologist/Malacologist

Minnesota Department of Natural Resources

http://mrbdc.mnsu.edu/mussels

Interview Clip: Fish

Brad Koenen

Fisheries Technician

Minnesota Department of Natural Resources

http://www.youtube.com/watch?v=wfrTqIdS3HI&feature=youtu.be

Educational Materials

MUSSEL OVERVIEW

ASK the EXPERT ABOUT THE MINNESOTA RIVER

History

Mussels are often the dominant community found in the substrate of streams and lakes. Historically, mussels were abundant across Minnesota's Rivers and lakes. At one time, across the US and Minnesota, there were large and diverse population of mussels. Humans have used mussels for millennia. Mussels and their shells have played a significant role in many different cultures around the world. North American Indian tribes ate mussels and crafted tools, jewelry and utensils out of the shells. Their importance to Native Americans can be seen by the large shell mounds associated with historic village sites.

Explorer's Account (1830s)

Wisconsin Electronic Reader

George Featherstonhaugh was an Englishman who explored the Minnesota River from Fort Snelling to Lake Traverse in 1835.

Canoeing from the Blue Earth River confluence to Granite Falls, he remarked on a "great profusion of unios [mussels] lying on the sandy bottom."

Downstream from the Redwood River confluence, "We found the river diminish from two feet and a half to one foot, the water beautifully transparent, and the unios [mussels] stuck in countless numbers in the pure white sand, so that I could, by baring my arm, select them as we went along."

Did You Know? Mussels from Minnesota River used for Buttons

Button Industry (1900s)

In the late 1800s and early 1900s enormous numbers of freshwater mussels were harvested for button-making to make pearl buttons for clothing. This became a multi-million dollar business. New Ulm was a center for this industry in the Minnesota River. the industry collapsed in the 1940s and 1950s due to the invention and widespread use of plastic buttons. A new market for freshwater mussels developed using cultured pearls for jewelry in the 1950s by the Japanese, specifically using the washboard and threeridge mussels. Mussel shells were cut and inserted into an oyster to serve as a nuclei for cultured pearls. Mussels are now protected in Minnesota and a permit is required to collect live mussels.

Timeline

1916 A crew of clammers arrived in Granite Falls to dig for mussels. They used boats with rakes between Montevideo and Mankato to gather 10 tons of shells worth $30,000 to ship to the button factories in Iowa.

1917 The mussel harvest was a poor one with the beds worked over from the previous summer.

1921 Fourteen tons of shells were shipped from Granite Falls and 16 tons from Wegdahl to the Muscatine Button Factory.

1926 Minnesota Conservation Department banned clamming on the Minnesota River between the Yellow Medicine and Lac qui Parle rivers.

1933 Twenty to thirty men were hired by the Smith Brothers of Granite Falls to dig mussels with 80 tons of shells shipped to button factories. The meat from the mussels were boiled and sold for hog feed.

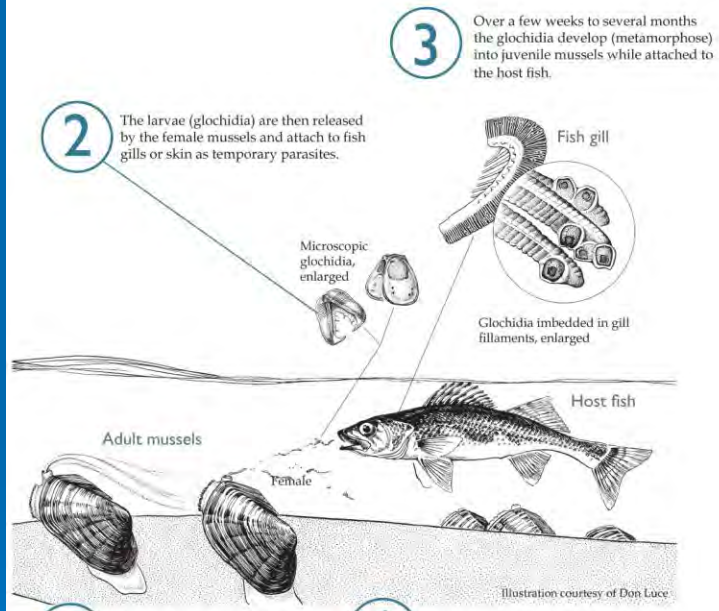
Today No live mussels may be collected in Minnesota without a special permit.

Source: http://www.karlspearls.com/pearl-buttons.html

MUSSEL LIFE CYCLE

ASK the EXPERT ABOUT THE MINNESOTA RIVER

Freshwater mussels have a complicated life history that is tightly linked to freshwater fishes. Attaching to a host is also the primary way that mussels are distributed throughout a water body; therefore, a mussel species' distribution is directly related to the host fish's distribution.



Field Guides

MUSSEL FIELD GUIDE

ASK the EXPERT ABOUT THE MINNESOTA RIVER

Freshwater mussels have two hard shells (valves) held together by hinge and are part of the mollusks - the world's second largest group of animals. A group of animals that would include familiar creatures like snails and the octopus. One of the mussel's more unique characteristics is its foot. The mussel opens up its shell, sticks out the foot and pulls itself slowly along the river or lake bottom. Look for a grooved or snakelike track in the stream's substrate to see where it has traveled. Many different animals like raccoons and muskrats eat mussels and you can find shells along the shoreline of most rivers in the Minnesota River Basin.

To learn more about the mussels identified in this fact sheet check out the "Field Guide to the Freshwater Mussels of Minnesota" written by Bernard E. Sietman, Minnesota Department of Natural Resources. You can purchase a copy at http://www.dnr.state.mn.us/eco/nhnrp/mussel_survey/fieldguide.html
To learn more about mussels, visit the Minnesota Department of Natural Resources Mussel website: http://www.dnr.state.mn.us/mussels/index.html

male female


Fatmucket - *Lampsilis siliquoidea*
An oblong mussel, the Fatmucket is yellowish to brown, usually with green rays color and grows up to 6 inches long. The shells of males and females differ with females being more inflated. The Fatmucket is one of the most widespread mussels in the Minnesota River Basin, but nearly extirpated from the Blue Earth River Basin.

Fragile papershell - *Leptodea fragilis*
An oval or oblong shaped mussel, the Fragile papershell has a thin shell and yellowish in color with pale green rays. Resembling the scaleshell and pink papershell, the fragile papershell is primarily found in medium and large rivers and today is one of the most common mussels present in Minnesota River Basin.

Giant Floater - *Pyganodon grandis*
Floater, stout floater, and papershell are just a few other names for this elongate or somewhat elliptical shaped mussel. Giant floaters have a smooth, thin shell, with a light tan or yellowish green color. They typically live in sluggish mud-bottomed pools of creeks or rivers. The Giant floater is one of the most common and widespread mussels in Minnesota and the Minnesota River Basin.

Plain Pocketbook - *Lampsilis cardium*
As one of the more commonly found mussel in the Minnesota River Basin, the Plain pocketbook prefers a stable sand substrate from small streams to large rivers. It has a smooth, oval or round shell that is usually yellowish in color with dark green rays. The shells of the males and females differ with females being more inflated.

Three Ridge - *Amblema plicata*
A commercially valuable mussel, the three ridge can be identified by thick to heavy valves and any number of ridges of folds. These mussels live in streams of all sizes and substrates (soft or coarse). It is much more abundant in the Pomme de Terre River watershed than anywhere else in the Minnesota River Basin.

MUSSEL FIELDGUIDE

ASK the EXPERT ABOUT THE MINNESOTA RIVER

male female

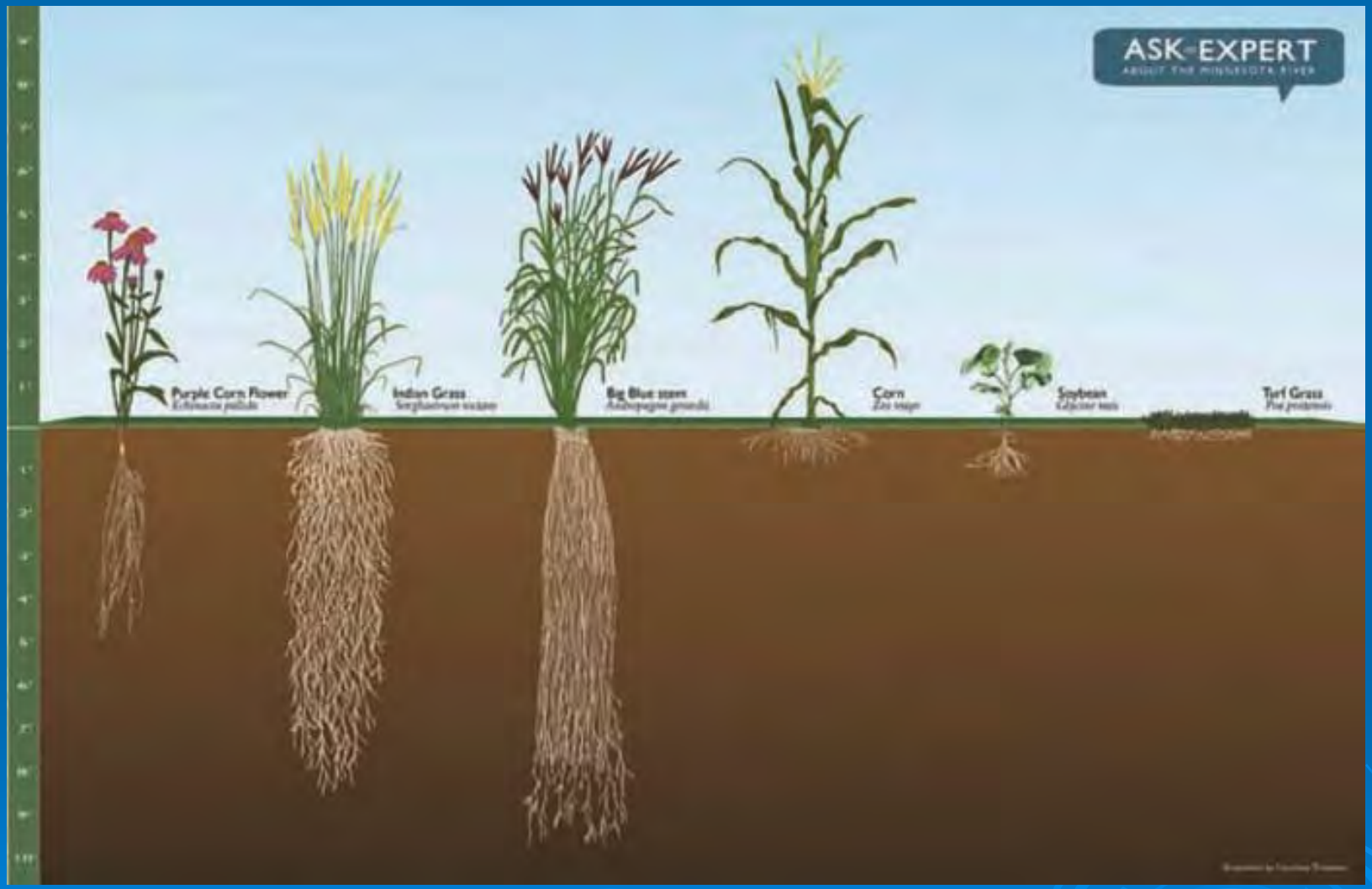

Black sandshell - *Ligumia recta*
This rare mussel can still be found in some of the tributaries of the upper Minnesota River Basin and grows up to 8 inches. Characteristics of the black standshell include moderately thick elongate, valves with a smooth and shiny outer shell that is usually black or greenish, sometimes with dark green rays. The inside of the shell is purple. It is locally abundant in the Chippewa River watershed.

Monkeyface - *Quadrula metanevra*
No longer found in the Minnesota River Basin, this mussel has a square-like shape with a yellowish, greenish or brown color. You can tell the difference between a Monkeyface and mussels like the wartyback and winged mapleleaf by its large, knobbed posterior ridge and green V-shaped markings.

Mucket - *Actinonaias ligamentina*
A smooth, thick, oval shell describes this mussel and brown in color, occasionally with broad green rays. The mucket lives in medium to large rivers in sand and gravel. Most likely, the mucket was the most abundant mussel in the Minnesota River but it has disappeared completely.

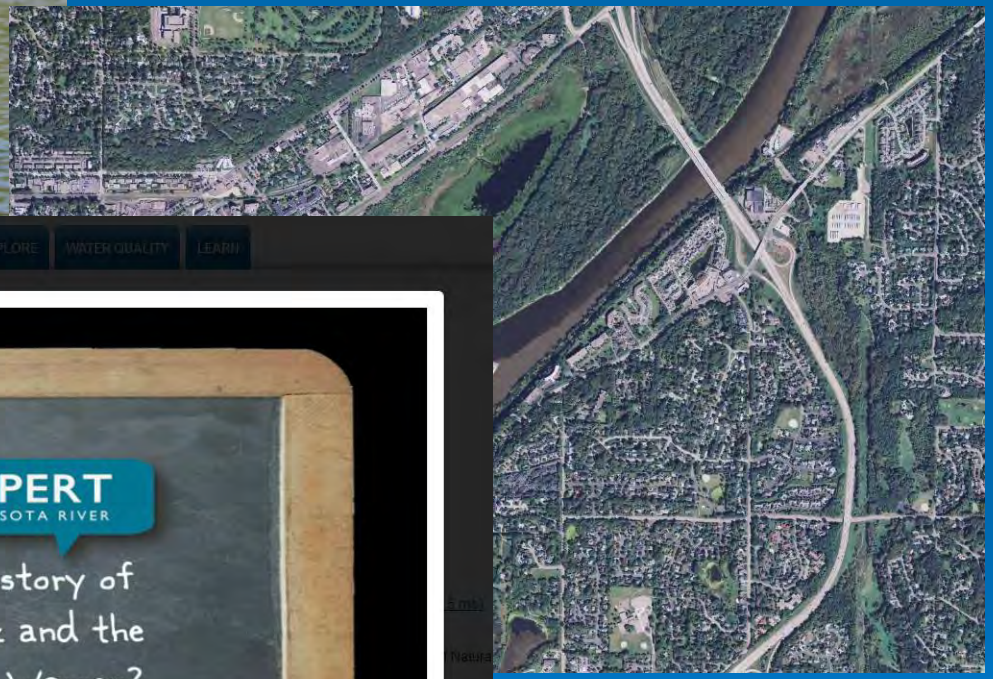
Elktoe - *Alasmidonta marginata*
This mussel can be identified by the colors of greenish yellow with numerous dark green rays and speckles on its outer shell and beak sculpture composed of 2 or 3 heavy ridges. Elktoe has a sharply angled posterior ridge, flat posterior slope with numerous fine ridges. Today, it is extirpated from most of the Minnesota River Basin, but there is a reproducing population in the Pomme de Terre River.

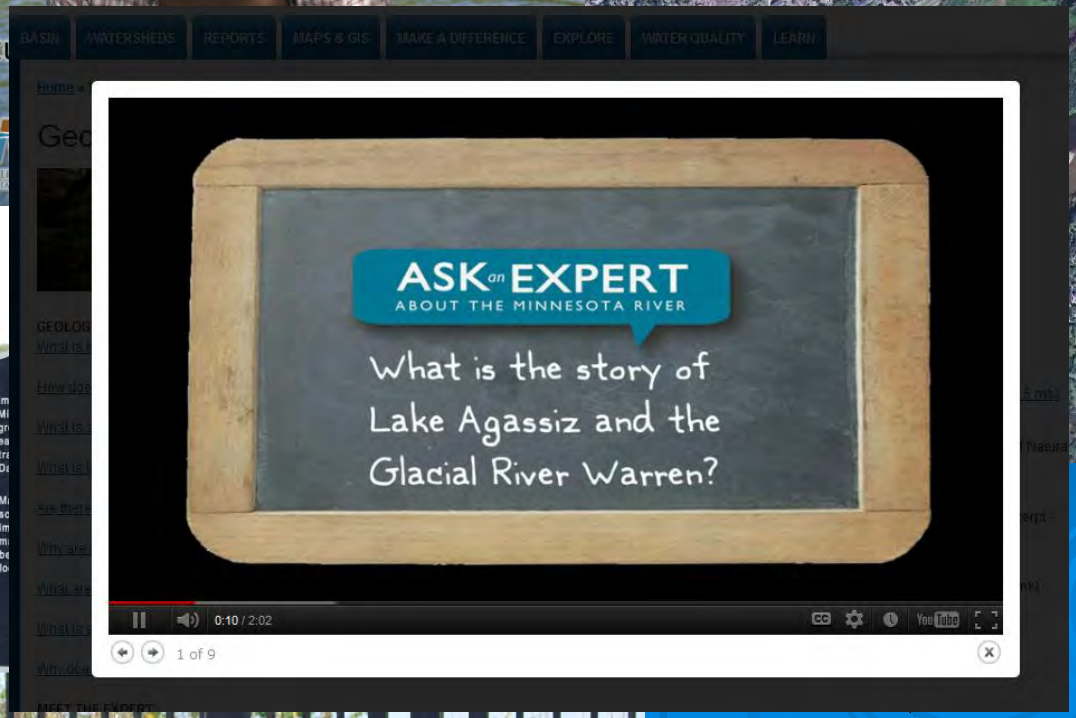
Spike - *Elliptio dilatata*
A fairly large mussel of no longer than 6 inches, the spike has two or three coarse ridges drawn up slightly in the middle on its beak sculpture. The shell's inside is usually purple. The only known population that still exists is in the Chippewa River.


ASK-EXPERT
Purple Corn Flower
Indian Grass
Big Blue stem
Corn
Soybean
Turf Grass

360 Virtual Tours

360 Virtual Tours





360 Degree panoramas

360 Virtual Tours

"Ask-an-Expert about the Minnesota River" profiles scientists and citizens answering questions about the health of the Minnesota River.
Produced by the Water Resources Center at Minnesota State University, Mankato
To learn more, visit the Minnesota River Basin Data: mrbdc.mnsu.edu/learn

THANK YOU
To the many scientist and citizen experts who shared their time and expertise with us.

FUNDING – THANK YOU
- Funding was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR)
- McKnight Foundation.

WRC WATER RESOURCES CENTER MINNESOTA STATE UNIVERSITY, MANKATO

MINNESOTA RIVER BASIN DATA CENTER

THE McKNIGHT FOUNDATION

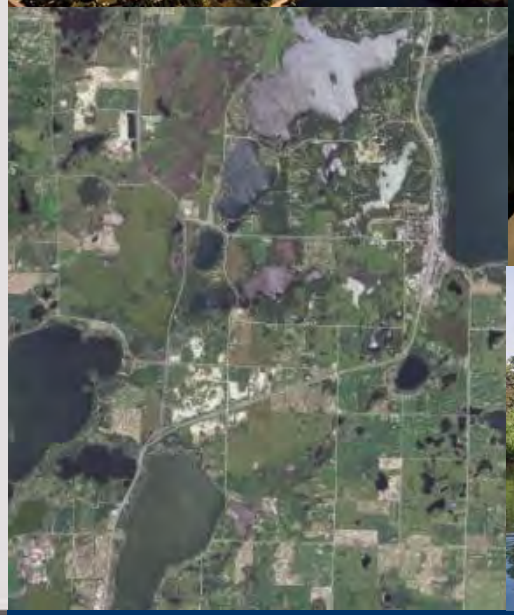
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

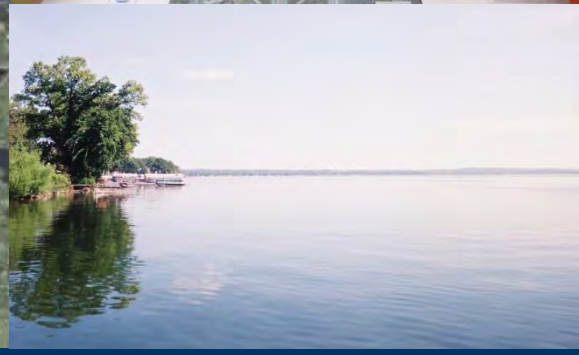
THE IMPORTANCE OF ADVISORY COMMITTEES

The Minnesota TH23 Water Quality Success Story

Paul Rasmussen
Minnesota Department of Transportation

Della Schall Young
HDR Engineering, Inc





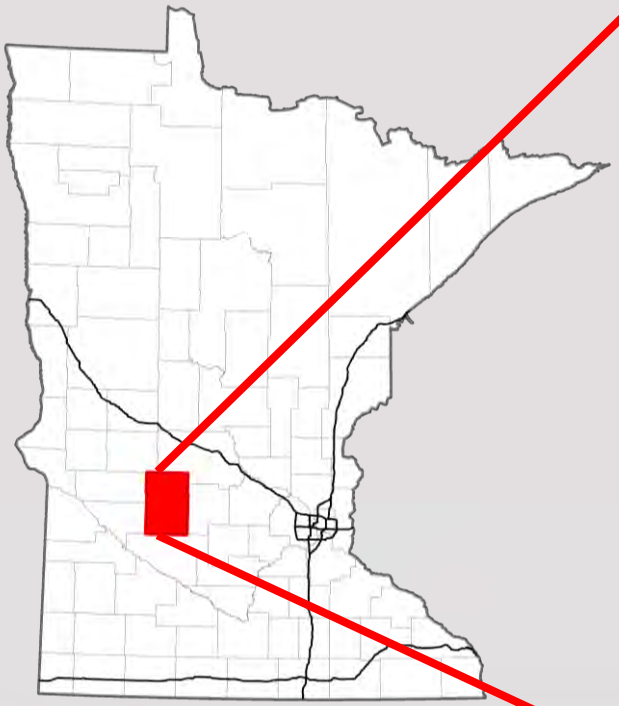
HDR

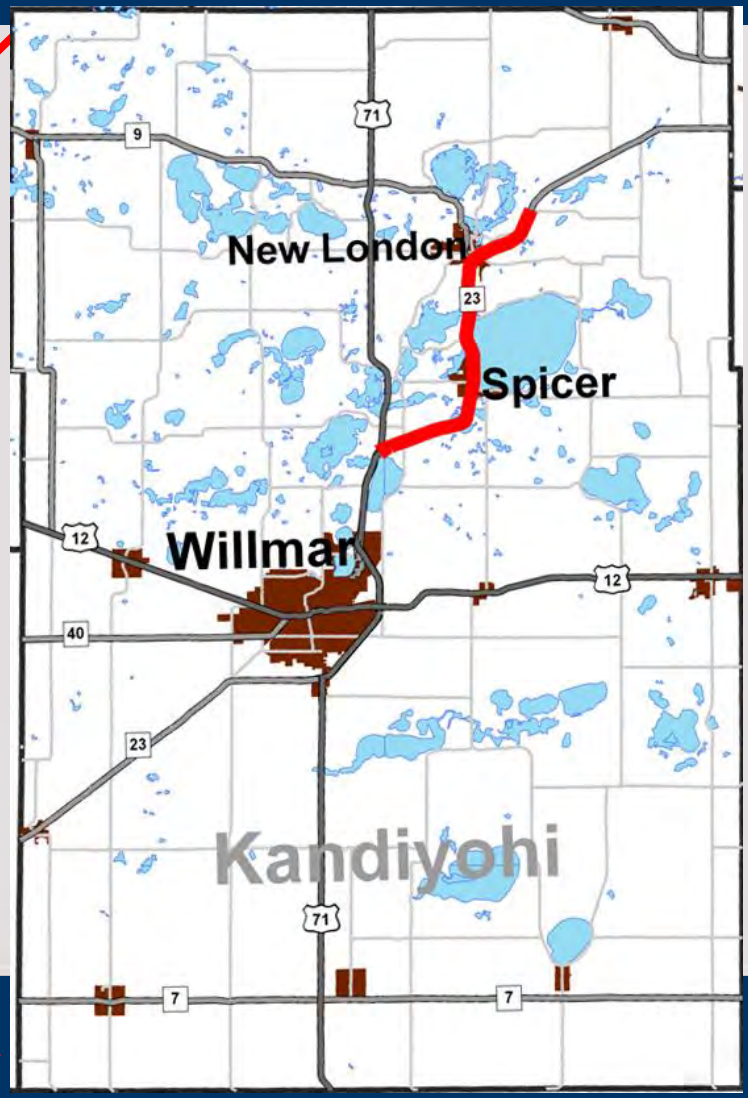
MINNESOTA DEPARTMENT OF TRANSPORTATION

Overview

- The Project
- The Committee
- The Outcomes

Project – General Location





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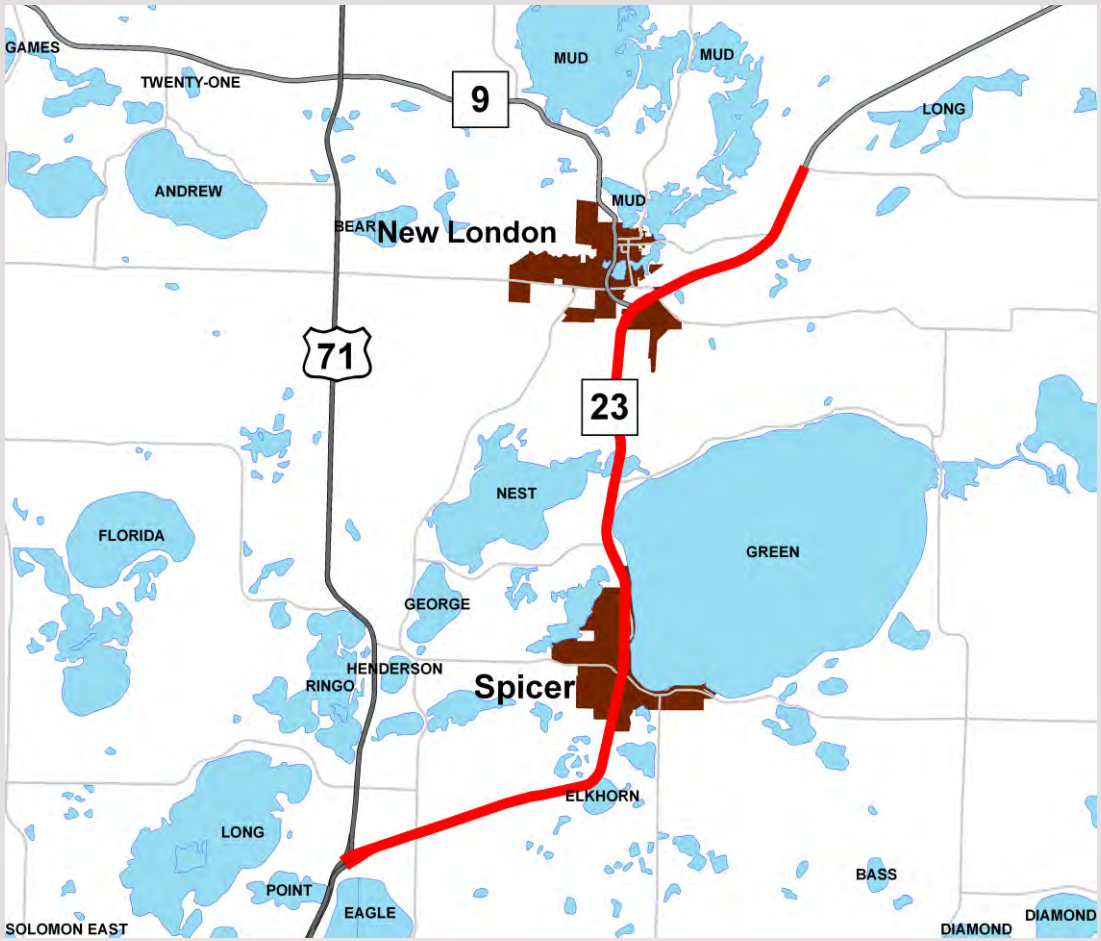
Project - Location



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Project – Overview

- Corridor Study
- Scoping Study
  - Alternatives
    1. No build
    2. Build along existing alignment
- Environmental Assessment / Cooperative Agreement

Committee - Formation

- Partnership Between:
  - Minnesota Pollution Control Agency (MPCA)
  - Minnesota Department of Natural Resources (MN DNR)
  - Minnesota Department of Transportation (MnDOT)
- TH23 Water Quality Advisory Committee (WQAC)
  - MnDOT hired a facilitator
  - Determined entities to be forwarded invitations for representation on committee
  - Each potential representative was interviewed before becoming a member

Committee - Members

- MN DNR
- MN Pollution Control Agency
- City of Spicer
- City of New London
- Green Lake Sanitary Sewer and Water District
- Lake Region Preservation Society*
- Izaak Walton League - New London Chapter
- Green Lake Property Owners' Association
- Nest Lake Improvement Association,
- Middle Fork of the Crow River Clean Water Partnership
- Green Lake Township
- New London Township

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Committee – Givens

- The project would remain on the existing alignment and continue in its current form (four lanes)
- Money could only be spent for trunk highway purposes and the project would be as cost effective as possible
- Avoid additional removal of any homes or businesses than already scheduled to be removed

Committee – Givens

- The WQAC recommendations would meet all permit conditions, conform to community values (aesthetics, local character and preferences, etc.) as much as possible, and would not affect the safety or capacity of TH 23
- The WQAC participants were expected to:
  - Attend and actively participate in all committee meetings
  - Act in good faith to accomplish all objectives of the process
  - Work to achieve agreement or consent for the recommended design
  - Attend open houses to explain and promote the water quality plan to the general public

Committee's Charge

To assist and advise MnDOT's Detail Design team with the preparation of the detailed water quality plan that meets the goal of sustaining the area's water resources through nutrient and water management; specifically, no net increase (or, if possible, a decrease) in nutrients and control of stormwater runoff rates due to the TH 23 expansion project from junction with TH 71 to the East junction with CSAH 31

Committee - Decision Making Process

Step 1: MnDOT

- Preliminary Layout of BMPs per segment – Based on available ROW and space constraints (Mostly Wet Detention Pond)

Step 2: Water Quality Technical Committee (WQTC)

- Recommend additional BMPs
- Complete screening analysis (Pondnet)
- Complete a decision grid of alternative reviewed
- Select the most effect BMP to recommend to…

Step 3: Water Quality Advisory Committee (WQAC)

- Reviewed WQAC Decision Grids
- Voted on Recommendation
  - If failed, the segment had to be re-evaluated by the WQTC (Return to Step 2)
  - If passed, HDR used recommended BMPs to model future conditions in P8

Step 4: HDR

- Model pre- and post-construction scenarios using P8

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Committee – Communication Pathform

- Decision Grid
- Fact Sheet
- Score Card

Treatment options at the Beach Street Location
Decision Grid
DRAFT
September 20, 2001

Best Management Practice	Description	Technical Committee Analysis	Recommended for further study (Y/N)	Fact Sheet Attached (Y/N)
NO TREATMENT	No treatment of water flowing to Alvig Slough by way of Beach Street	Environmental, aesthetic and economic value of the area would be adversely impacted	N	N
CONSTRUCT A SINGLE CELL POND	Construct a single cell basin in the area south of the tennis court, adjacent to Beach Street	This is a viable option that would provide adequate storm water treatment. An infiltration component may be applicable, if there is an outlet control structure and preferred sandy soil exist.	Y	Y
*** CONSTRUCT A 2-CELL POND**	Construct both cells with an earthen berm separator in the area south of the tennis court, adjacent to Beach Street	This is a viable option that would provide adequate storm water treatment. An infiltration component may be applicable, if there is an outlet control structure and preferred sandy soil exist.	Y	Y
NUTRIENT TRADING	Construct no water quality device within this section and over compensate somewhere else in the watershed	Environmental, aesthetic and economic value would be adversely impacted.	N	N
CONSTRUCT AN INFILTRATION BASIN	Construct an infiltration basin in the area south of the tennis court, adjacent to Beach Street	May not be feasible due to high ground water table. No soil boring in the area to document water table. Maybe able to add as an enhancement on the Final Design.	N	N

* indicates Water Quality Steering Committee preference

- Size of Treated Area
- Sizing Assumptions
- Cost of Land
- O&M Description
- Estimated O&M Costs
- Estimated Removal Efficiency

SINGLE CELL POND – BEACH STREET
FACT SHEET
DRAFT

SIZE OF TREATED AREA (ACRES) **24.6 Acres**

SIZING ASSUMPTIONS

Permanent pool volume of the wet pond will be designed to equal runoff volume generated from a 2.5inch rainfall event. The average depth of the pond will be 4 feet with a maximum depth of 10 feet.
(See map attached – Figure 1: SINGLE CELL POND – BEACH STREET)

COST OF LAND ACQUISITION:

ESTIMATED CONSTRUCTION COST:

OPERATION AND MAINTENANCE (O&M) DESCRIPTION[1]

Routine Maintenance

- **Mowing** – Side slopes, embankment and emergency spillway of a wet detention pond must be mowed at least twice a year to prevent woody growth and control weeds
- **Inspections** – Ponds need to be inspected on an annual basis to ensure that the structure operates in the manner originally intended. When possible, inspection should be conducted during wet weather to determine if the pond is functioning properly.
- **Debris and litter removal** – As part of the periodic mowing operation, debris and litter should be removed from the surface of the pond. Particular attention should be paid to floatable debris as they may clog outlet structures.
- **Erosion control** – The pond side slope, emergency spillway, and embankment all may suffer from erosion. Re-grading and revegetation may be necessary. Riprap protecting channels near the outlet may need to be repaired or replaced.
- **Nuisance control** – Control of insects, weeds, odors and algae may be needed in some ponds. However, properly sized and vegetated ponds should rarely produce the above-mentioned nuisances.

Non-Routine Maintenance

- **Structural repair and replacement** – Inlet and outlet of wet detention ponds over time will deteriorate and must be replaced. The actual life of these components depends on the type of soil, pH of runoff and other factors.
- **Sediment removal** – The sediment that accumulates at the bottom of the pond should be removed every 3 – 5 years. If left un-maintained, the accumulation of sediment can reduce the storage capacity of the permanent pool and reduce both the appearance and removal performance of the pond.

ESTIMATED O&M COSTS/ HOW OFTEN? **$1500[2] per pond surface acre per year**

ESTIMATED REMOVAL EFFICIENCY **40% – 60% - Average Annual Total Phosphorus**

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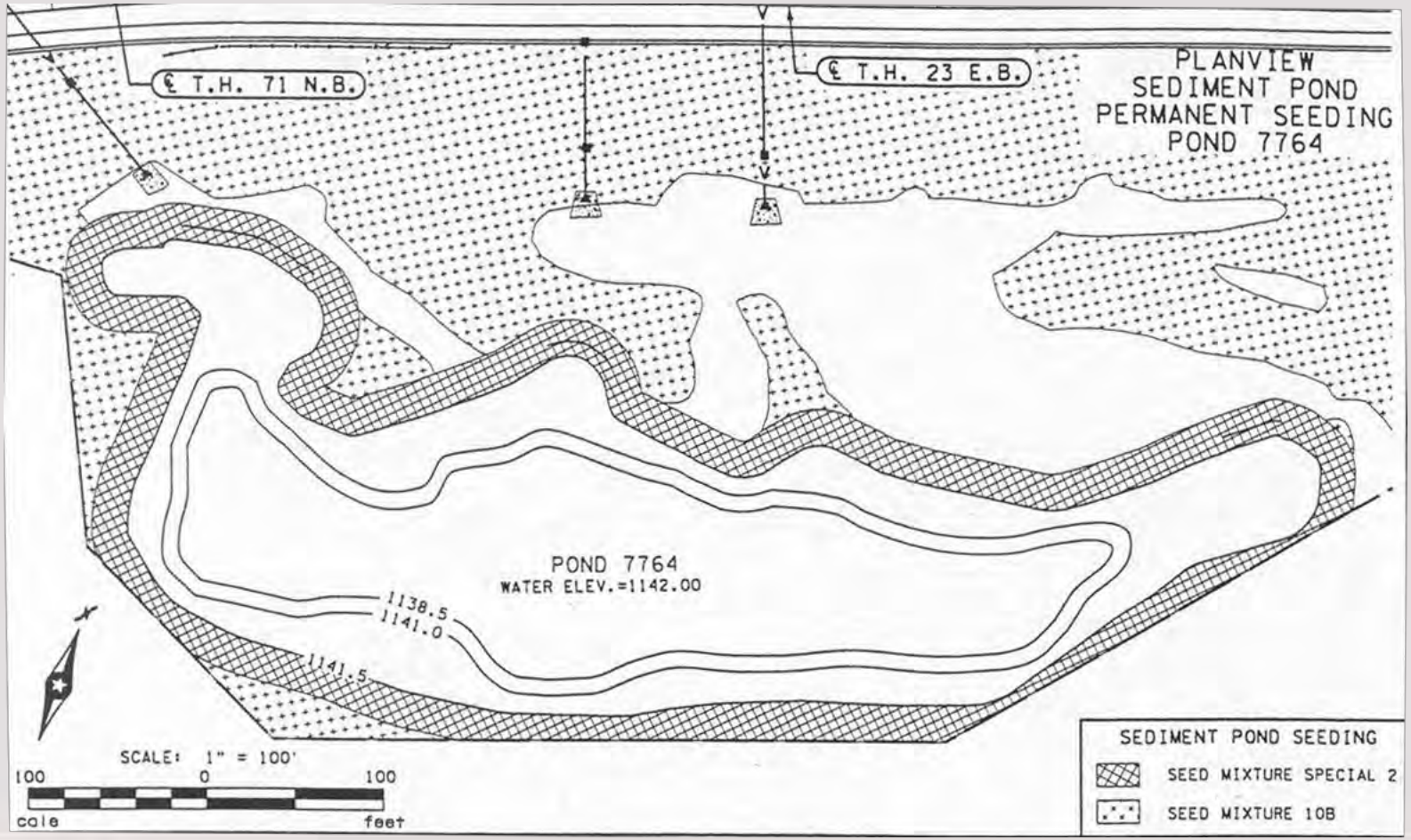
Trunk Highway 23 – Water Quality Score Card
Green Lake Segment
Total Phosphorus - lbs/year
Draft

GREEN LAKE	Food and Fuel Ruth St. & Beach St	Manitoba Street	Miller Street	Total
Existing Load	42	7	-	49
Future Load w/ BMPs	27	4	-	31
Total Load (Gain or Reduction)	-15	-3	-	-18
% Reduction	36%	43%	-	37%

2-Cell Pond (Food and Fuel & Water Slide) – Ruth Street and 3 Cell Pond – Beach Street

- Not Completed

Results – 28 Wet Detention Ponds



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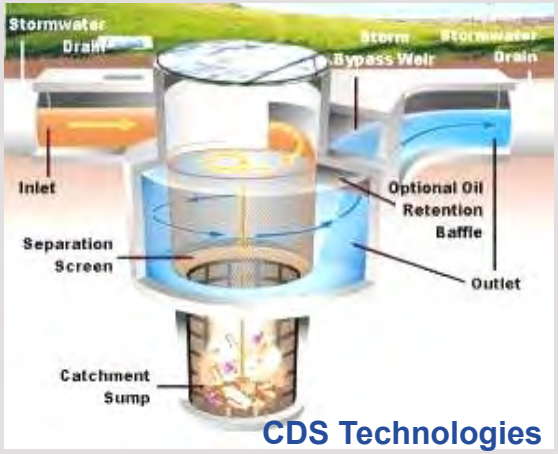
Results – 3 Grit Chambers



CDS Technologies


Lake Nokomis


Lake Nokomis

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Results - 1 Underground Infiltration Chamber

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Results - BMPs

BMPs	AMOUNT
WET DETENTION PONDS	28
MULTI-CELL WET DETENTION PONDS	6
MULTI-CELL DRY DETENTION PONDS	1
GRIT CHAMBER	3
UNDERGROUND INFILTRATION CHAMBER	1
CONSTRUCTED WETLAND	1
INFILTRATION BASIN	3
TOTAL	43

Outcomes - Load Summary

	Annual Rainfall		
	12-inch	24-inch	46-inch
Existing Conditions	97	160	1099
With Treatment	75	144	1071
Total Load (gain or reduction)	-22	-16	-28
Percentage (gain or reduction)	-23%	-10%	-3%

Summary / Secondary Benefits

- Developed external project promoters
- Improved local understanding of water resource issues
- Developed improved relationships with regulating agencies and local governments
- Middle Fork of the Crow River Watershed District

QUESTIONS