

PROFESSIONAL ASSISTANCE YOU MAY NEED: THE ROLES OF A WATER RESOURCES CONSULTANT



Researcher



- Define Problem
- Develop hypothesis
- Implement Methods
- Gather data
- Analyze data
- Make
recommendations
based on results

Information Dissemination (Passive)

- Gather ecological/procedural information from scientifically-sound sources
- Verbal, written, email, internet communications



Educator (Active)



- Includes interactive learning with physical samples and demonstrations
- Especially reaches hands-on learners
- Reaches across broad educational backgrounds

Aquatic Vegetation Sampling

- Implement U.S Army Corps of Engineers and other scientifically-sound sampling strategies from academia
- Use of newest technologies
- Can be interactive with riparians (key to sustainability)



Aquatic Vegetation Research



- Grant funding for species-specific research is limited
- Latest APM technologies dependent on research
- Each site is unique!
The same species may behave differently in another system

Evaluation of New Technologies

- New technologies are available for WQ issues and can be “retrofitted” to specific sites
- Future use of these require good data/coordination with the State



Oversight (not to be overlooked)

- Although highly qualified, contractors are not “mind readers”!
Direction essential
- Allows for a “custom” result of methods
- Quality assurance



Locating Obscure Ecological Threats



Investigation of Unique Limnological Phenomena

- Rare occurrences of certain events within/around a lake ecosystem may be “natural” but due to uncertainty, residents may think a hazard exists
- May require coordination with academia if identity unknown



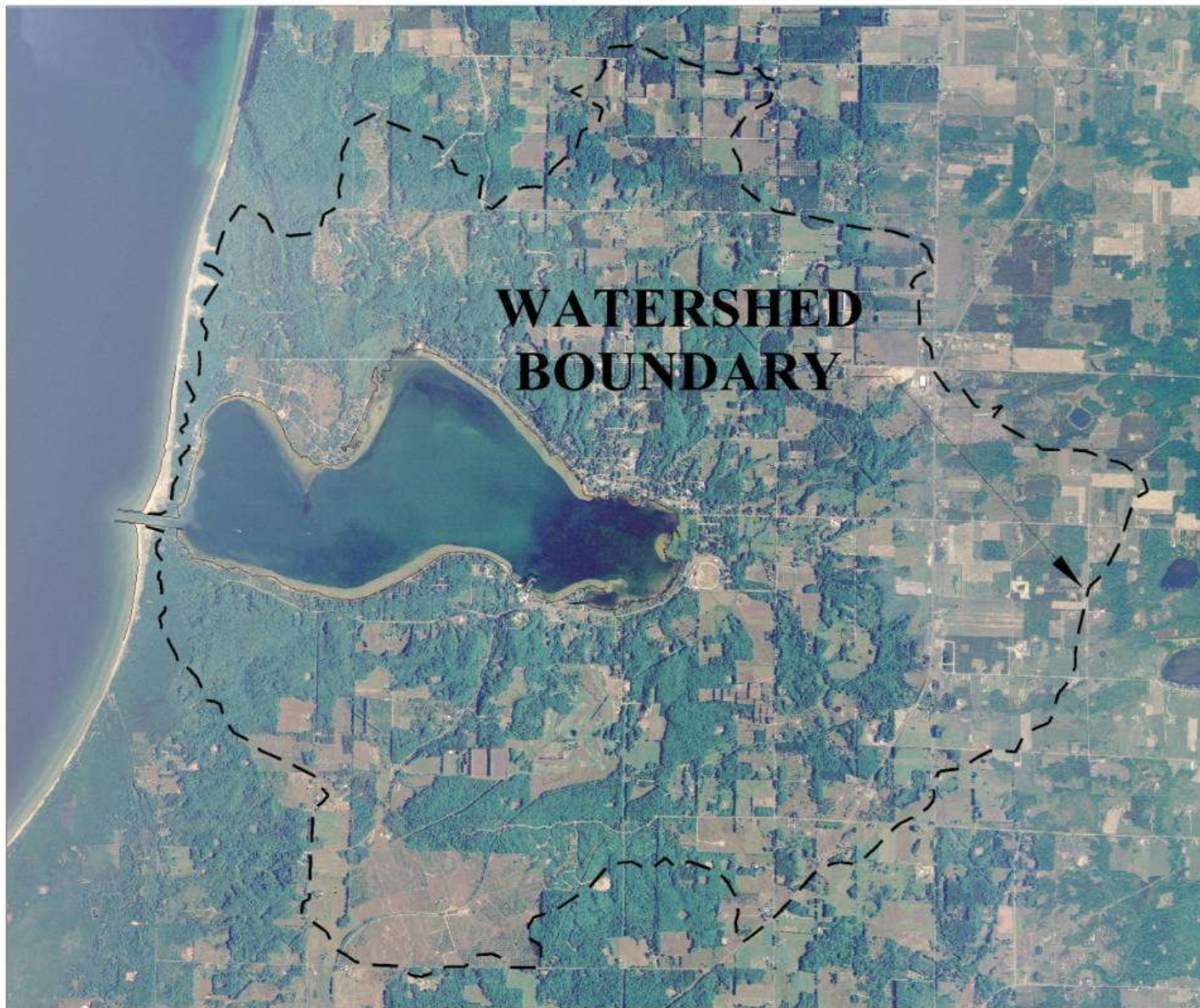
Dissolved Organic Matter
“foam” from Bear Lake,
Manistee County, MI
Photo Courtesy of Don Raiff

GIS, GPS, and Mapping

- GIS = Geographic Information Systems (often accessed via servers)
- GPS = Global Positioning System (uses satellites to determine relative locations on planet)
- Mapping = Integrated technique using BOTH technologies for creating visual interpretation of ecosystem elements

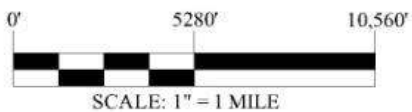


PORTAGE LAKE
WATERSHED IS
APPROXIMATELY
13,750 ACRES.



GIS

ORTHOIMAGERY -
STATE OF MICHIGAN GEOGRAPHIC DATA LIBRARY, 2005.



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**PORTAGE LAKE
WATERSHED BOUNDARY**

ONEKEMA TOWNSHIP,
MANISTEE COUNTY,
MICHIGAN

JOB # 09-1036

JUNE 12, 2009

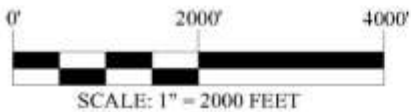
FIGURE 3

GIS + GPS

APPROXIMATELY 150 ACRES
OF PHRAGMITIES FOUND

- = FOUND
- = SPARSE
- = COMMON
- = DENSE

ORTHOIMAGERY -
STATE OF MICHIGAN GEOGRAPHIC DATA LIBRARY, 2005.
DATE OF SURVEY - MAY 21, 2009



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PORTAGE LAKE
PHRAGMITIES sp. LOCATIONS

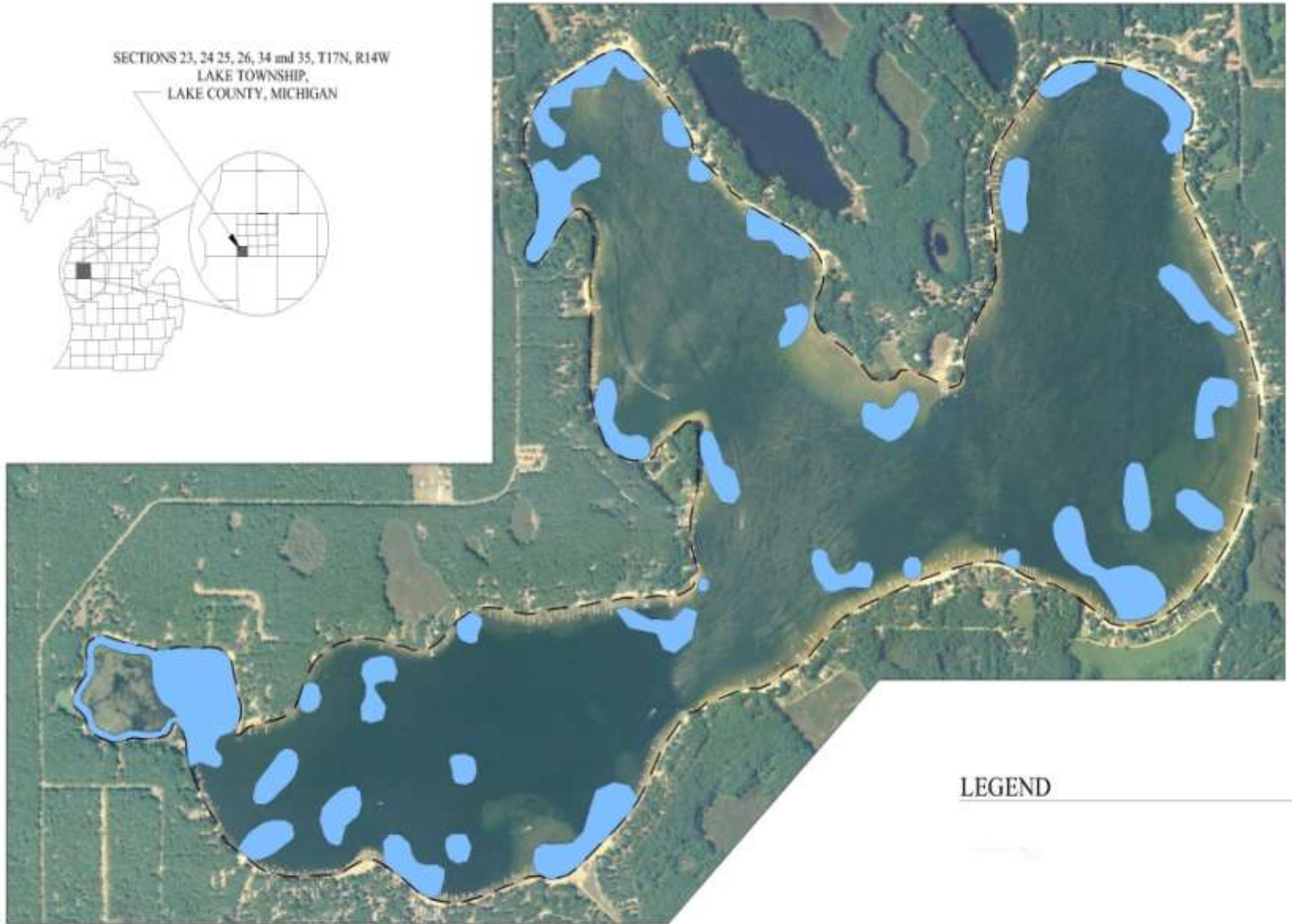
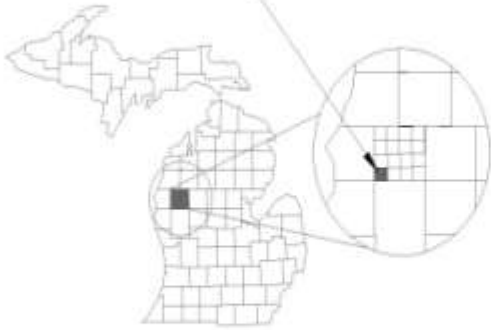
ONEKEMA TOWNSHIP,
MANISTEE COUNTY,
MICHIGAN

#09-1036

JUNE 12, 2009

FIGURE 10

SECTIONS 23, 24 25, 26, 34 and 35, T17N, R14W
LAKE TOWNSHIP,
LAKE COUNTY, MICHIGAN



LEGEND

GIS + GPS + MAPPING



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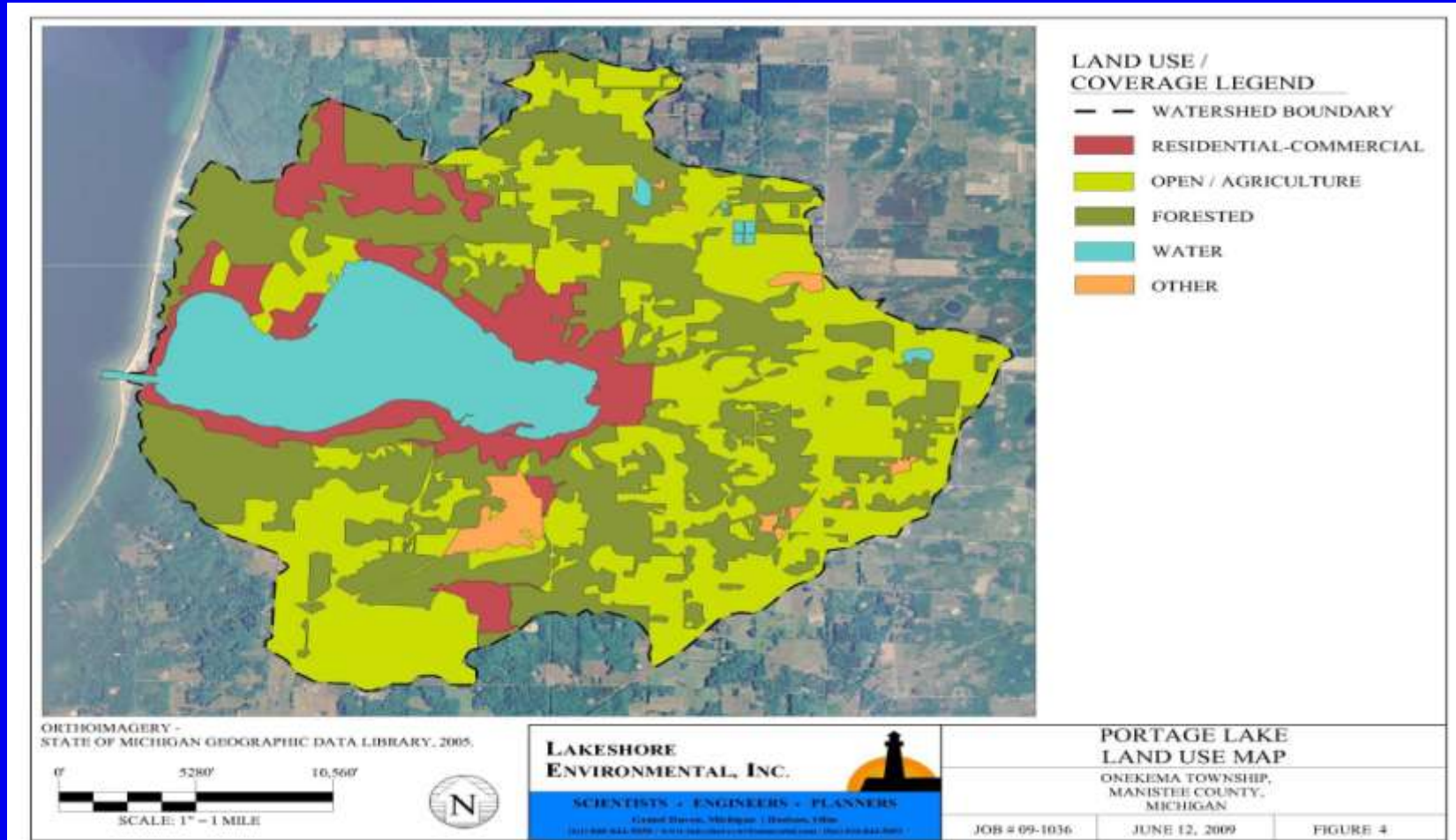
BIG STAR LAKE
GRID SAMPLING POINTS

LAKE TOWNSHIP,
LAKE COUNTY, MICHIGAN

08-1019

JUNE 2010

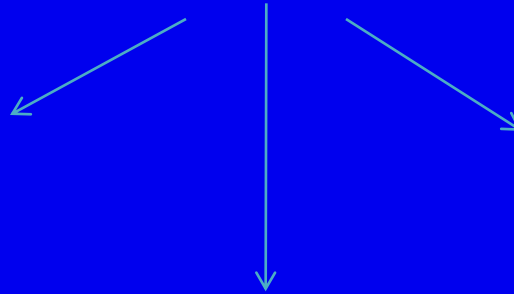
Land Use Characterization



Assessment of Watershed Impacts on WQ of a System



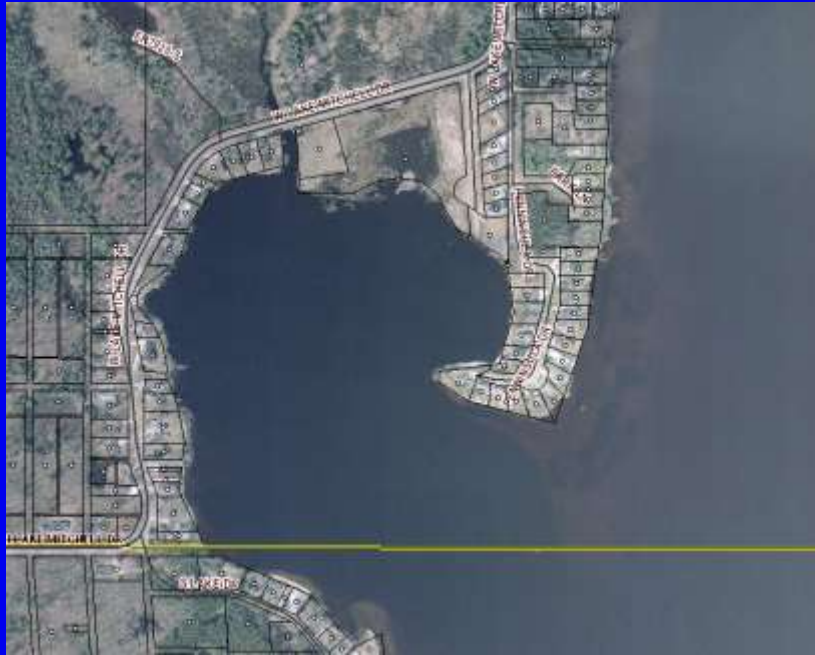
Indian Lake Inlet



Water Quality Assessments

<i>Depth</i>	<i>Water</i>	<i>DO</i>	<i>pH</i>	<i>Cond.</i>	<i>Turb.</i>	<i>ORP</i>	<i>Total</i>	<i>Total</i>	<i>Total Phos.</i>
<i>ft</i>	<i>Temp</i>	<i>mg L⁻¹</i>	<i>S.U.</i>	<i>μS cm⁻¹</i>	<i>NTU</i>	<i>mV</i>	<i>Kjeldahl</i>	<i>Alk.</i>	<i>mg L⁻¹</i>
	<i>°F</i>						<i>Nitrogen</i>	<i>mgL⁻¹</i>	
							<i>mg L⁻¹</i>	<i>CaCO₃</i>	
0	76.5	10.0	7.6	364	1.8	79.9	0.78	140	0.046
7.5	76.1	9.0	7.6	364	1.9	111.2	0.50	140	0.050
15.0	76.2	8.5	7.6	365	2.1	122.3	2.2	140	0.140

Setting Up a Special Assessment District (SAD)



- May be conducted with an attorney and municipality reps and officials
- Requires careful analysis to ascertain equitable methodologies
- Should be “defensible” if subject to court of law
- Can be used in future years of a program
- Flexibility with methods but different requirements with different Acts (i.e. PA 188 vs. PA 451)

Development of Financial Budgets for Water Quality Improvements

Proposed Lake Improvement Item	Estimated 2009 Cost	Estimated 2010 Cost ⁴	Estimated 2011-2013 Cost ⁵
Herbicides (2,4-D) for <i>M. spicatum</i> ¹ for 155 acres@ \$345 per acre; \$1,500 MDEQ permit fee	\$54,975	\$41,232	\$20,616
Herbicides (n=3) for <i>Phragmites</i> for 150 acres@\$450 per acre; NOTE: Does not include deduction from MDNR grant	\$69,000	\$51,750	\$25,875
Lake Management Plan/Study	\$7,600	--	--
Professional Services (limnologist surveys, oversight, processing, education, newsletter) ²	--	\$7,000	\$7,000
Contingency ³	\$13,158	\$9,998	\$5,349
Total Annual Estimated Cost	\$144,733	\$109,980	\$58,840

Permitting Assistance

- Permits required for lake improvements through MDNRE, USACE, etc.
- Many require studies or other information a consultant may provide
- New permits in progress for evolving technologies (i.e. aeration, microbial applications)

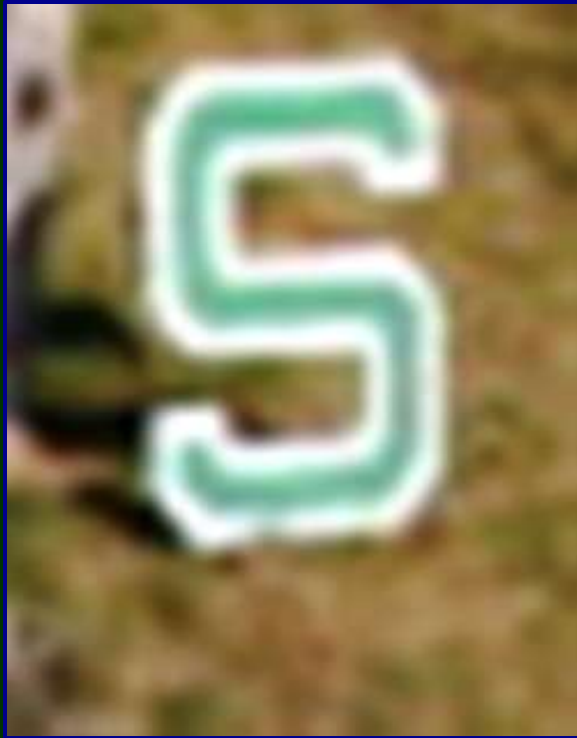


Things to Consider...

- Educational Background and Experience
- Location
- Cost
- Philosophical Views
- Personal Chemistry



QUESTIONS ?



GO GREEN!!