

Fox Lake Inland Lake and Protection and Rehabilitation District

Annual Meeting
August 3, 2019

Neal O'Reilly, Ph.D.

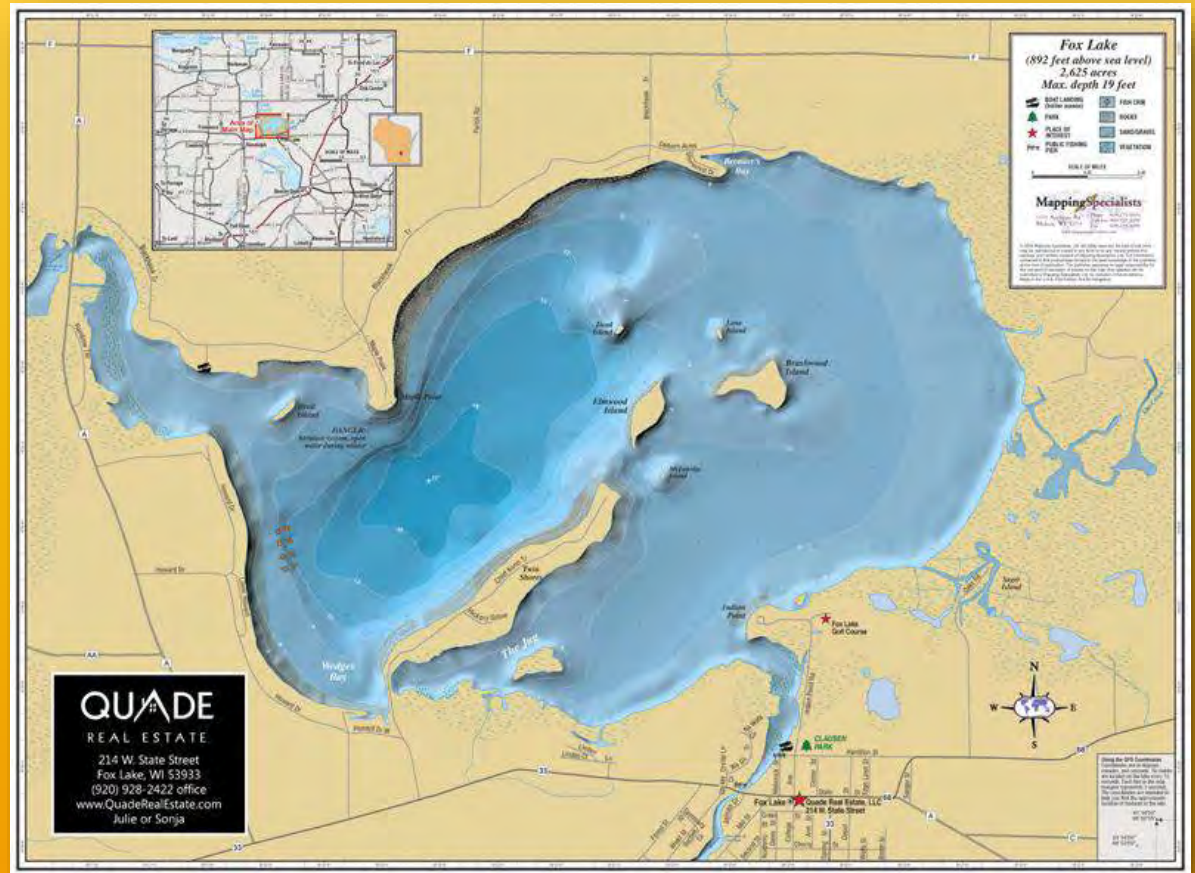


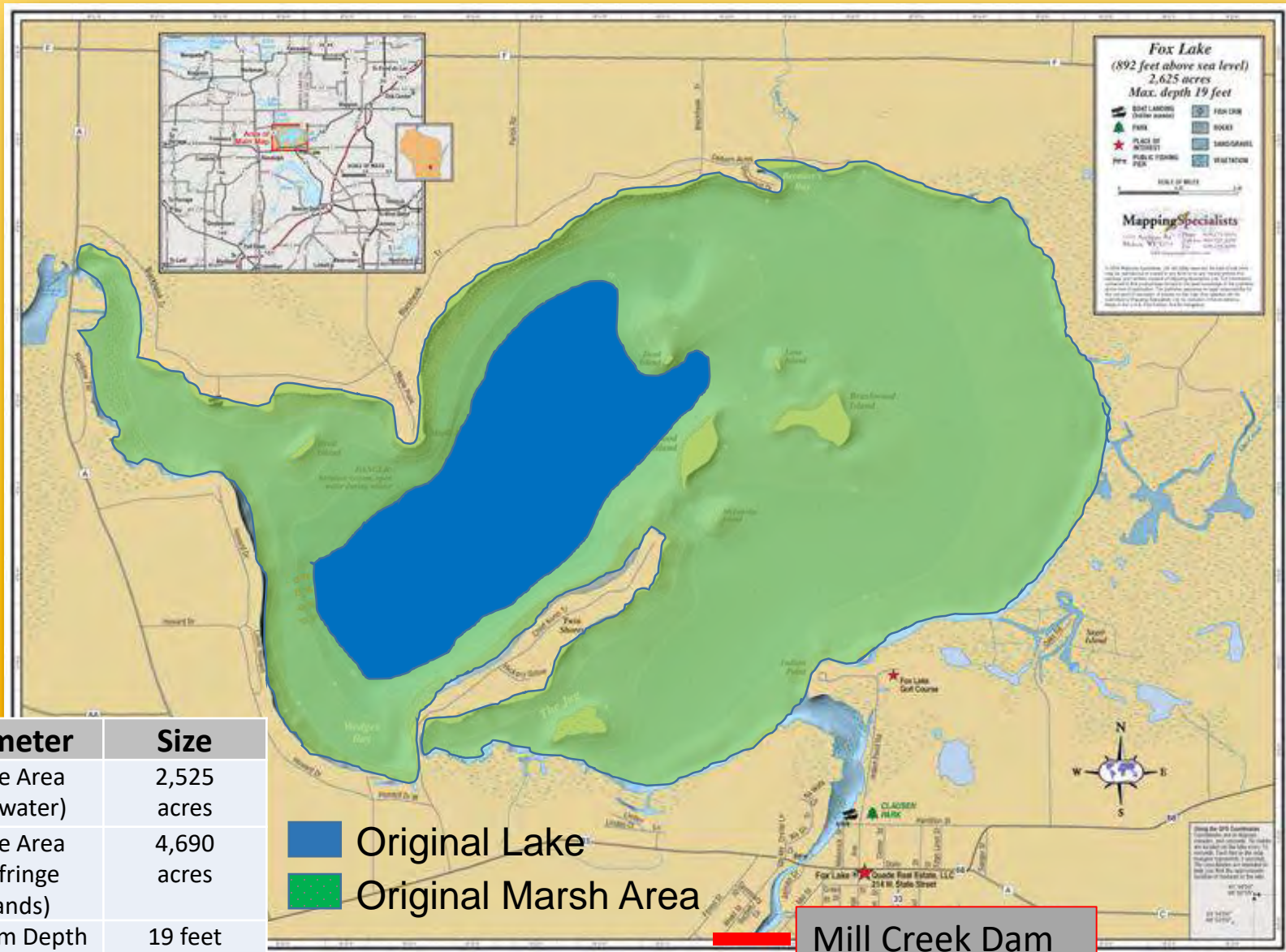
*“Those who cannot
remember the past are
condemned to repeat it”.*

–George Santayana

History of Fox Lake

- Lake was enlarged in 1845 by construction of a dam at the outlet on Mill Creek.



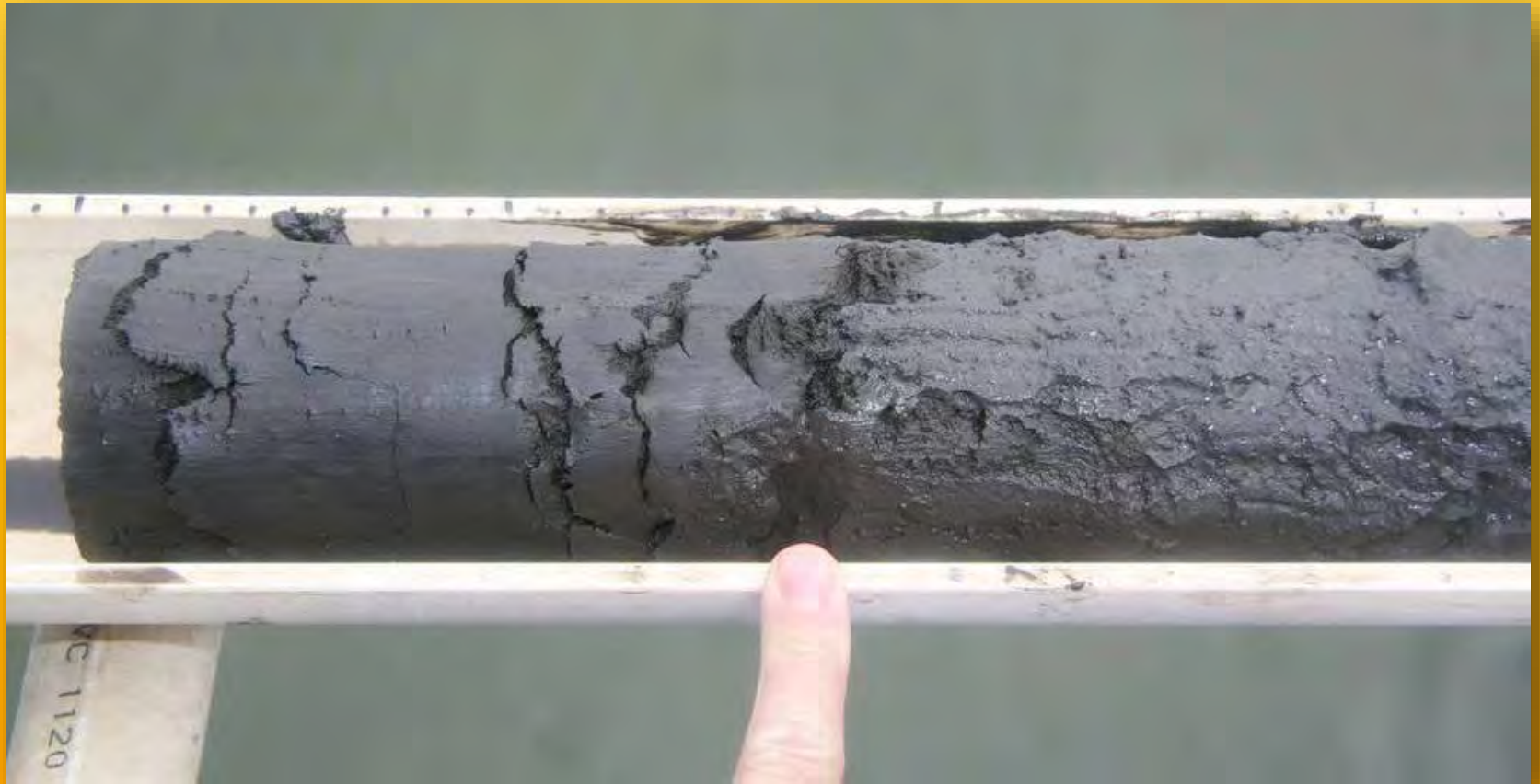


History of Fox Lake

- Through the 1950's the lake was clear, dominated by aquatic plants and had a balanced fishery.



History of Fox Lake



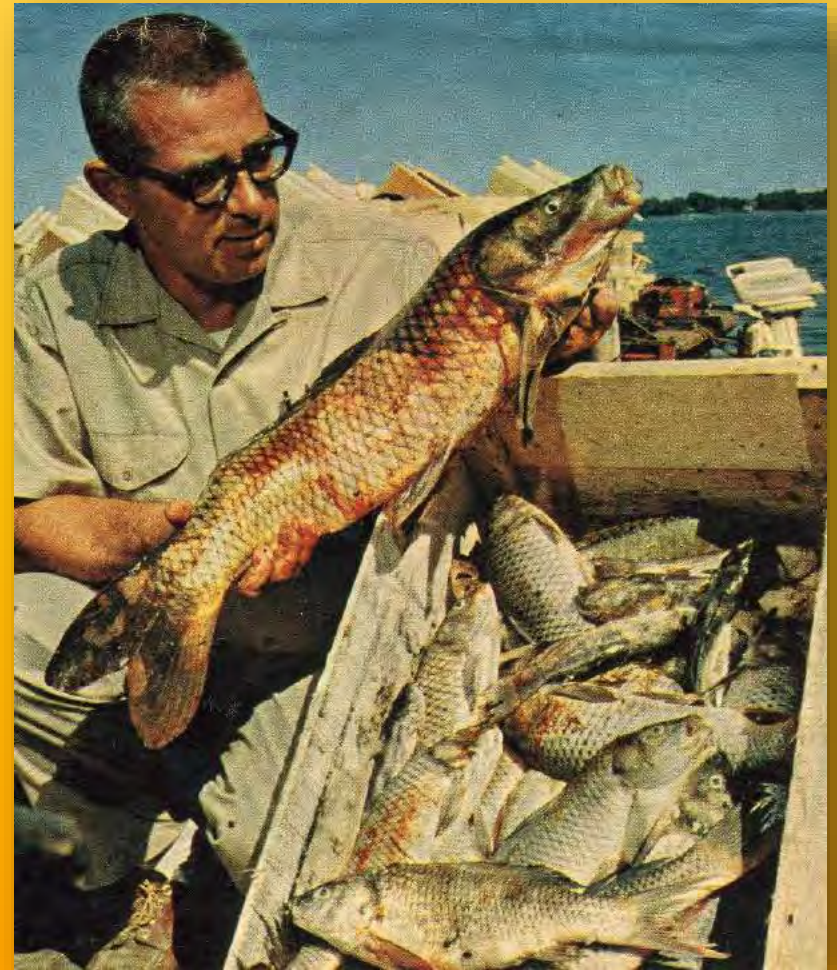
History of Fox Lake

- Mid 1960's carp began to become a problem causing a loss of aquatic plants, increase in water turbidity due to algae, and a decline in game fishery



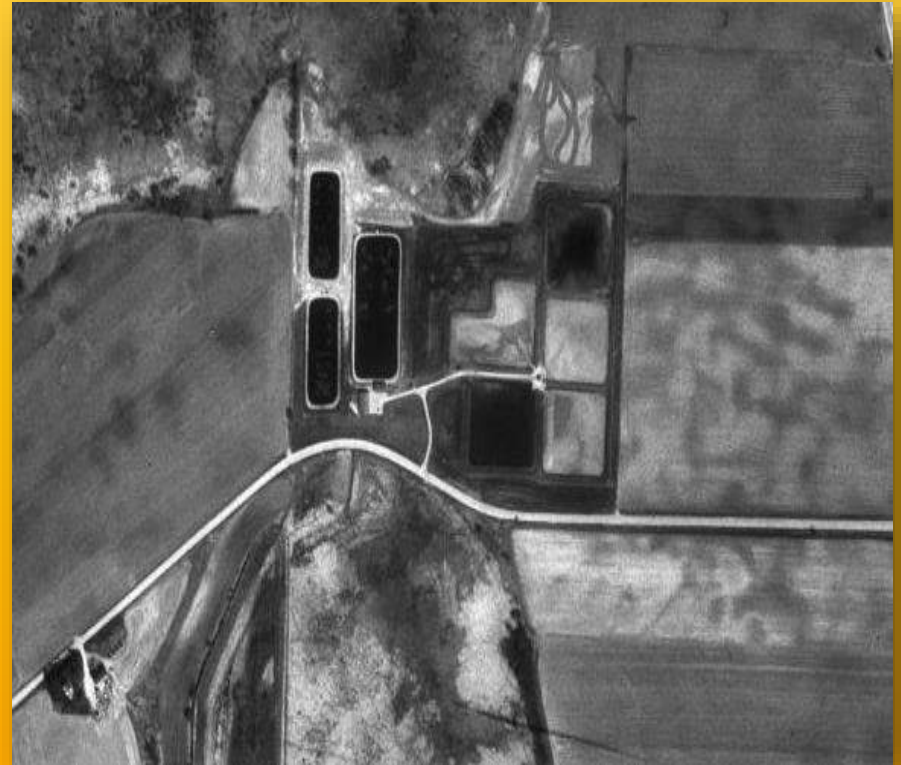
History of Fox Lake

- In 1967 DNR conducted an eradication of rough fish.
- From the late 1960's till mid-1980's Fox Lake was again clear, dominated by aquatic plants, and was considered one of the best panfishing lakes in Wisconsin



History of Fox Lake

- In 1970's the ***Fox Lake Inland Lake Protection and Rehabilitation District*** in partnership with the City of Fox Lake created the ***Fox Lake Wastewater Control Commission***.
- They constructed a regional Wastewater Treatment Plant and installed a sanitary sewer around the lake, eliminating septic systems.



History of Fox Lake

- By early 1990's Fox Lake again became dominated by carp, returned to turbid water conditions and had lost most of its rooted aquatic plants.



Original Management Plan

- In 1995 a long-range management strategy for Fox Lake was developed by an advisory committee that included:

- FLILPRD,
- WDNR,
- Dodge County,
- University of Wisconsin-Extension,
- Town of Fox Lake,
- City of Fox Lake, and
- civic and sportsman groups.



Original Management Plan

- The project management strategy is outlined in a report tilted, **Long Range Planning Strategy for the Rehabilitation of Fox Lake, Dodge County** (R. A. Smith and Associates, Inc. 1998).



Original Management Plan

- The goal for the project was:
 - ***Restore and protect the fishery, wildlife and recreational values of Fox Lake by implementing a sustainable, ecologically-based management plan that promotes increased water clarity, aquatic plant diversity and lake stability.***



Original Management Plan

- To achieve the above goal, the following objectives were established:
 1. Halt the degradation of the lake through the control of nonpoint source pollution.
 2. Protect and enhance environmentally sensitive areas such as wetlands.
 3. Reduce in-lake phosphorus concentrations to pre-1950 levels.
 4. Reduce the occurrence of nuisance algae blooms.
 5. Reestablish the aquatic macrophyte community.

Original Management Plan

6. Restore lost wetland areas.
7. Rehabilitate the degraded sports fishery.
8. Remove sediment deposits from in front of the Town Park, lake inlet and lake outlet.
9. Maintain and improve the economic base of the area through enhancement of recreational opportunities.
10. Develop a management plan for lake level management.
11. Control boating activities in environmentally sensitive areas.

Original Management Plan

1. Shoreline Stabilization
2. Aquatic Plant Management
3. Fishery Management
4. Dam Replacement
5. Public Education
6. Watershed Protection



Shoreline Stabilization Project



Shoreline Stabilization Project



Aquatic Plant Management

- 1997 Lake Drawdown



Fishery Management

- Rough Fish Removal



Fishery Management

Rough Fish Removed (lbs. of carp) From Fox Lake from 1996 through 2007

Year	Commercial Fishing	Rotenone Spot Treatments	Total
1996	54,000	59,688	113,688
1997	124,880	120,000	244,880
1998	49,155	159,000	208,155
1999	80,520	248,000	328,520
2000	77,700	80,000	157,700
2001	81,800	121,000	202,800
2002	375,954	30,000	405,954
2003	13,670	0	13,670
2004	66,100	0	66,100
2005	29,560	0	29,560
2006	6,080	0	6,080
2007	2,880	0	2,880
Totals	962,299	817,688	1,779,987

Fishery Management

- Stocking of Game Fish



Enhancement of Dam



Dredging of Town Park Public Boat Launch



Protection of Sensitive Areas

- No-wake Areas

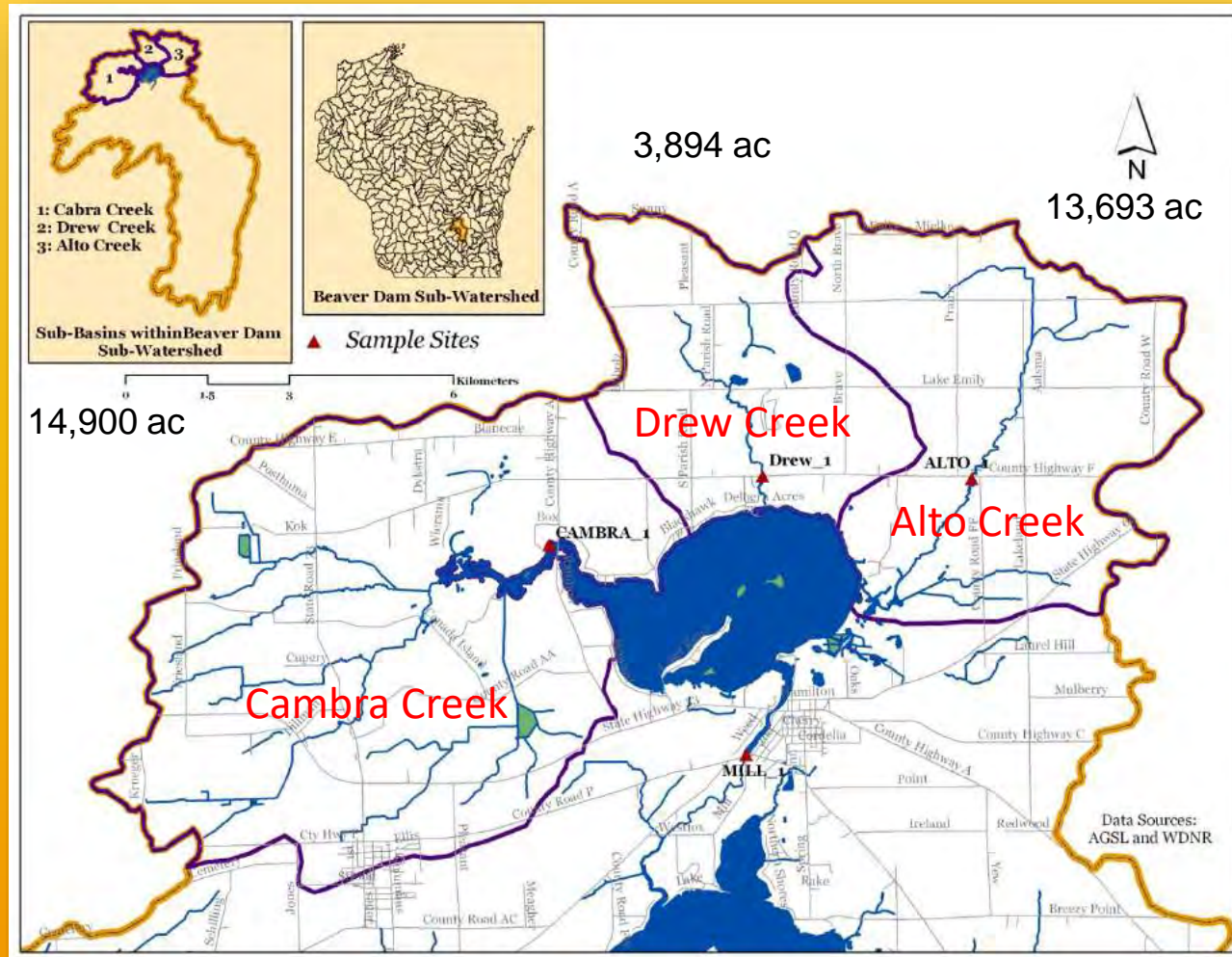


Public Engagement

- Educational Forums
- Newsletters
- News Articles
- Citizen Survey



Fox Lake Drainage Area

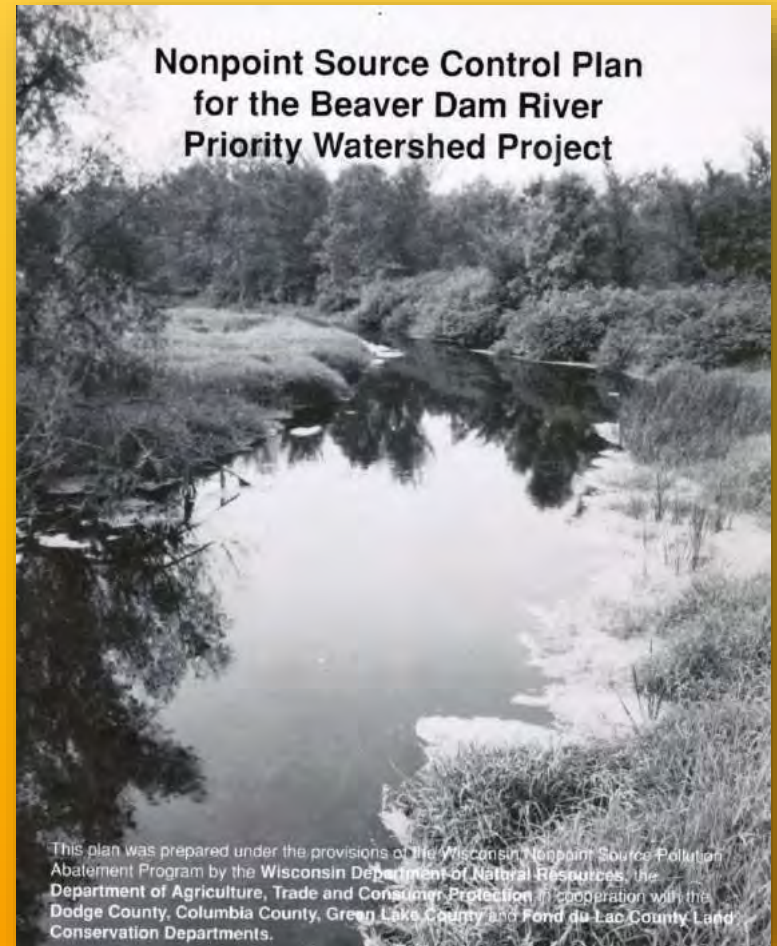


Fox Lake Watersheds

Sub-watershed	Acres	Percent of Total
Cambra Creek	14,900	42%
Alto Creek	13,693	38%
Drew Creek	3,894	11%
Fox Lake Direct Drainage	3,087	9%
Total	35,574	100%

Watershed Management

- **A Nonpoint Source Control Plan for the Beaver Dam River Priority Watershed Project** (WDNR, 1993).



Sediment and Phosphorus Inputs to Fox Lake

Sub-watershed	Land Area (ac)	Sediment Load (tons/yr)	Phosphorus Load (lbs/yr)
Alto Creek	13,693	6,477	23,859
Cambra Creek	14,900	4,156	18,530
Drew Creek	3,894	1,861	6,834
Fox Lake	3,087	1,000	3,845
Total	35,573	13,494	53,068

Based on WinHUSLE Modeling

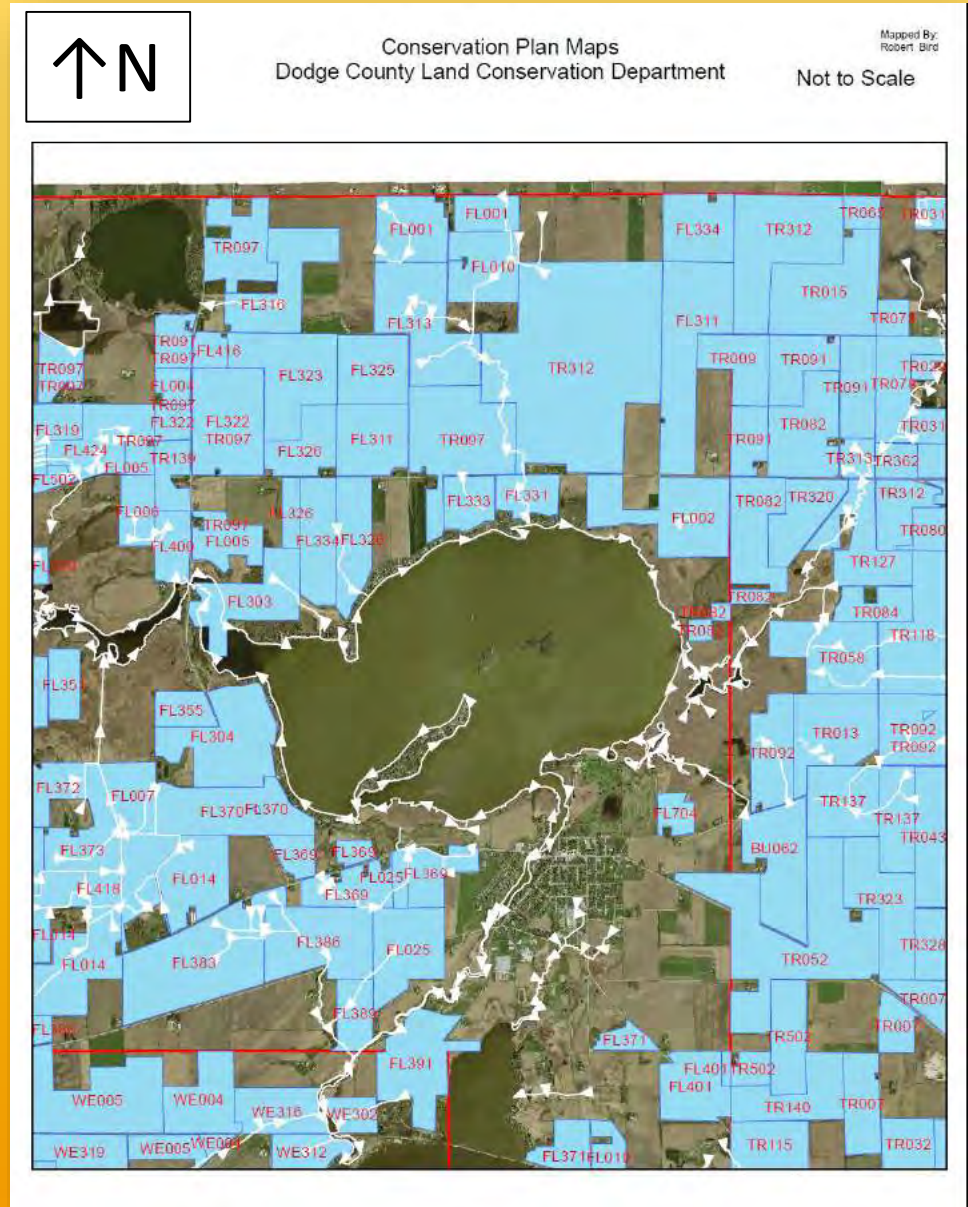
Strategy to Reduce Sediment and Phosphorus Inputs to Fox Lake

1. Conservation practices on agricultural fields and barnyard management systems

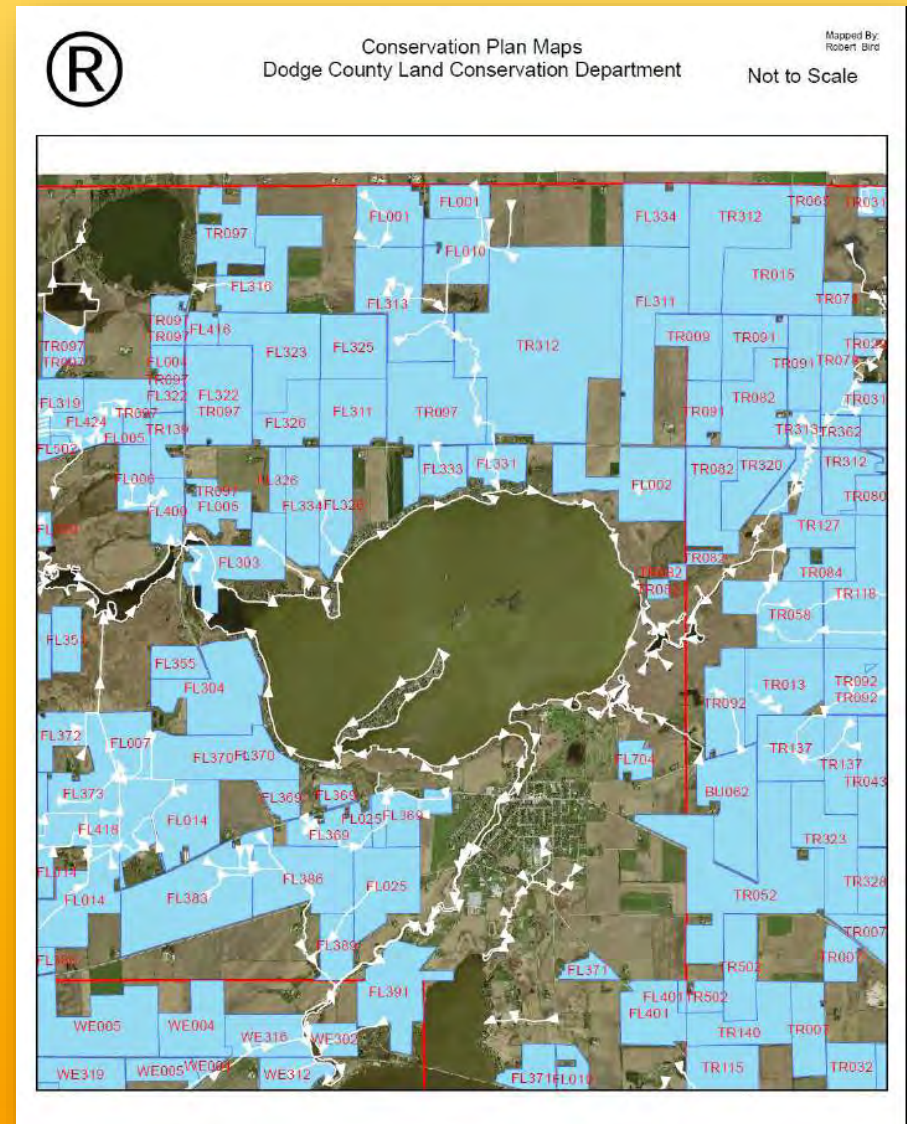
- Conservation tillage
- Manure storage systems
- Nutrient management



- Farms with nutrient management plans in Town of Fox Lake



- Farms with nutrient management plans in Town of Fox Lake



Strategy to Reduce Sediment and Phosphorus Inputs to Fox Lake

2. Buffers and grass waterways on tributary drainage channels



Strategy to Reduce Sediment and Phosphorus Inputs to Fox Lake

- Buffers and grass waterways



Strategy to Reduce Sediment and Phosphorus Inputs to Fox Lake

3. Improved water filtering through riparian wetlands on main channels



Strategy to Reduce Sediment and Phosphorus Inputs to Fox Lake

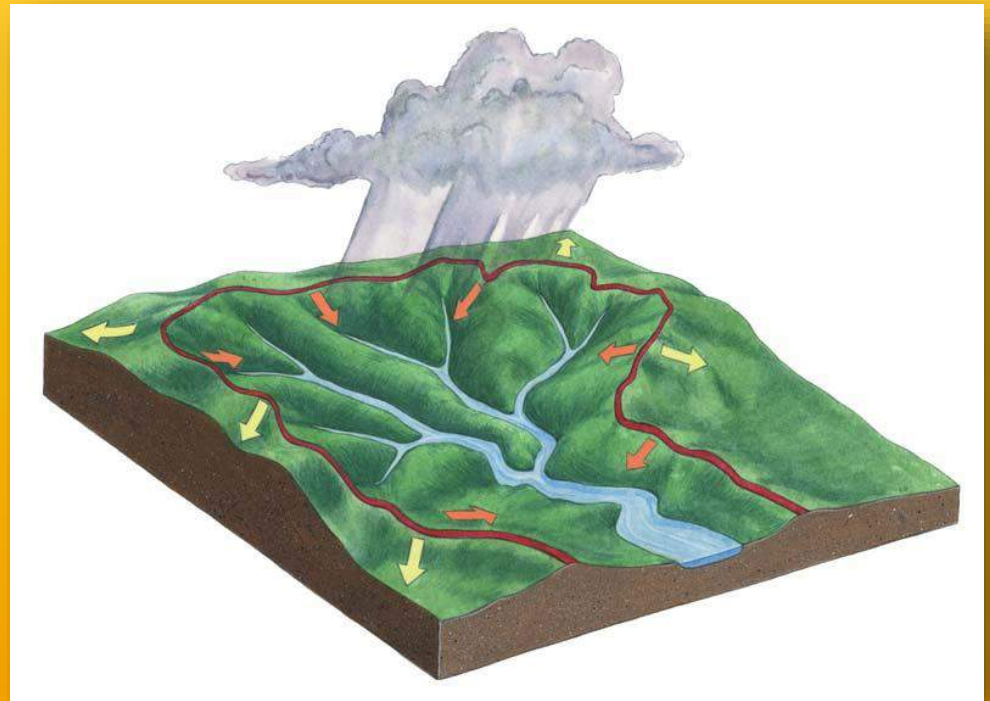
Control small storms on the agricultural field



Trap moderate size storms in buffer areas



Trap large size storms in wetland filters



Alto Creek Wetland Project

- Land acquisition by WDNR Fish and Wildlife Management (*Glacial Habitat Restoration Areas*)



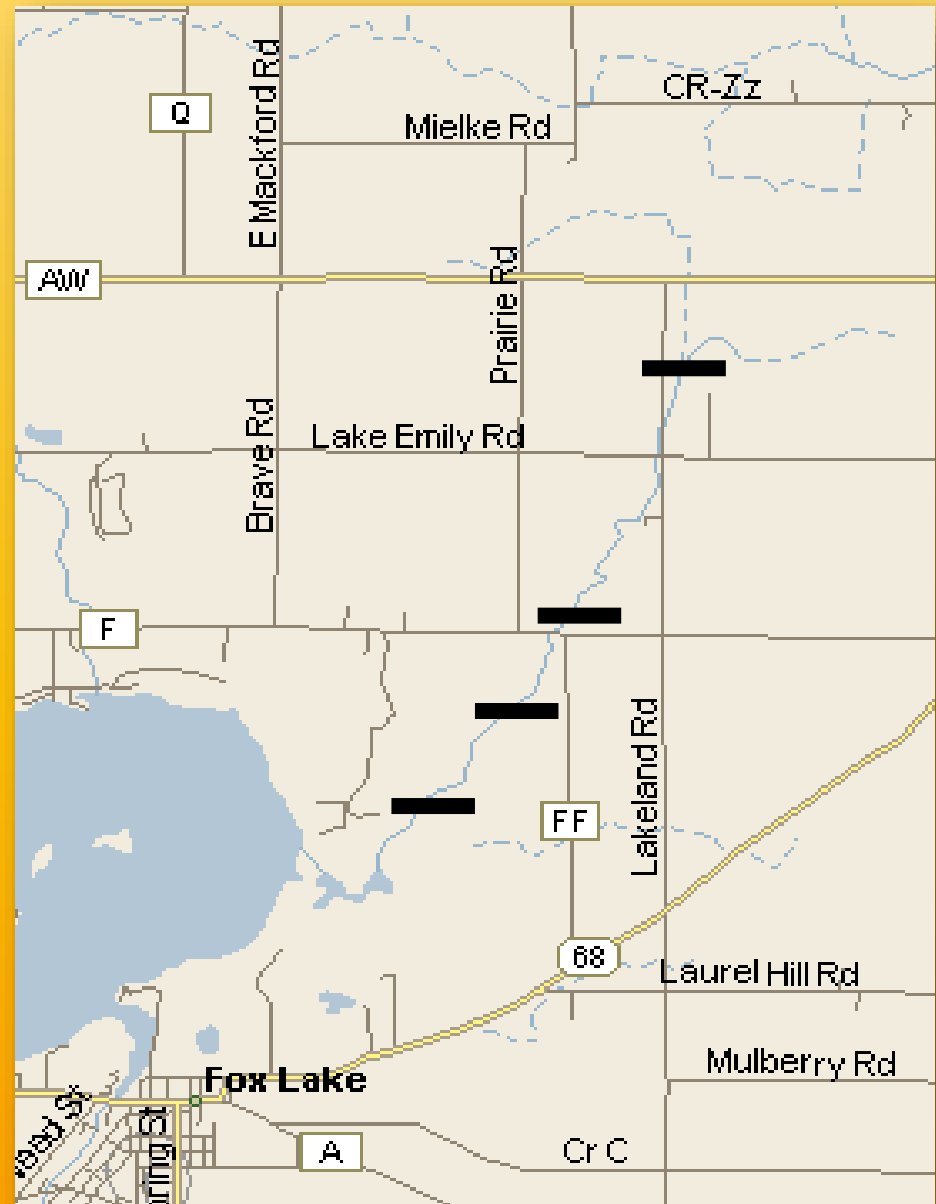
Alto Creek Wetland Project



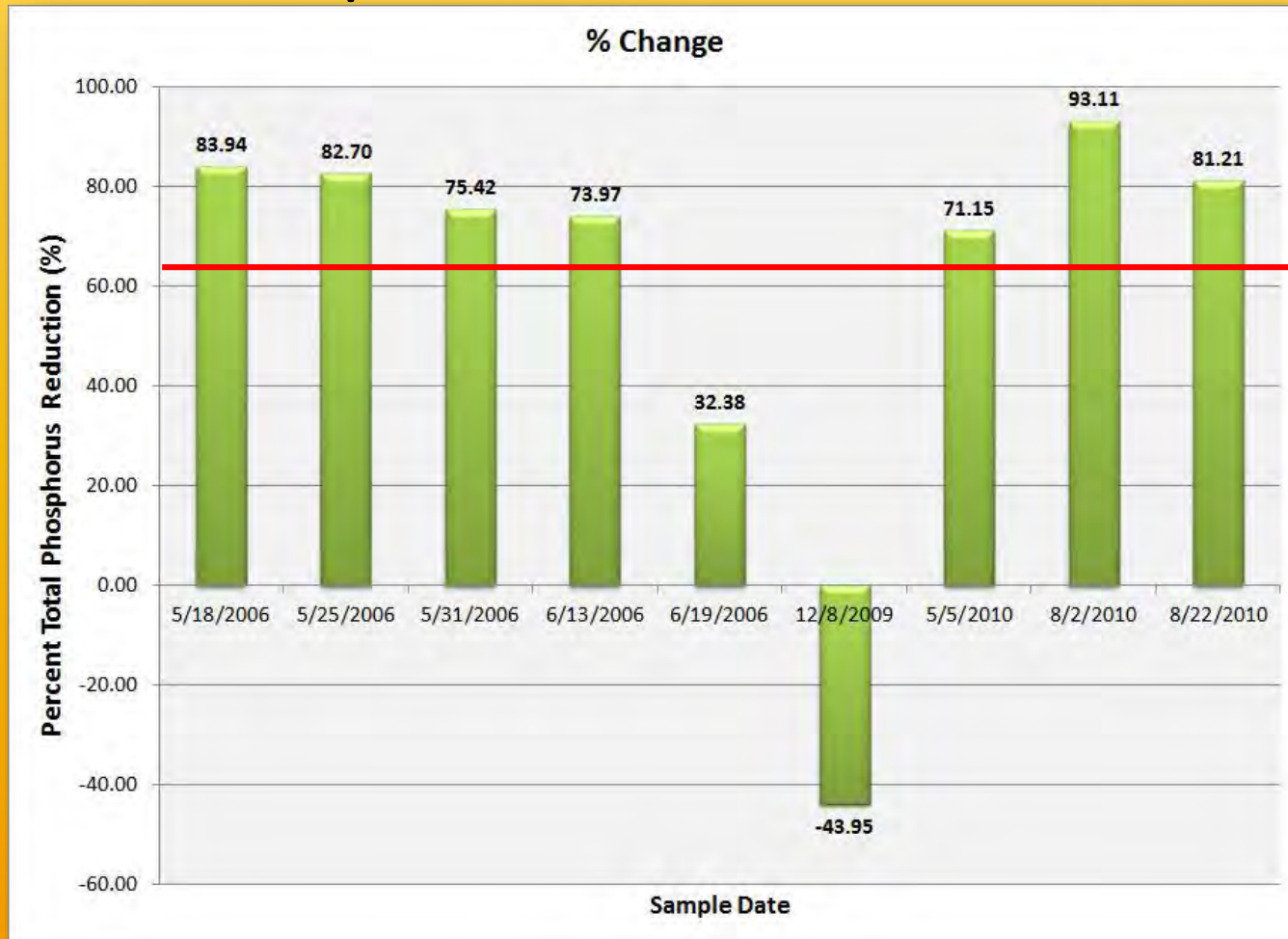
Alto Creek Wetland Project



Alto Creek Wetland Project



Total Phosphorus



61.1%

Cambra Creek Watershed

- Conservation tillage
- Barnyard controls
- Wetland restoration project (Wersma Farm)



Drew Creek Watershed

- Developed a management plan

Hey and Associates, Inc.

DREW CREEK MONITORING PROJECT FINAL REPORT

FOX LAKE, DODGE COUNTY, WISCONSIN



Prepared for:

Fox Lake Inland Lake Protection and Rehabilitation District
W10543 HWY F
Fox Lake WI 53933

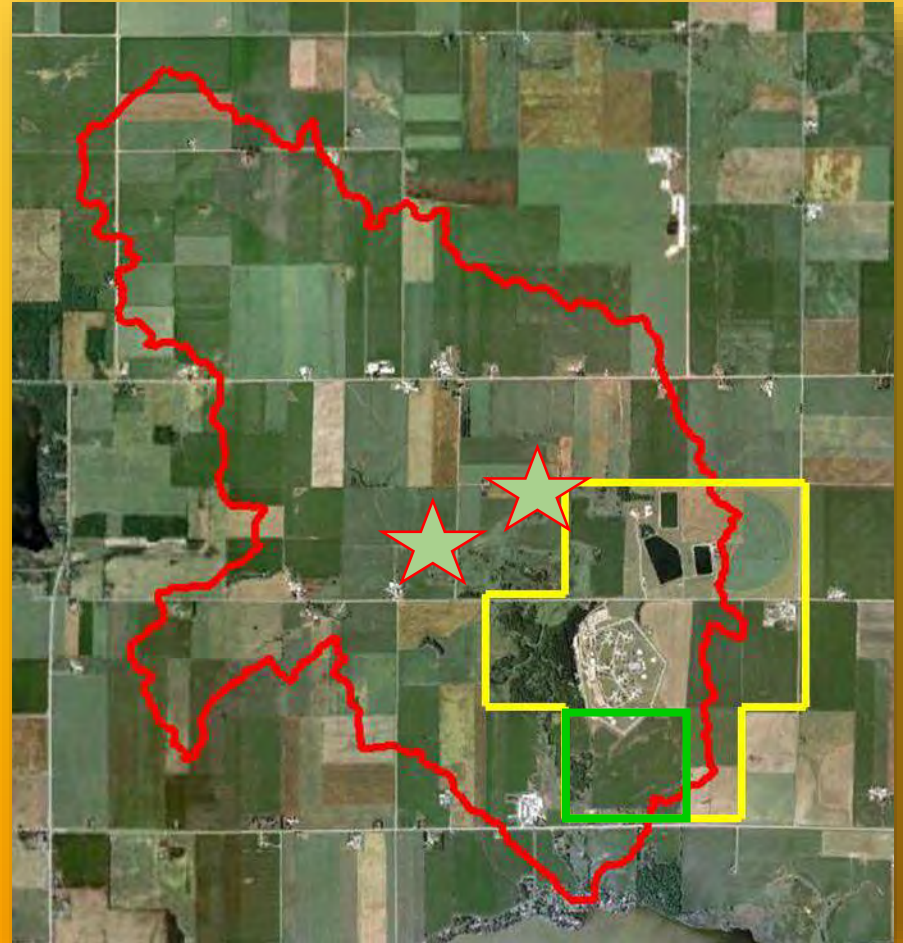
December 1, 2009

PN: 08167

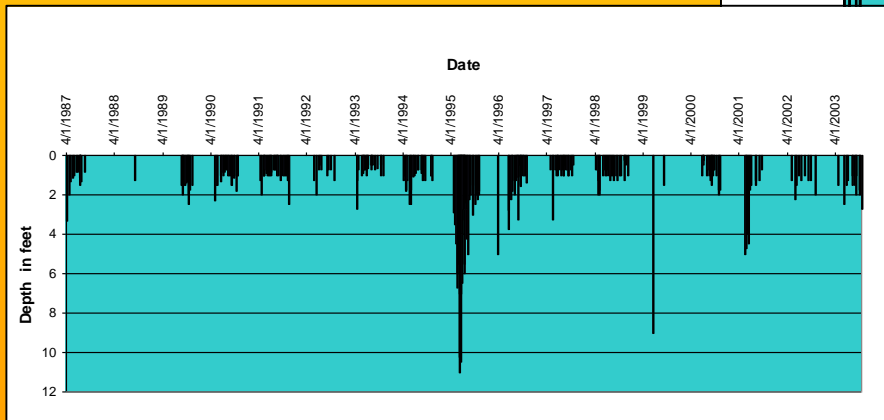
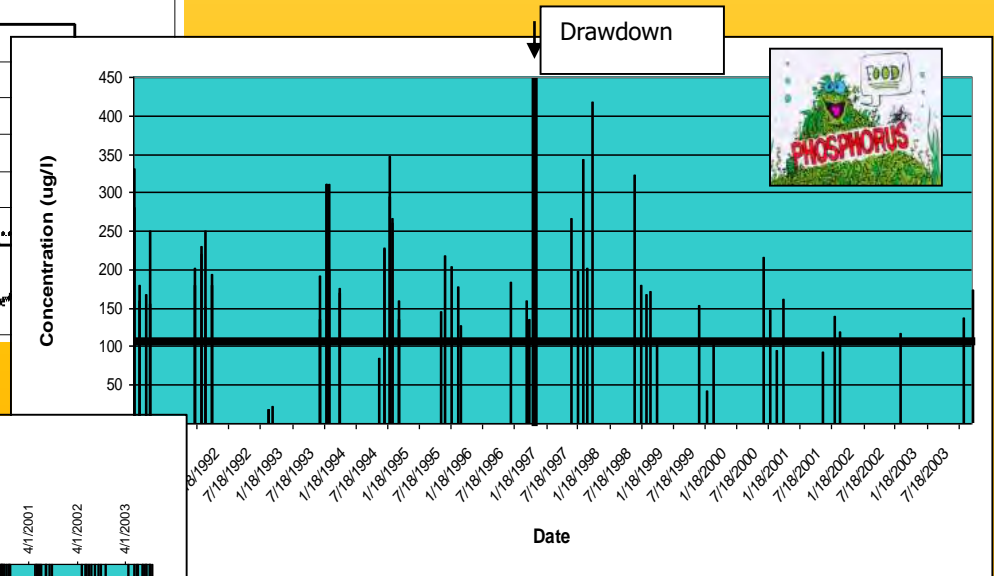
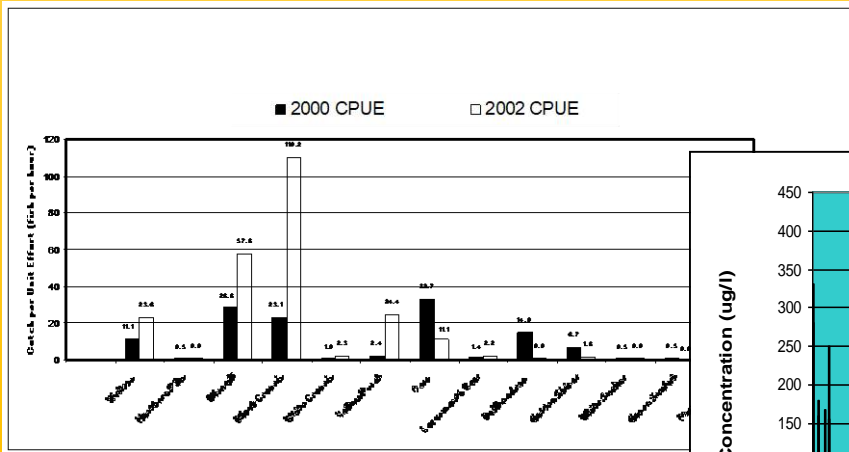
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Drew Creek Watershed

- Recommended tile management and innovative nutrient management on Prison Farm.
- Recommended installation of two wetland treatment systems.



How Well Has the Plan Worked?



How Well Has the Plan Worked?

- To answer the question it was recommended that a third party be brought in to evaluate the state of the lake.
- I recommended the University of Wisconsin - Milwaukee



- The 2005 – 2006 project resulted in the report to the right.

Hey and Associates, Inc.

FOX LAKE MANAGEMENT STRATEGY
EVALUATION REPORT AND RECOMMENDATIONS
FOR FUTURE ACTION - 2008

Prepared for:

Fox Lake Inland Lake Protection and Rehabilitation District
and
Wisconsin Department of Natural Resources

Prepared by:

Hey and Associates, Inc.
and
University of Wisconsin--Milwaukee

May 2008

PN: 04141

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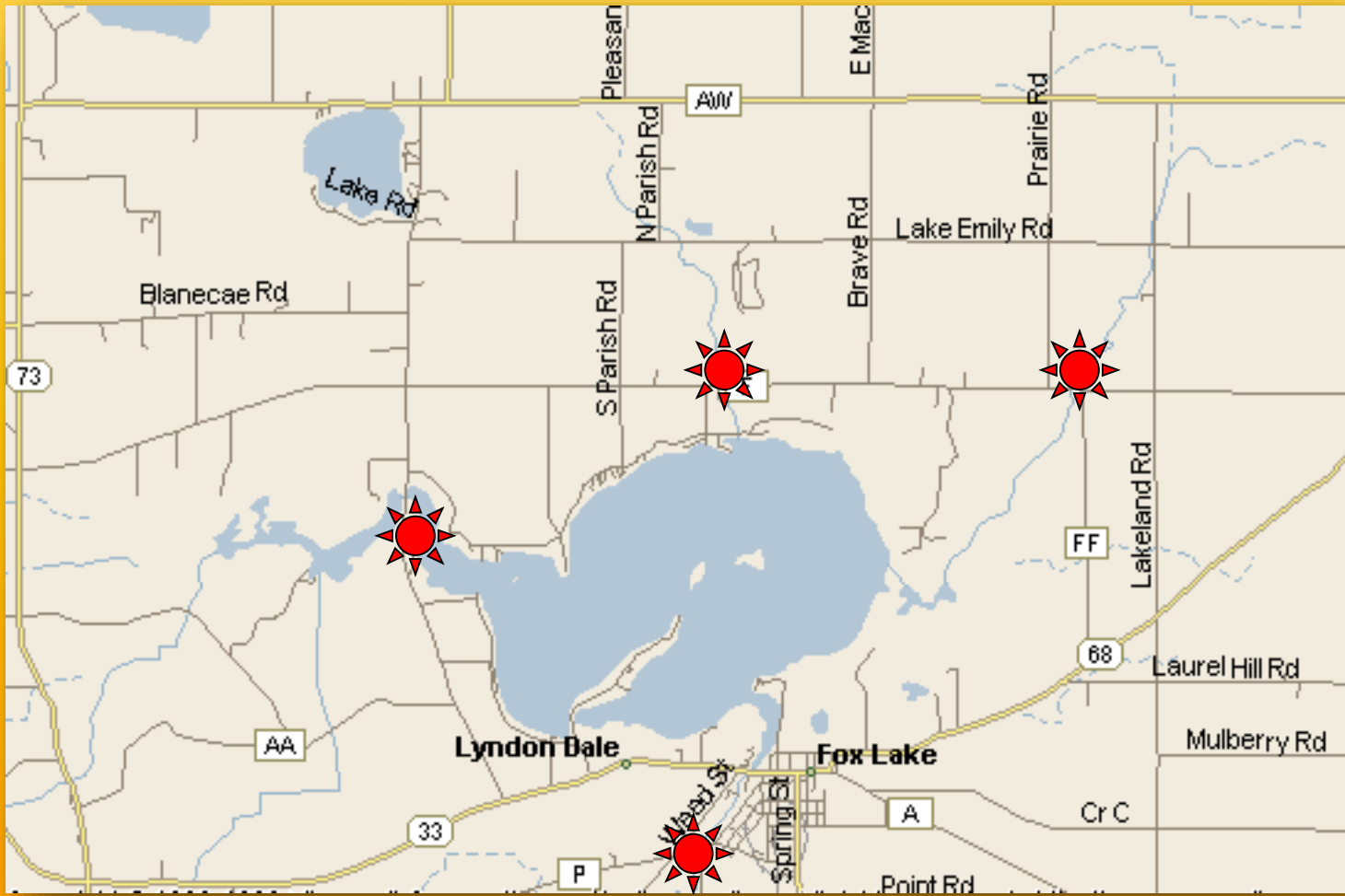
How Well Has the Plan Worked?

One-year monitoring program:

- Watershed inputs and outputs
- Inlake chemistry
- Aquatic plants
- Fish and other aquatic organisms

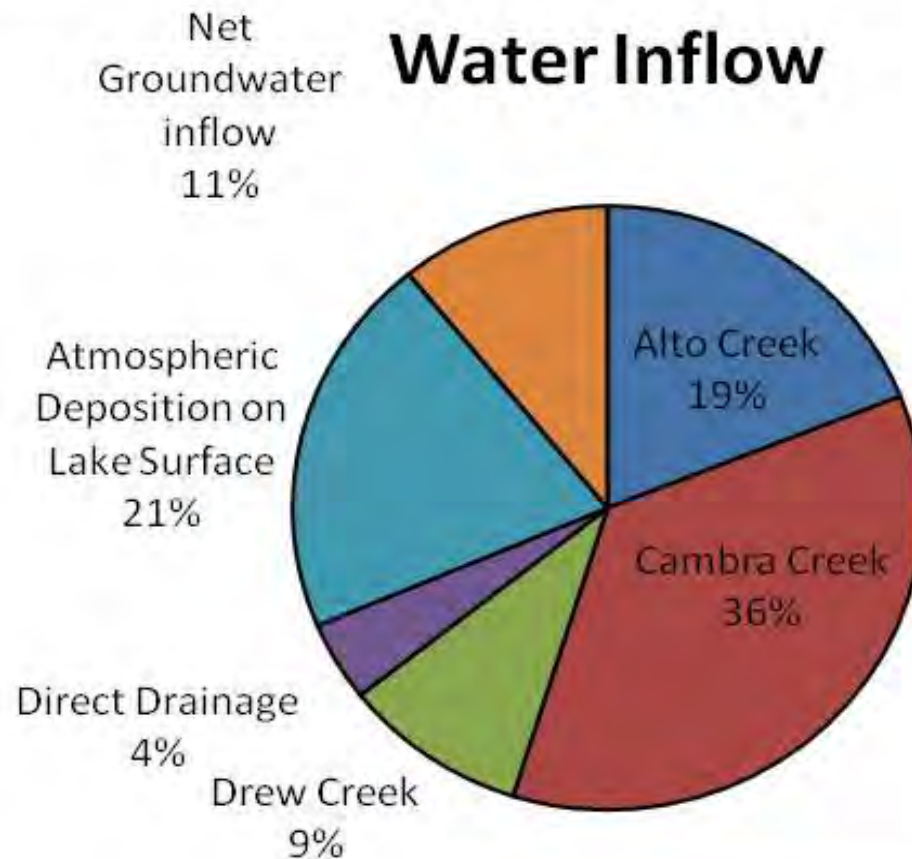


Watershed Monitoring



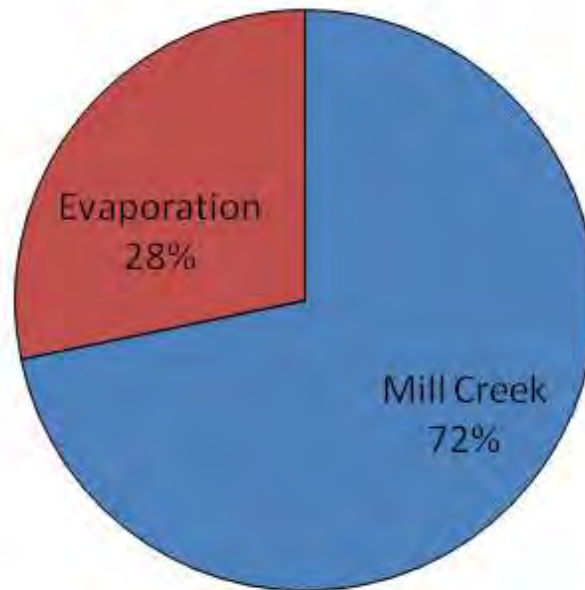
Monitoring
sites (2005)

Watershed Monitoring

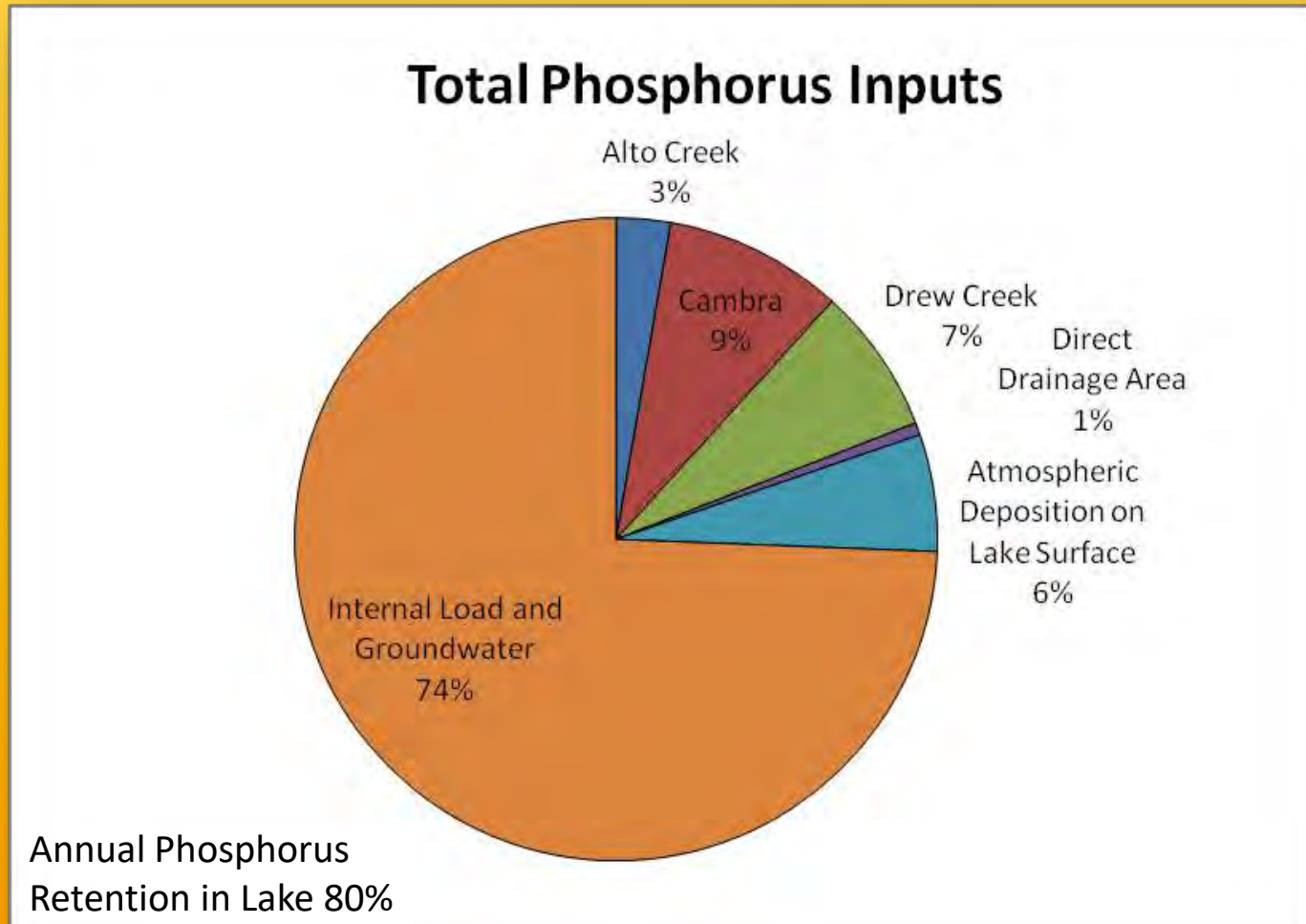


Watershed Monitoring

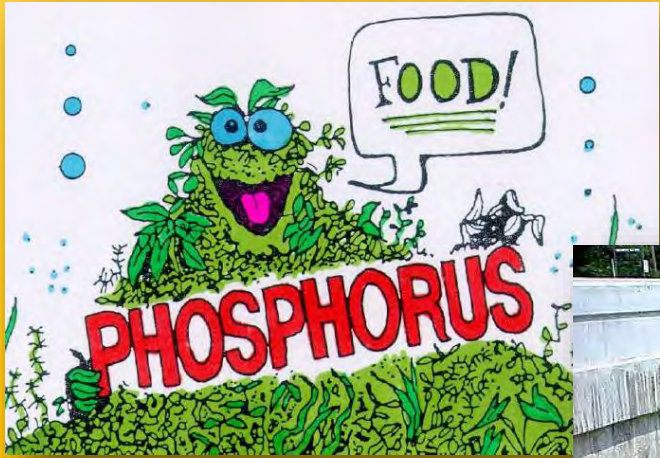
Water Outflow



Watershed Monitoring



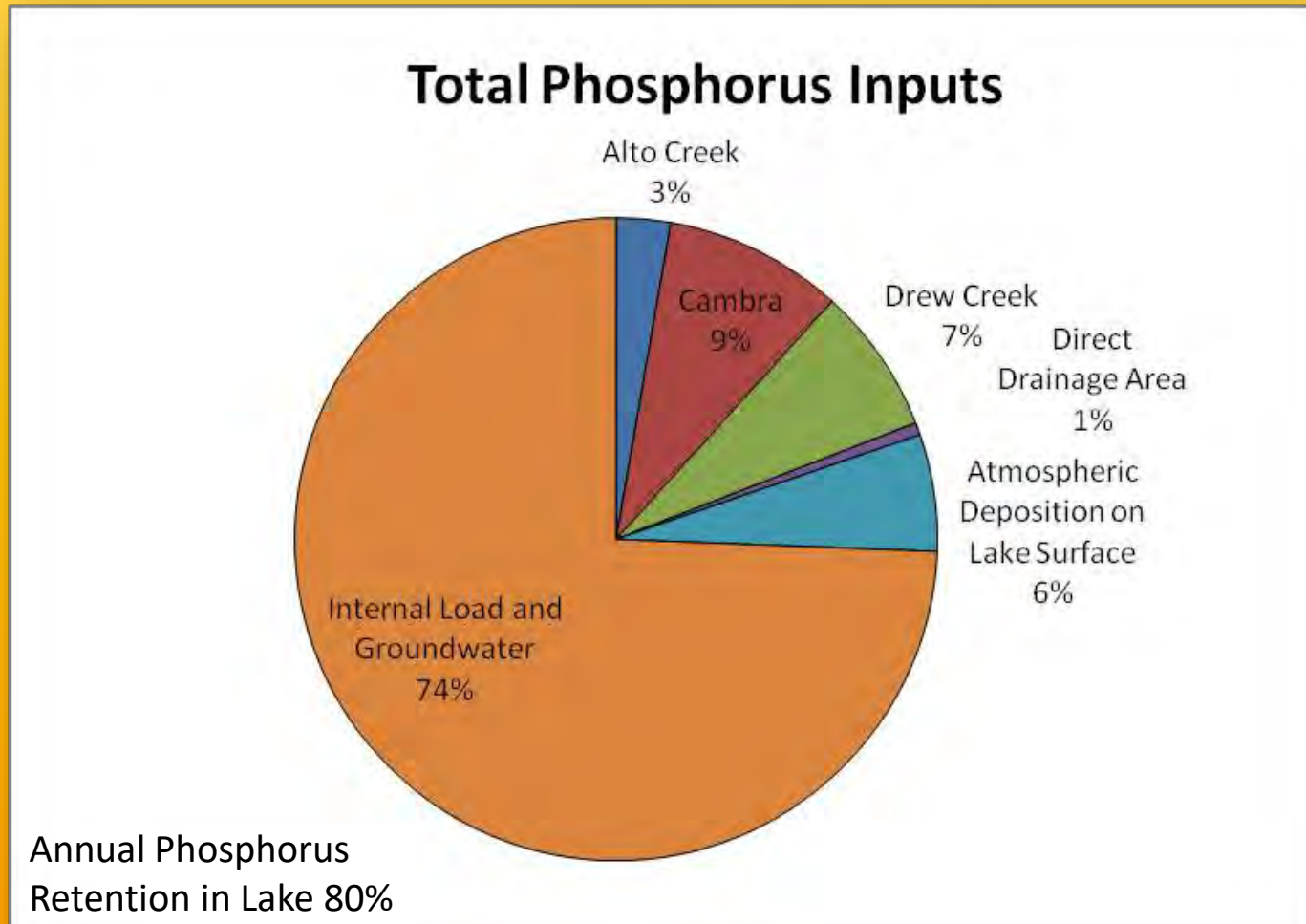
Phosphorus



Chlorophyll a



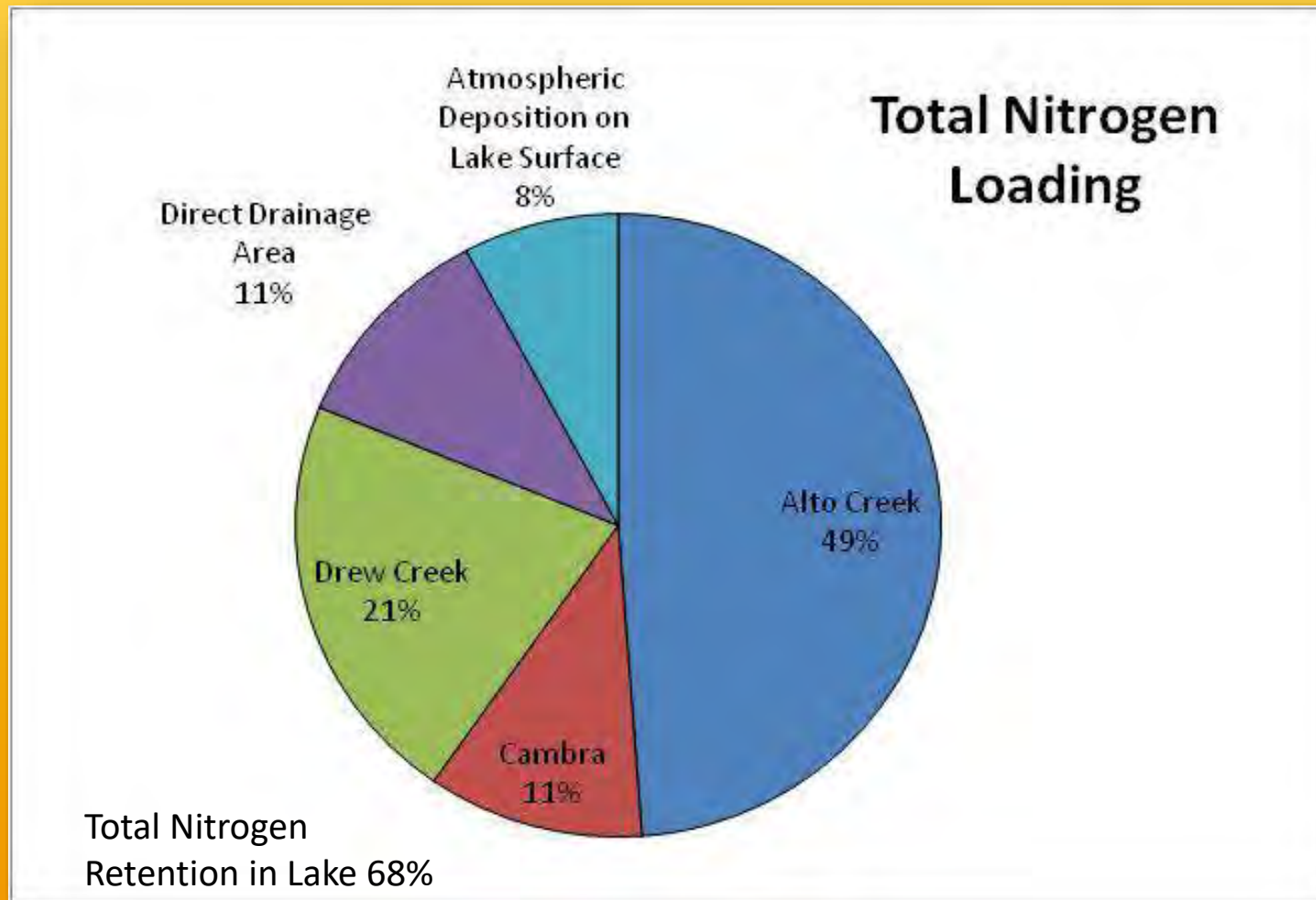
Watershed Monitoring



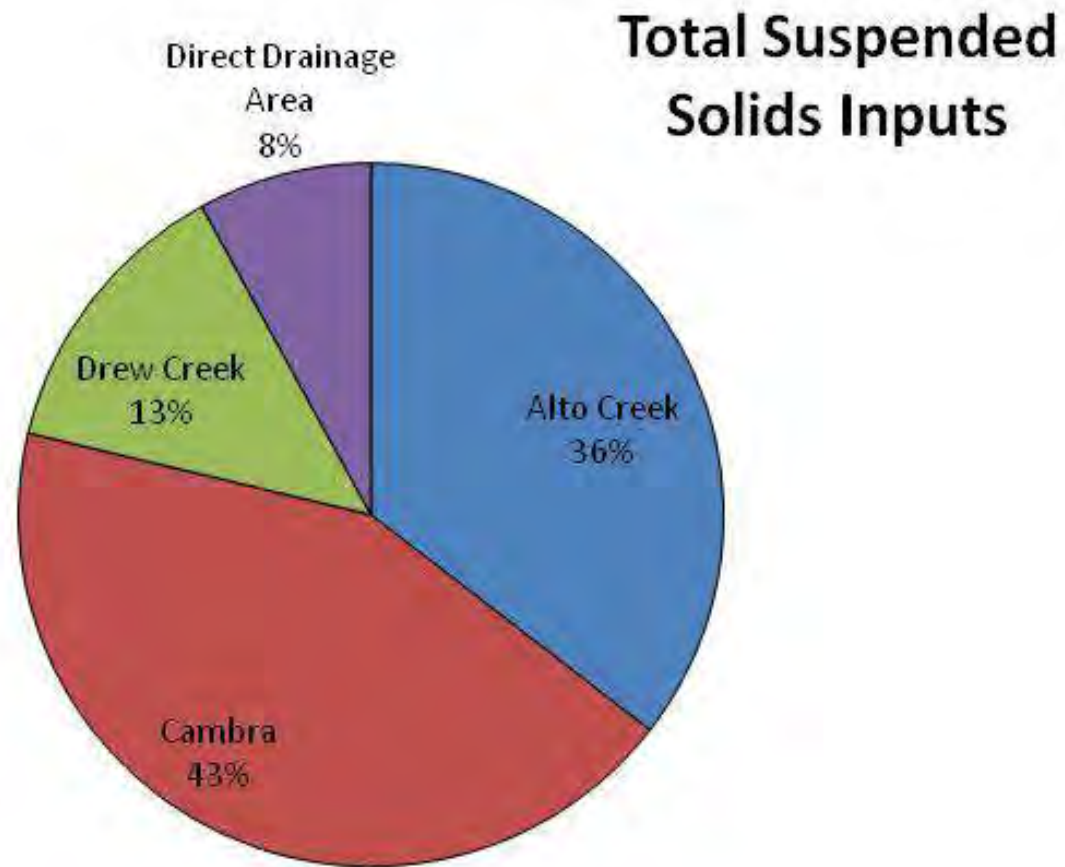
Lake Sediments



Watershed Monitoring



Watershed Monitoring



Follow-up Monitoring of Tributaries (Alto Creek)

Hey and Associates, Inc.

ALTO CREEK MONITORING PROJECT FINAL REPORT

FOX LAKE, DODGE COUNTY, WISCONSIN



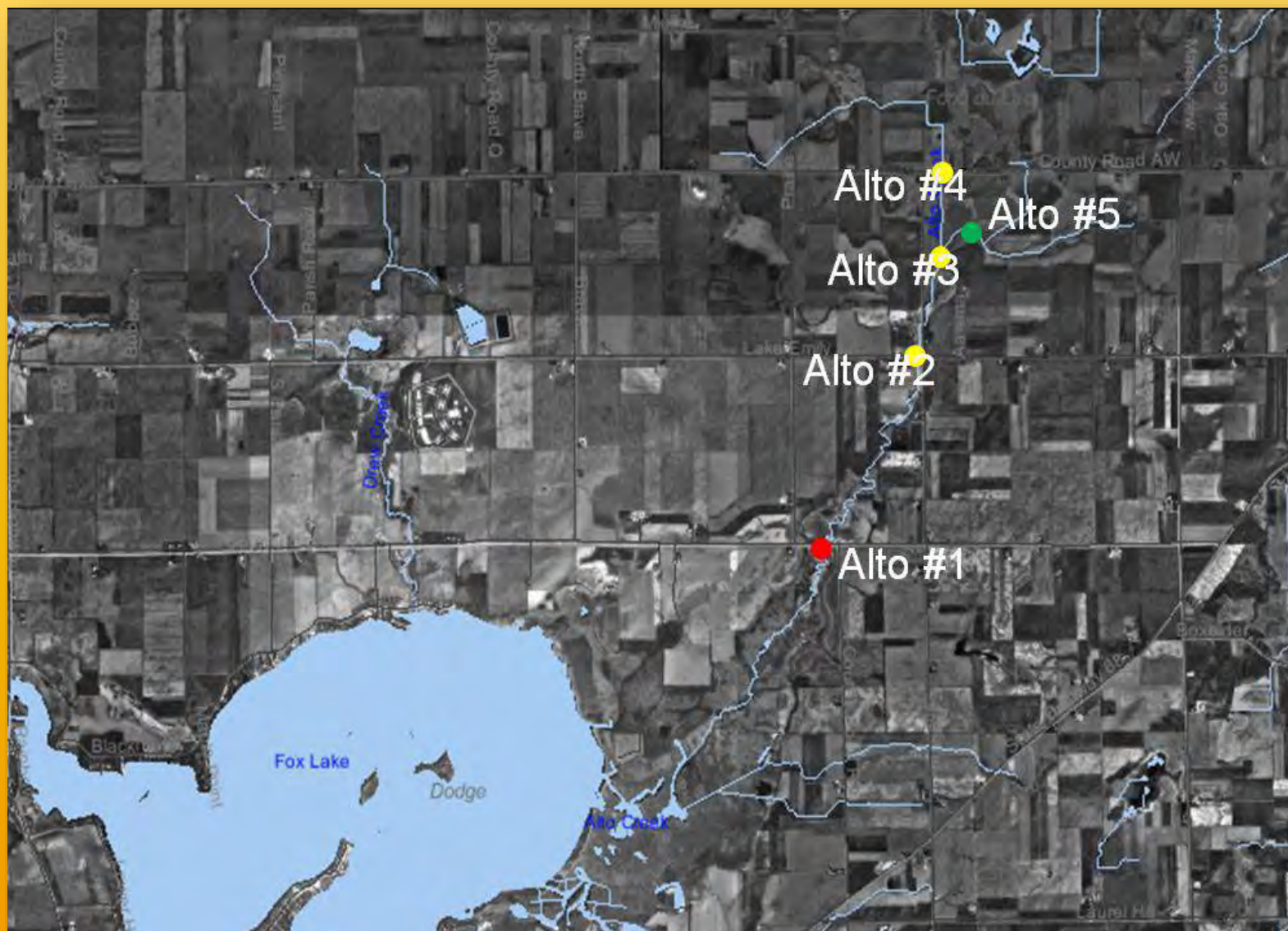
Prepared for:

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Fox Lake WI 53933

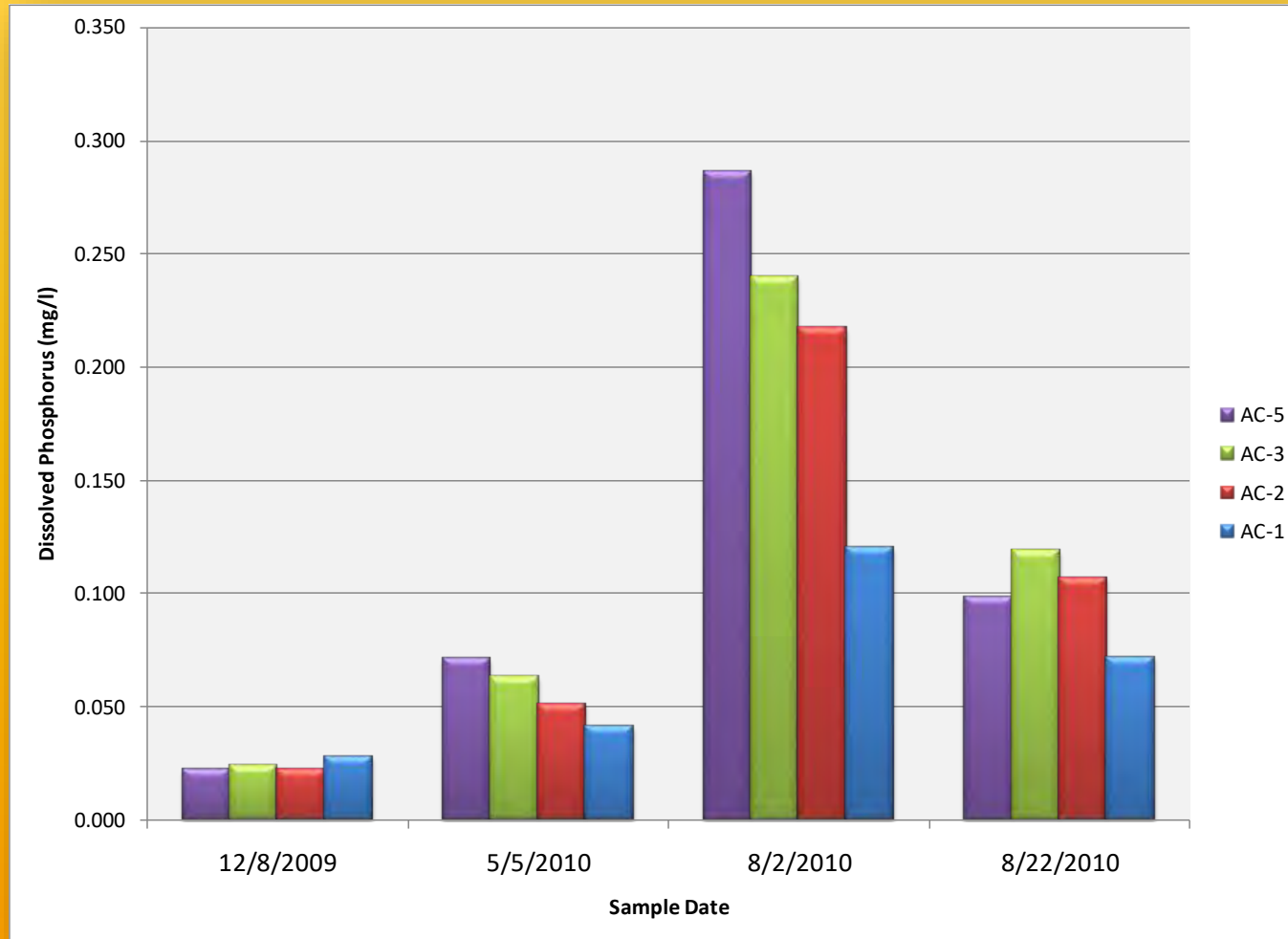
December 15, 2010

PN: 09005

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Relationship of Dissolved Phosphorus Concentrations from Upstream to Downstream by Sample Date Alto Creek



Follow-up Monitoring of Tributaries Cambra Creek

Hey and Associates, Inc.

**CAMBRA CREEK MONITORING PROJECT
FINAL REPORT**

FOX LAKE, DODGE COUNTY, WISCONSIN



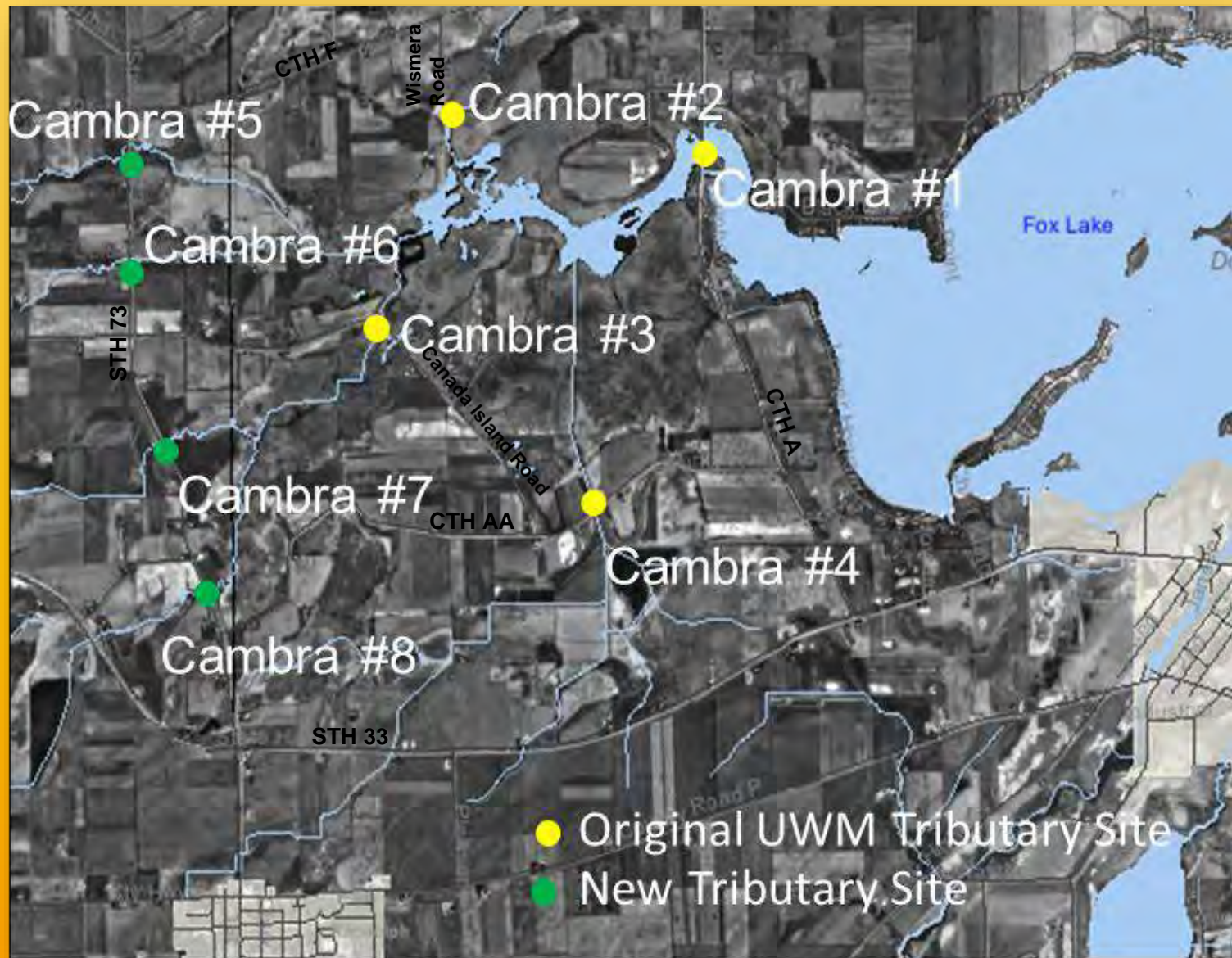
Prepared for:

Fox Lake Inland Lake Protection and Rehabilitation District
W10543 HWY F
Fox Lake WI 53933

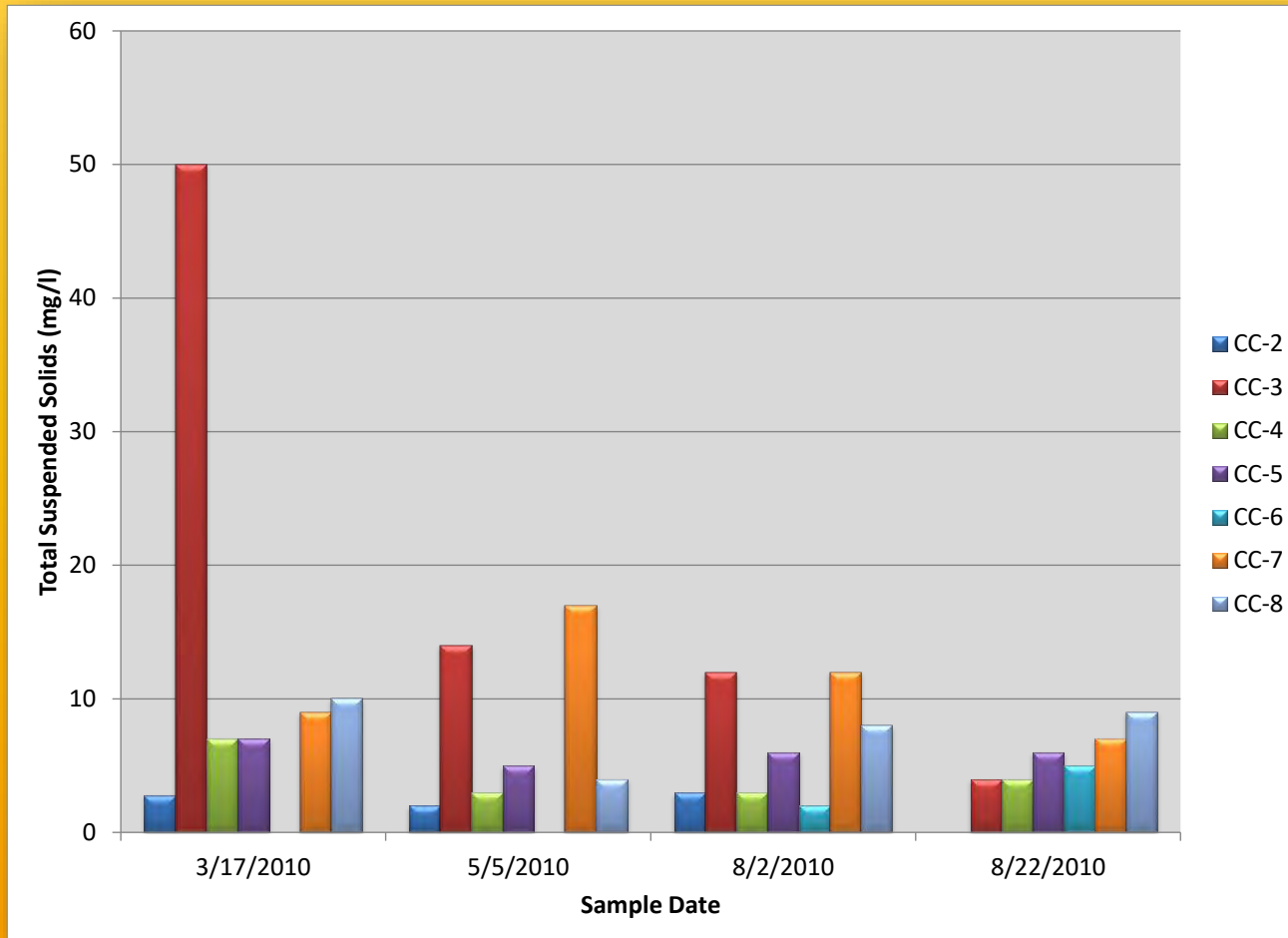
December 15, 2010
Revised: December 15, 2011

PN: 09006

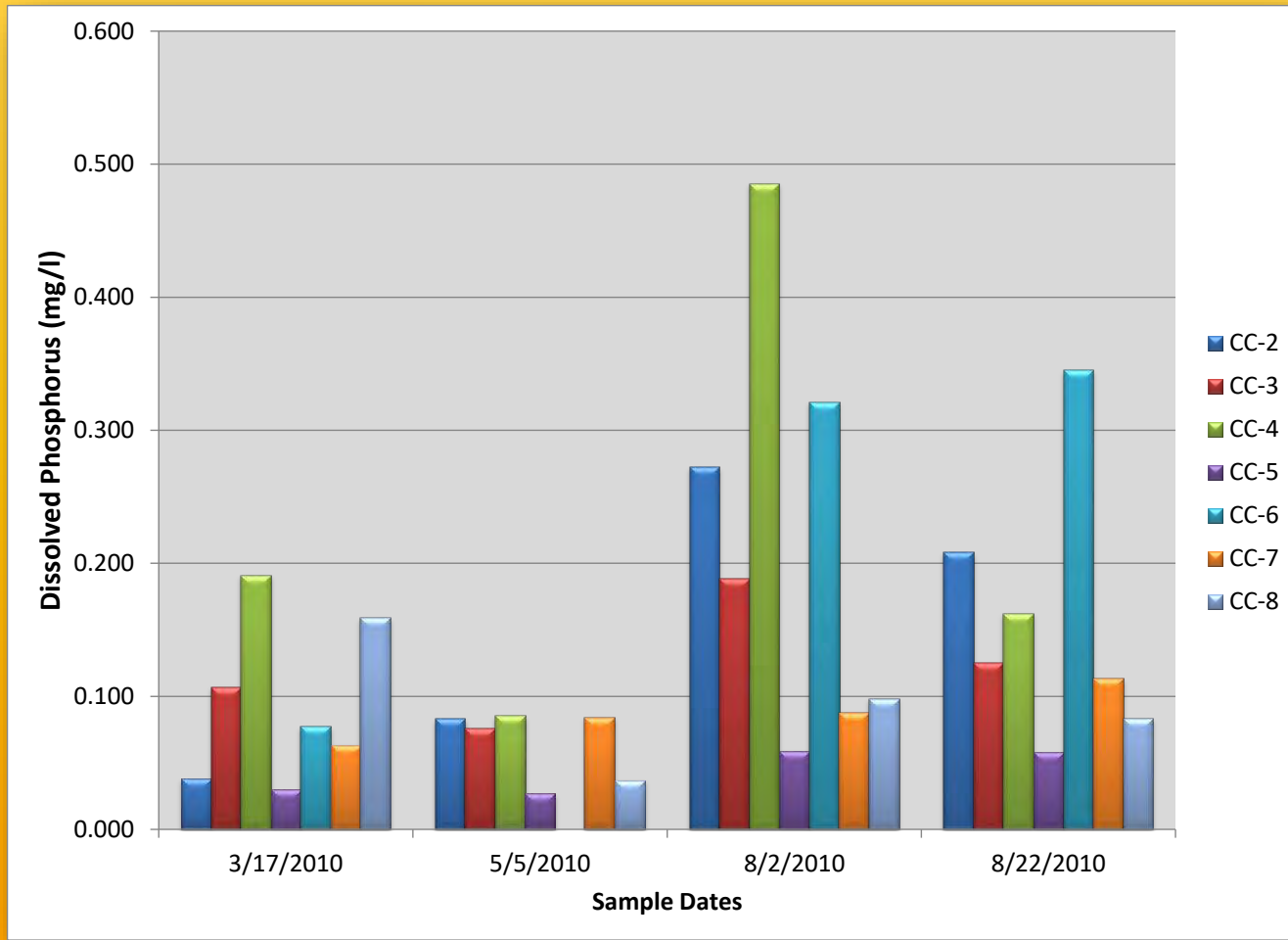
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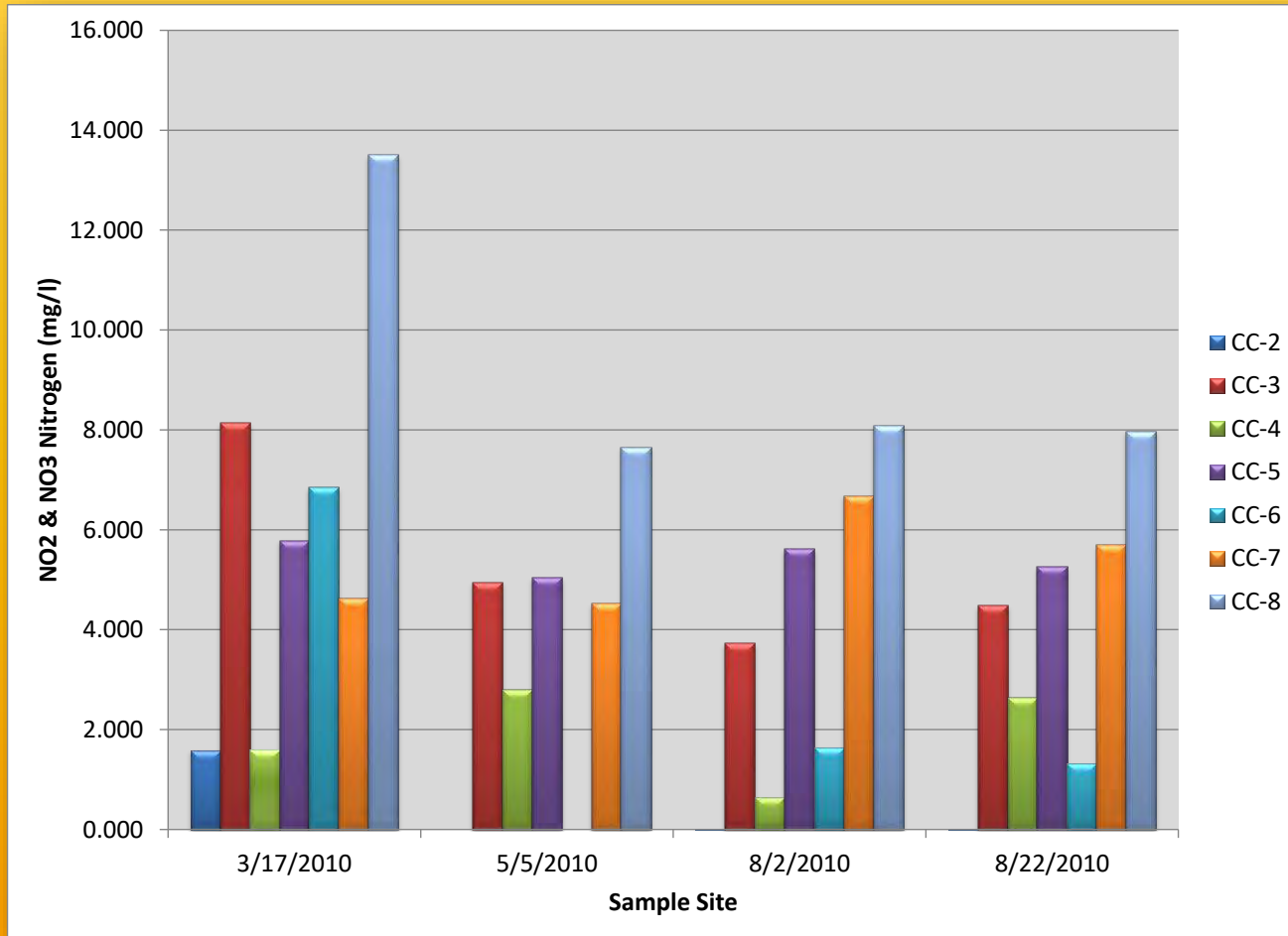
Relationship of Total Suspended Solids Concentrations by Sample Site and Date



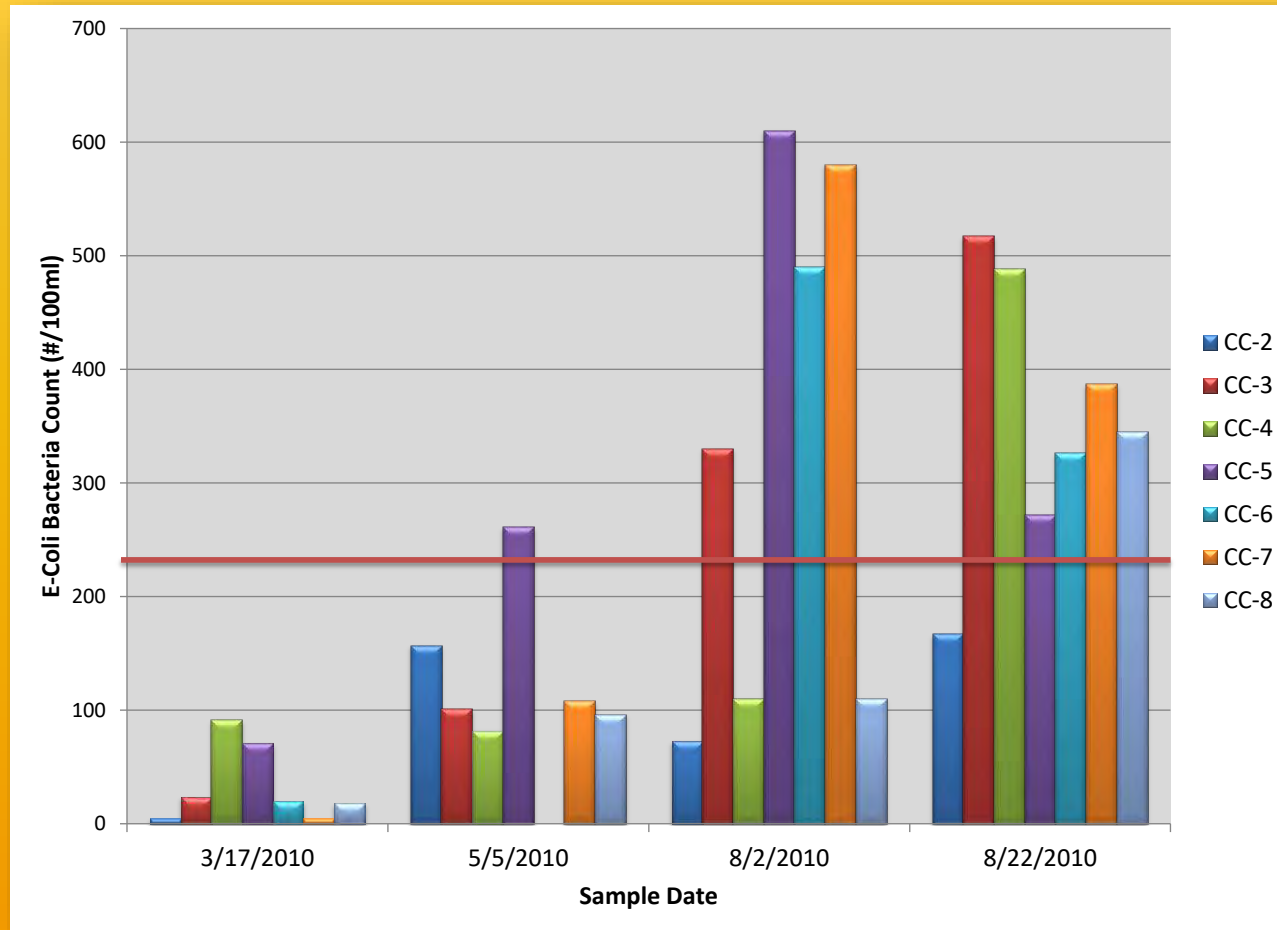
Relationship of Total Phosphorus Concentrations by Sample Site and Date



Relationship of NO₂/NO₃ Concentrations by Sample Site and Date



Relationship of Fecal E-Coli Bacteria Counts by Sample Site and Date



Follow-up Monitoring of Tributaries (Drew Creek)

Hey and Associates, Inc.

**DREW CREEK MONITORING PROJECT
FINAL REPORT**

FOX LAKE, DODGE COUNTY, WISCONSIN



Prepared for:

Fox Lake Inland Lake Protection and Rehabilitation District
W10543 HWY F
Fox Lake WI 53933

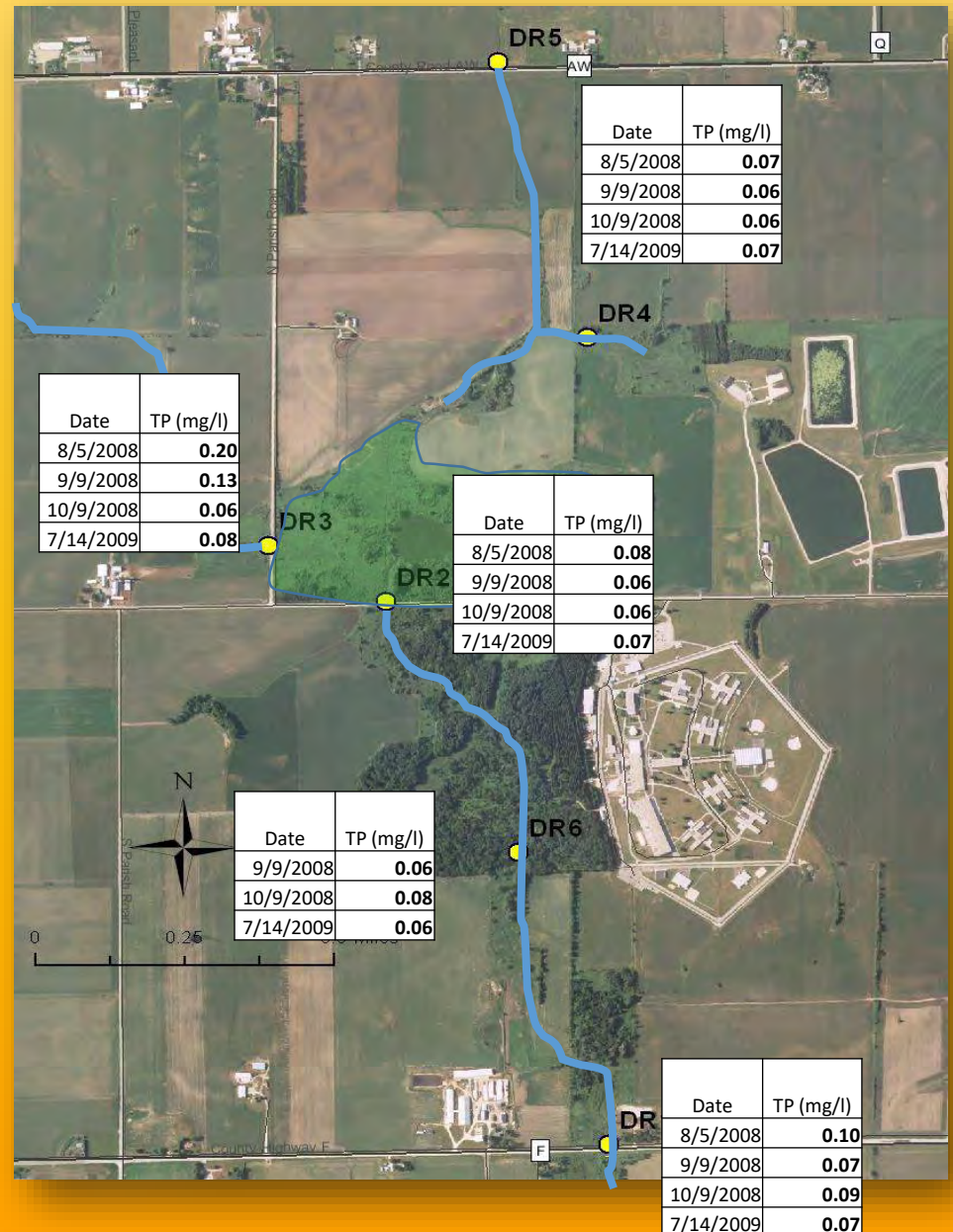
December 1, 2009

PN: 08167

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Office (262) 796-0440 Fax (262) 796-0445*

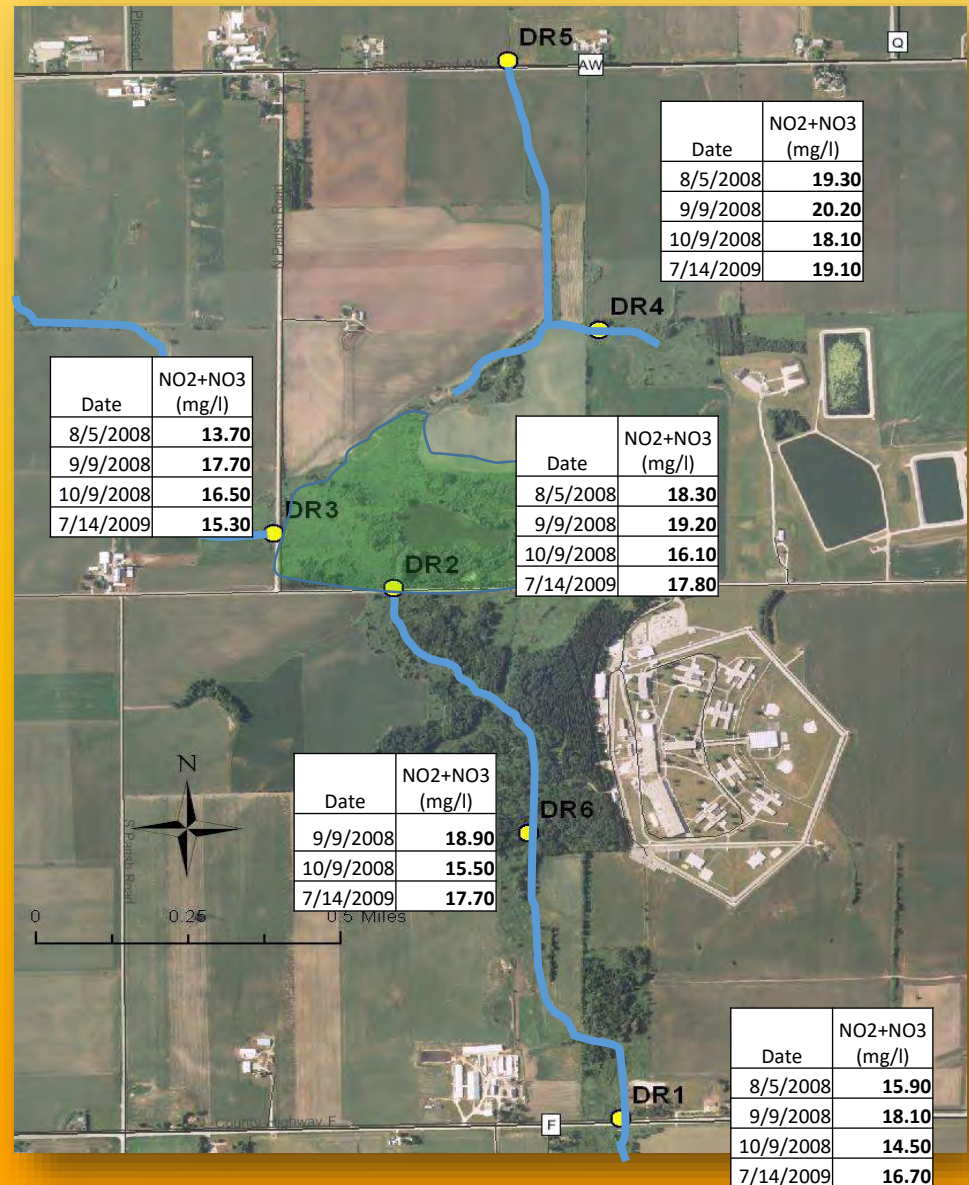
Total Phosphorus

- CONCENTRATION (MG/L)



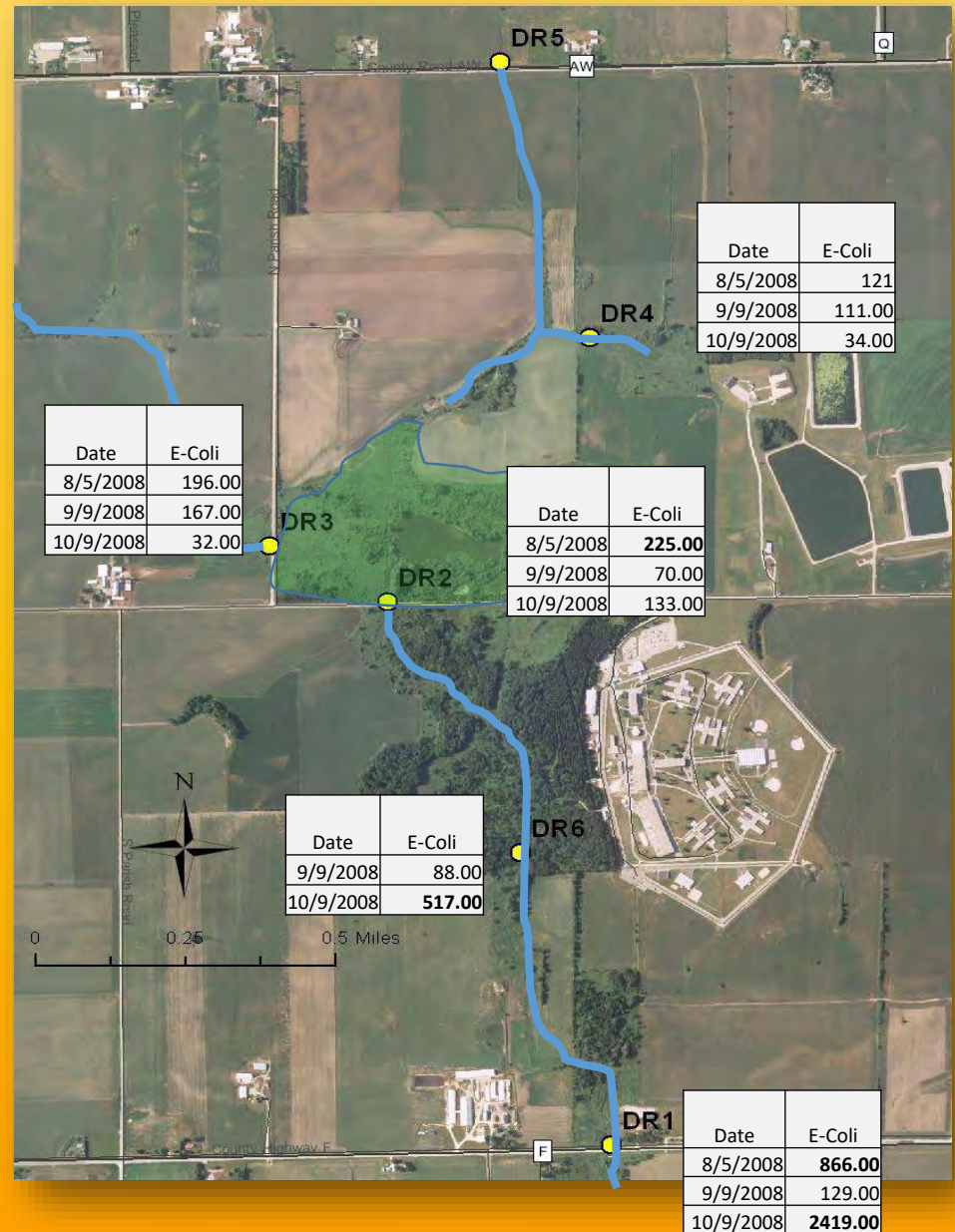
Nitrate/Nitrite

- CONCENTRATION (MG/L)



E-coli Bacteria

- CONCENTRATION
(COUNTS PER 100ML)



Conclusions of Watershed Monitoring

- Suspended solid concentration were low in all stream monitored indicating that surface runoff is not the major source of pollutants into Fox Lake.

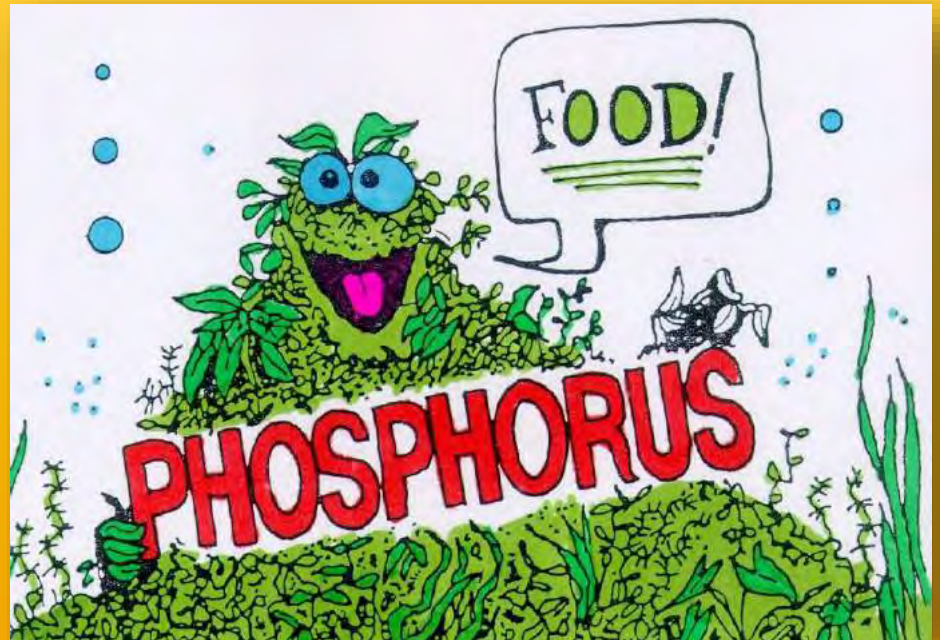


Phosphorus

*Attached
Phosphorus*
(sediment
bound)

+ *Dissolved
(Soluble)
Phosphorus*

Total Phosphorus



Conclusions of Watershed Monitoring

- Total phosphorus levels were made up of predominantly dissolved (soluble) phosphorus.
 - Alto Creek 67%
 - Cambra Creek 75%
 - Drew Creek 65%

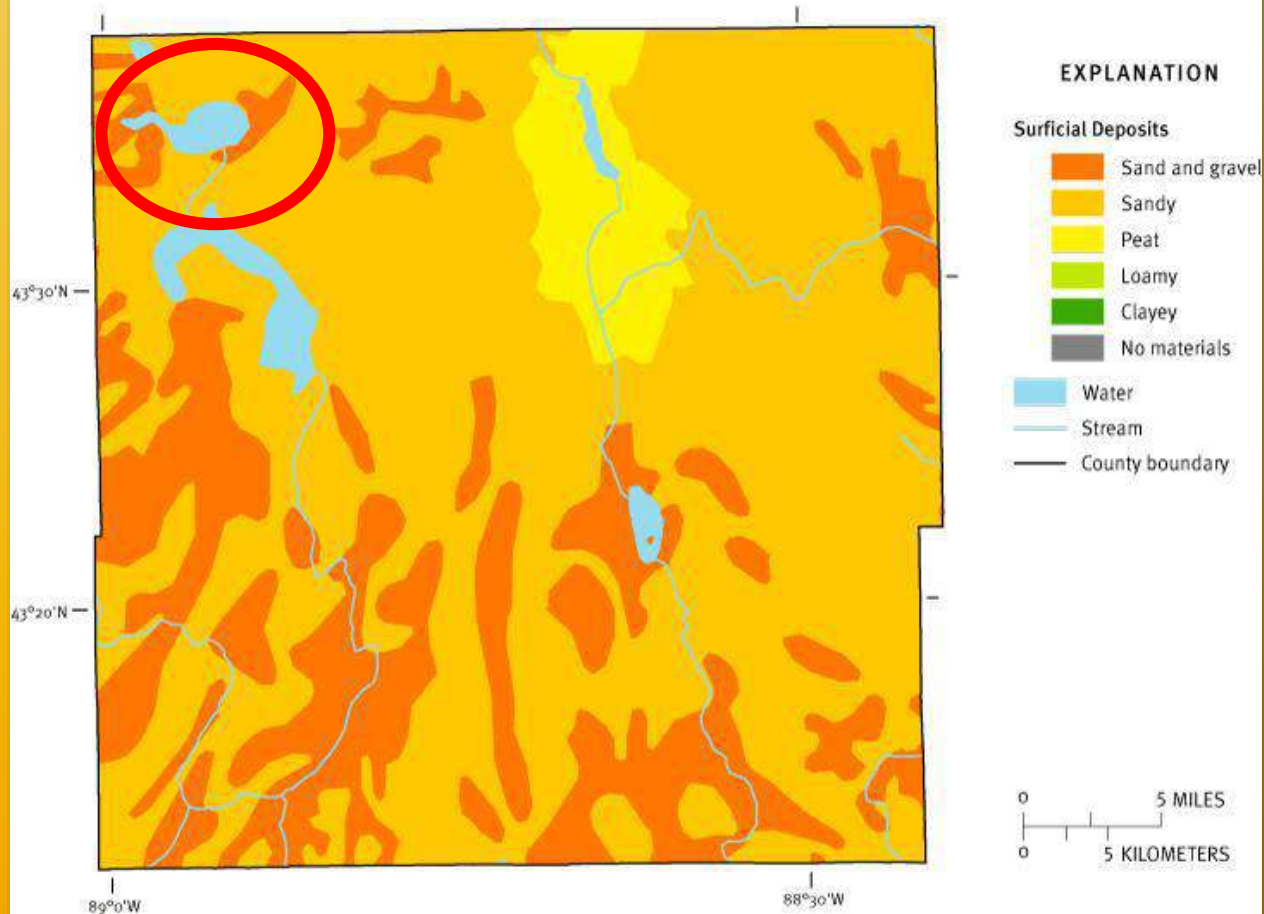


Conclusions of Watershed Monitoring

- High levels of dissolved phosphorus combined with low levels of suspended solids indicated that the major source of nutrients entering Fox Lake tributaries is from groundwater in the form of springs and drain tiles.



Dodge County – Surficial Deposits

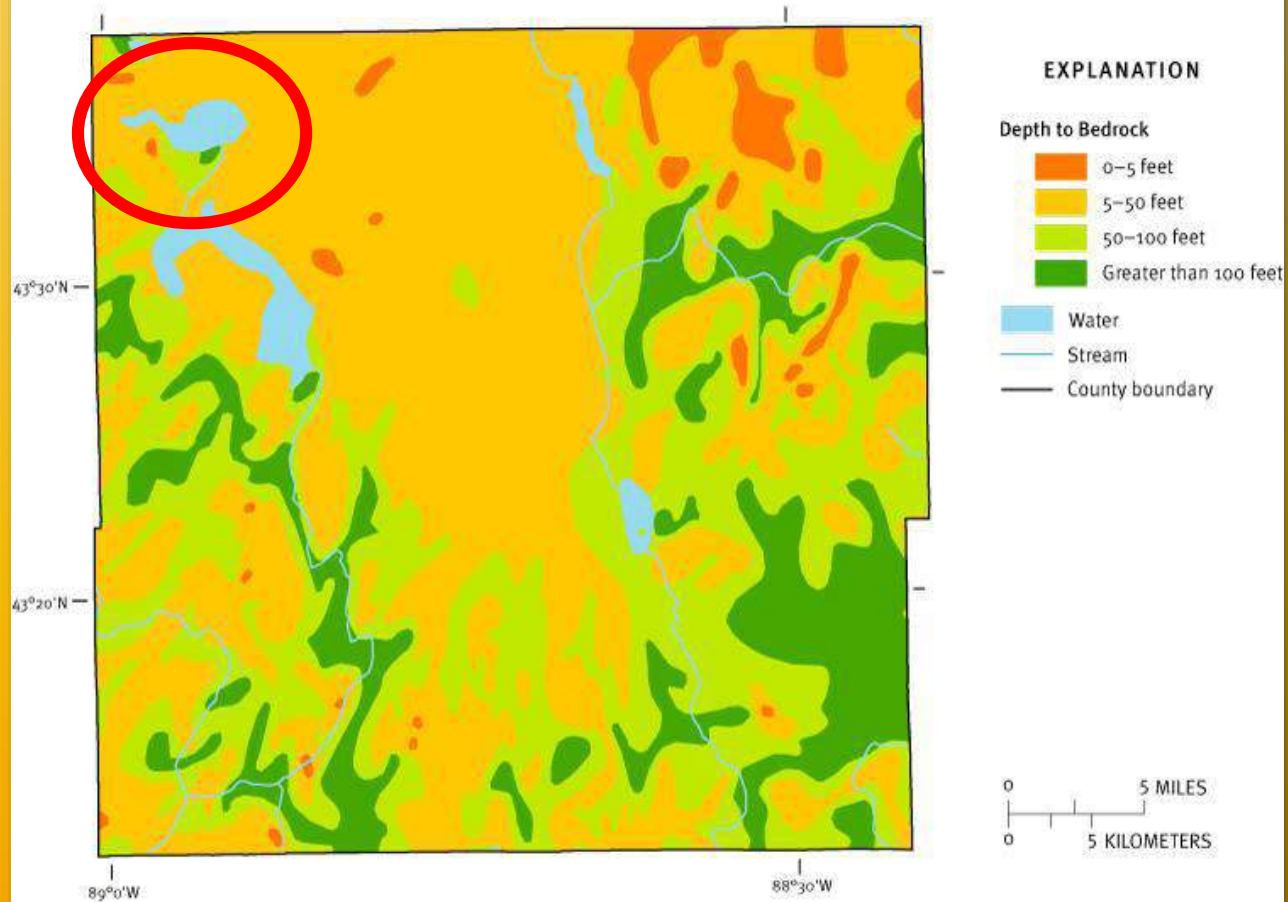


This resource characteristic map was derived from generalized statewide information at small scales, and cannot be used for any site-specific purposes.

Map source: Schmidt, R.R., 1987, Groundwater contamination susceptibility map and evaluation: Wisconsin Department of Natural Resources, Wisconsin's Groundwater Management Plan Report 5, PUBL-WR-177-87, 27 p.

Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007, <http://wi.water.usgs.gov/gwcomp/>

Dodge County – Depth to Bedrock

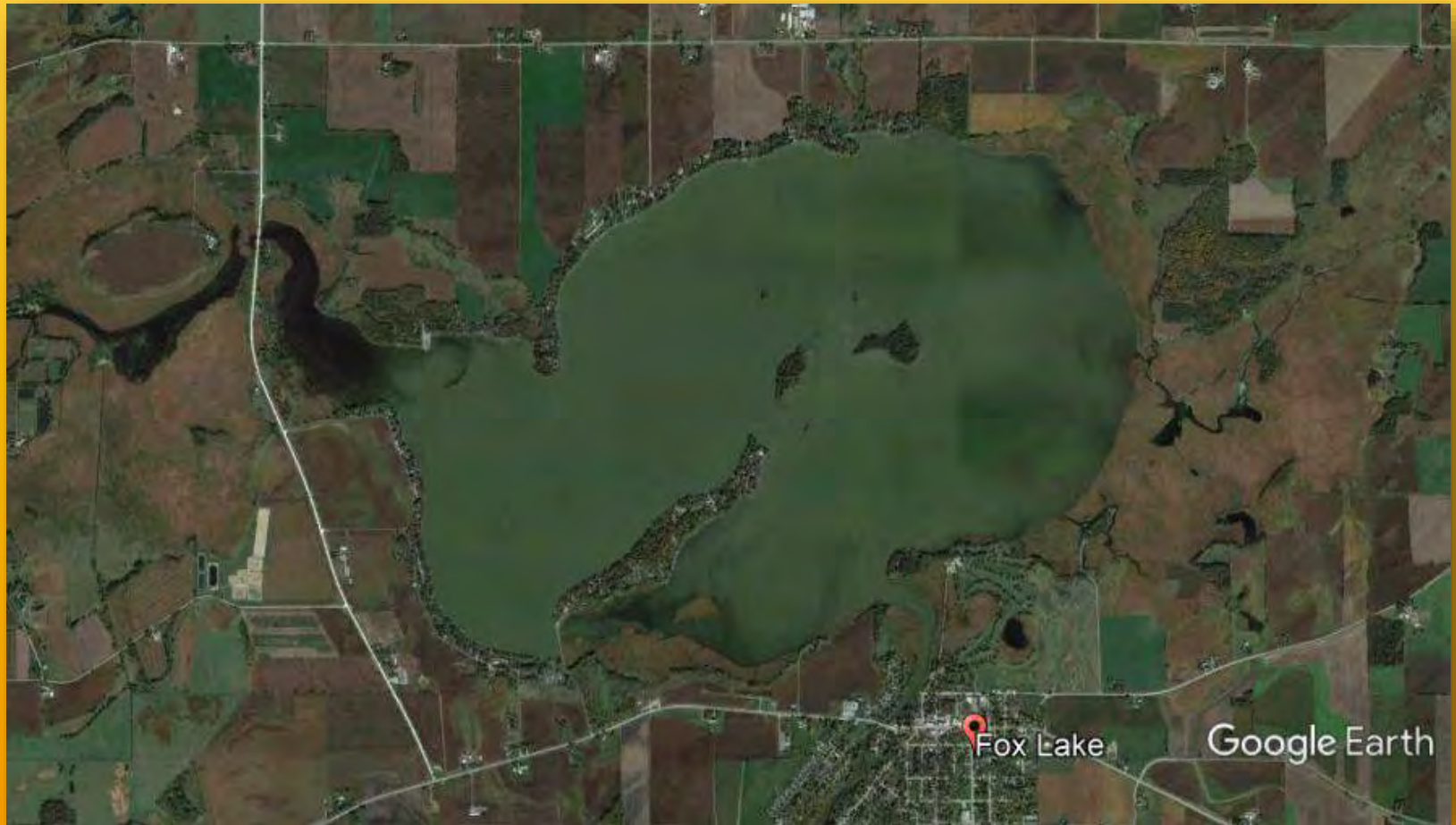


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Conclusions of Watershed Monitoring

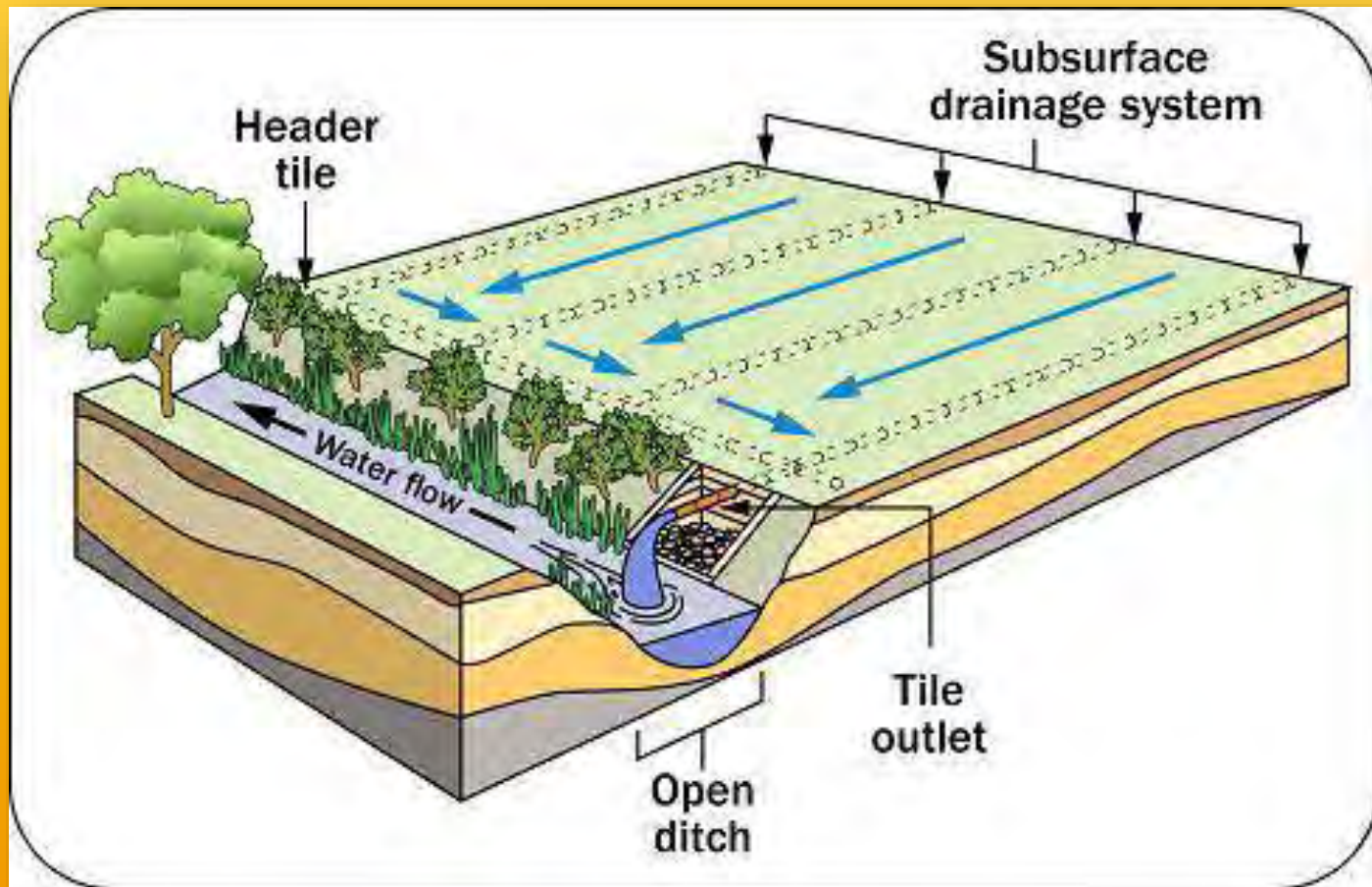


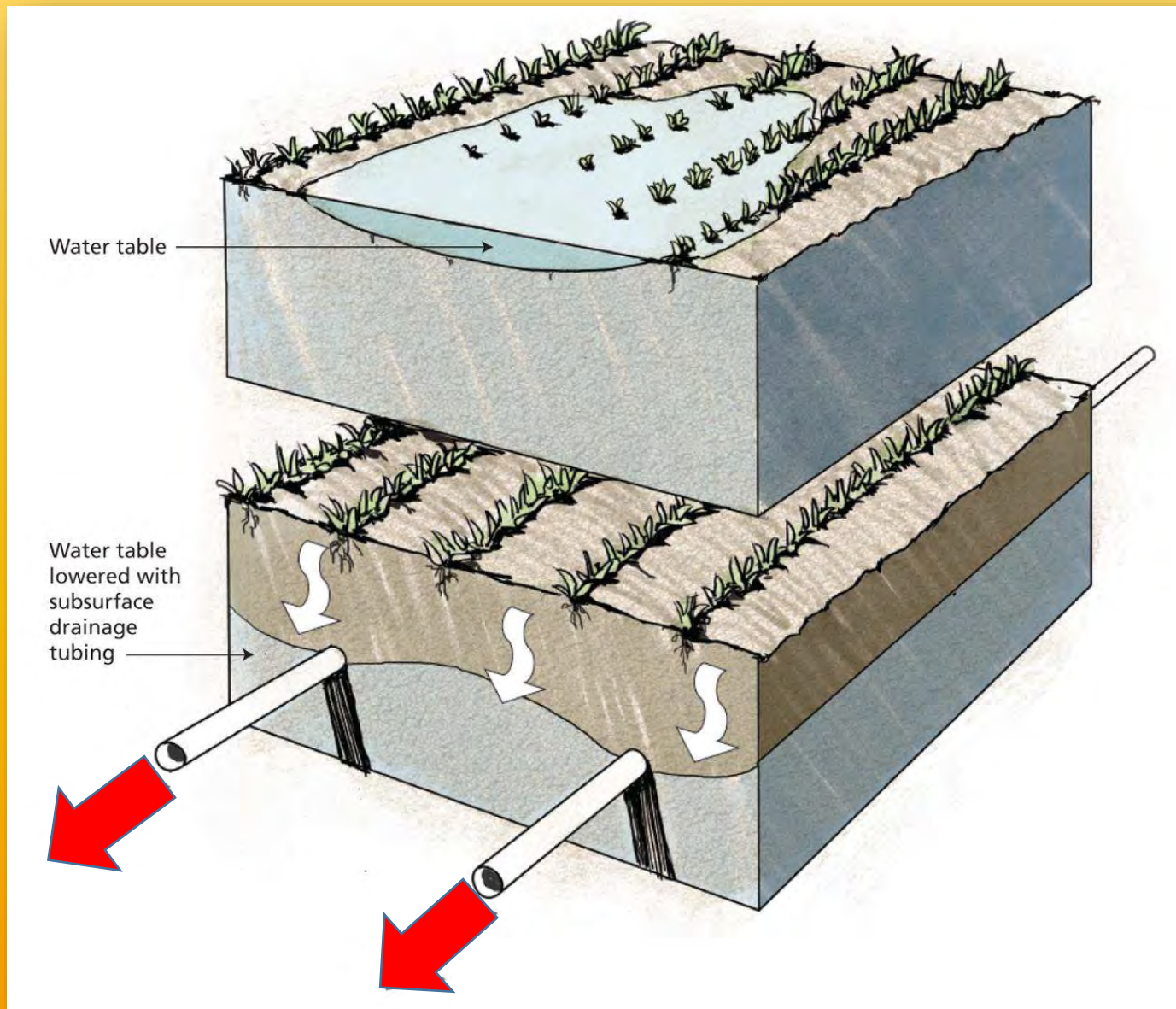
Conclusions of Watershed Monitoring

- Groundwater was a bigger source of nutrients than surface runoff.
- Tile drainage was a major issue.



Conclusions of Watershed Monitoring





Conclusions of Watershed Monitoring

- Nitrite/nitrate nitrogen levels ranged from 1.0 to 20.2 mg/l, with many samples above the state's drinking water standard of 10 mg/l.
- Highest levels were found in the Drew Creek watershed.



Revised Recommended Watershed Management Strategy

- Develop strategies that not only address surface runoff but also groundwater contamination.



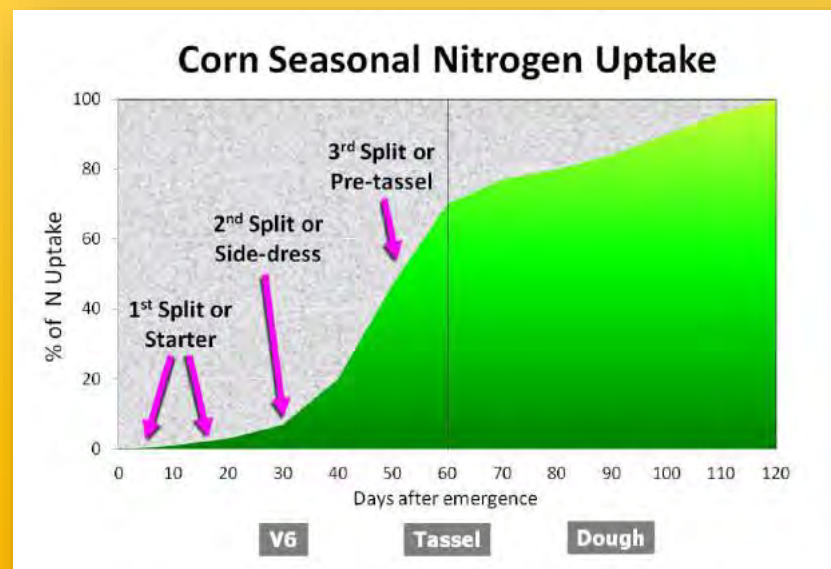
Management Practices

- *Nutrient Management Based on Nitrogen not Phosphorus and on Nitrogen Soil Sampling* - Using soil samples to determine nitrogen needs not an assumption that each year you start with zero in the soil.



Management Practices

- *Split Nitrogen Applications* – Applying annual nitrogen over several applications during the growing season.



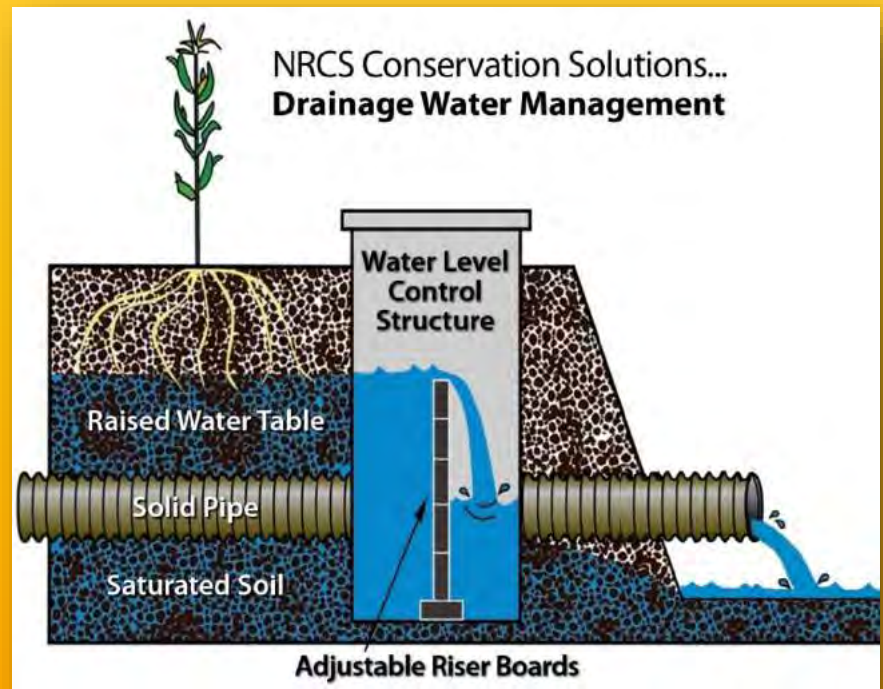
Management Practices

- Cover Crops
(Intercropping) - A study by the National Soil Tilth Laboratory in Ames, Iowa found that planting a cover crop such as Rye grass between the rows of corn or soybeans can reduce nitrate export by 74%.



Management Practices

- *End of Tile
Treatment Systems*
 - Seasonal Tile Management



Management Practices

- *Nitrogen Trading* - The concept is to pay farmers to grow crops that have lower nitrogen requirements (alfalfa, oats, peas, etc.)(Agricultural Research Service (ARS).



Management Practices

- **Wetland**
Treatment
Systems



Dodge County Farmers for Healthy Soil- Healthy Water



Dodge County Alliance



Lake Sinissippi



Improvement
District

FOX LAKE INLAND LAKE
PROTECTION & REHABILITATION
DISTRICT



Conclusions of Lake Monitoring

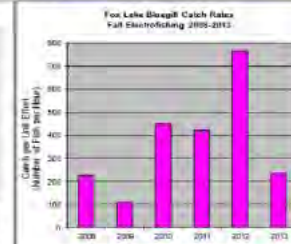
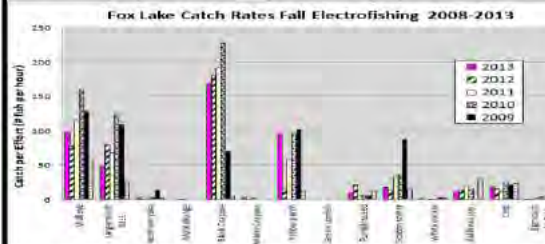


Fishery

Fox Lake Fall Electrofishing Summary Report – 2013

Fall Electrofishing - Defined

Fall electrofishing was conducted on Fox Lake in Dodge County on October 7-9, 2013. Fall electrofishing is conducted using a large boom-shocker boat allowing for the collection of young-of-the-year (YOY) and adult bass and walleye that are often under-sampled by other gear types. Fall electrofishing sampling provides an indication of the health of the fishery through estimates of gamefish and panfish relative abundance (catch rate or catch per effort), gamefish population size-structure (length-frequencies), an index of growth and gamefish recruitment (young-of-year catch per effort). In order to standardize fisheries data and allow for comparisons over time, total effort in the form of time spent shocking and/or miles of shoreline shocked is recorded and presented as catch rates or catch-per-unit effort (CPUE). The 2013 fall electrofishing survey differed from previous fall surveys in that effort (distance and time spent sampling) increased threefold to 11.6 miles and 6.47 hours. The more intensive fall survey was part of the 2013 comprehensive fish survey being conducted on Fox Lake and aimed to sample more habitat types and collect YOY walleye to assess the contribution of stocked walleye in Fox Lake. Length measurements were taken from a subset of fish and all fish were returned to the lake. Average water temperature was 63° F and water clarity was poor due to excessive algae. This report highlights the results of 2013 fall electrofishing with comparisons to previous fall surveys. Compiled by: Laura Stremick-Thompson, DNR Fisheries Biologist, N7725 Hwy 28, Horicon WI 53032, 920-387-7876 Laura.StremickThompson@wisconsin.gov



Gamefish Summary

Walleye	2013	2012	2011	2010
Total Catch:	631	162	241	357
Catch Rate (fish per hour):	98	78	116	160
Length Range (inches):	6.5-25.3	5.6-27.1	7.0-25.6	6.1-27.2
Average Length (inches):	14.7	13.4	14.1	12.6

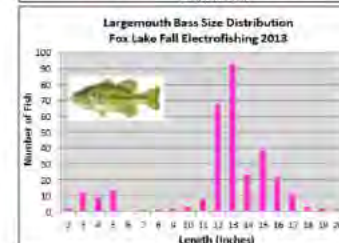
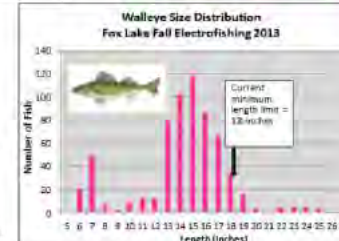
2013 walleye catch rate was 98/hour, compared to 78/hour in 2012, 116/hour in 2011, a high of 160/hour in 2010 and comparable to the 10-year average of 93/hour. The number of young-of-the-year (YOY) was 12/hour in 2013, compared to 11/hour in 2012, 4/hour in 2011, 21/hour in 2010 and a high of 78/hour in 2009. In 2013, 11% of the walleye sampled were over 18-inches (current minimum length limit), compared to 9% in 2012, 16% in 2011 and 13% in 2010. The majority of walleye were between 14 and 15.9 inches in length, representing fish from the large year-class produced in 2009. In 2013, DNR stocked 47,323 small fingerling (2-inch) walleye into Fox Lake.

Largemouth bass	2013	2012	2011	2010
Total Catch:	311	165	140	275
Catch Rate (fish per hour):	48	79	67	123
Length Range (inches):	2.6-20.0	2.3-17.6	3.0-17.4	2.5-17.9
Average Length (inches):	12.8	11.0	10.6	9.1

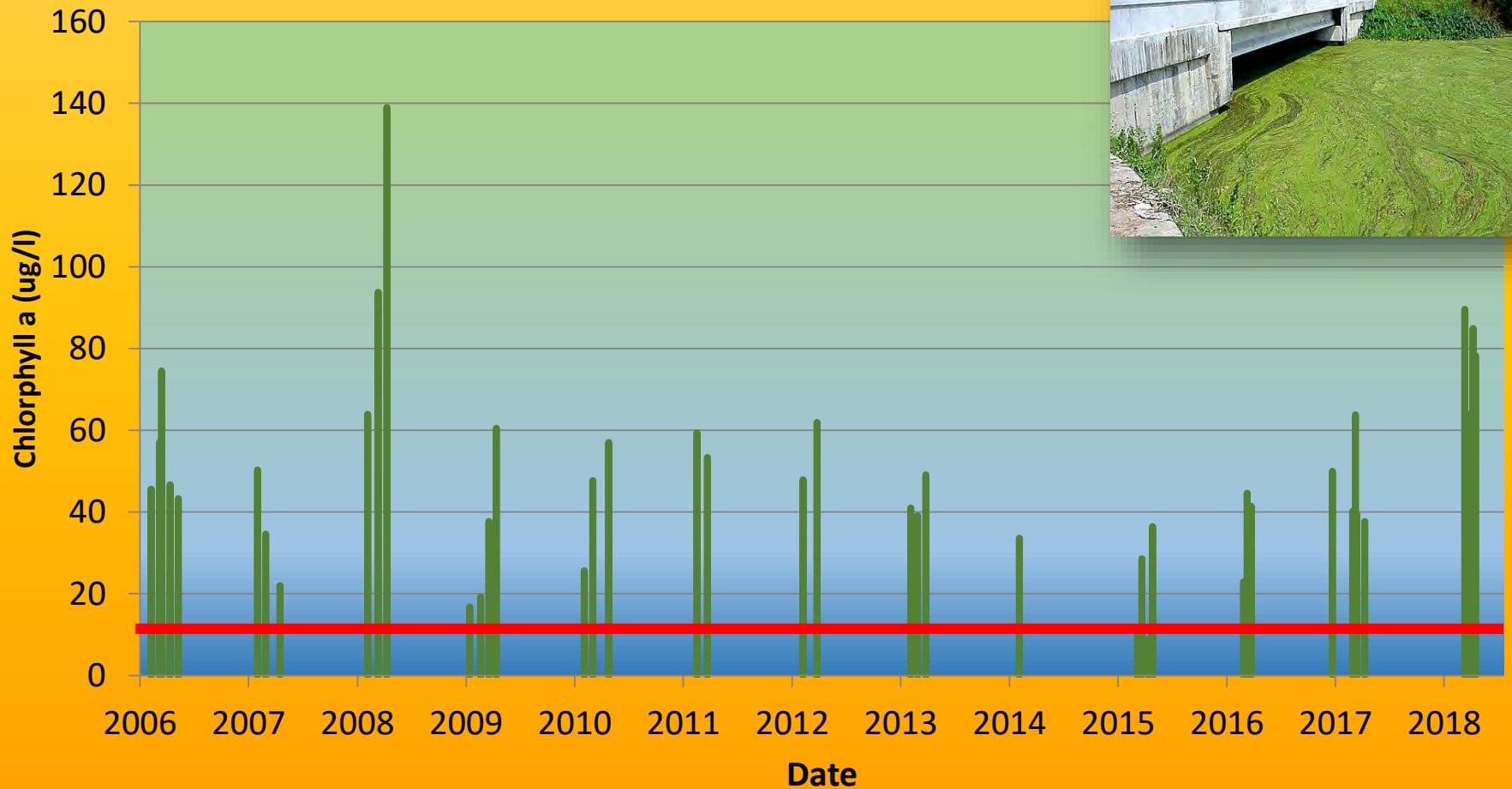
2013 largemouth bass catch rate was 48/hour, compared to 79/hour in 2012, 67/hour in 2011, a high of 123/hour in 2010 and above the 10-year average of 61/hour. The majority of bass (52%) were between 12 and 13.9 inches.

Northern pike	2013	2012	2011	2010
Total Catch:	19	2	6	5
Catch Rate (fish per hour):	3	1	3	2
Length Range (inches):	11.5-36.0	11.7-26.1	16.0-31.8	20.8-32.3
Average Length (inches):	22.9	18.9	25.4	26.6

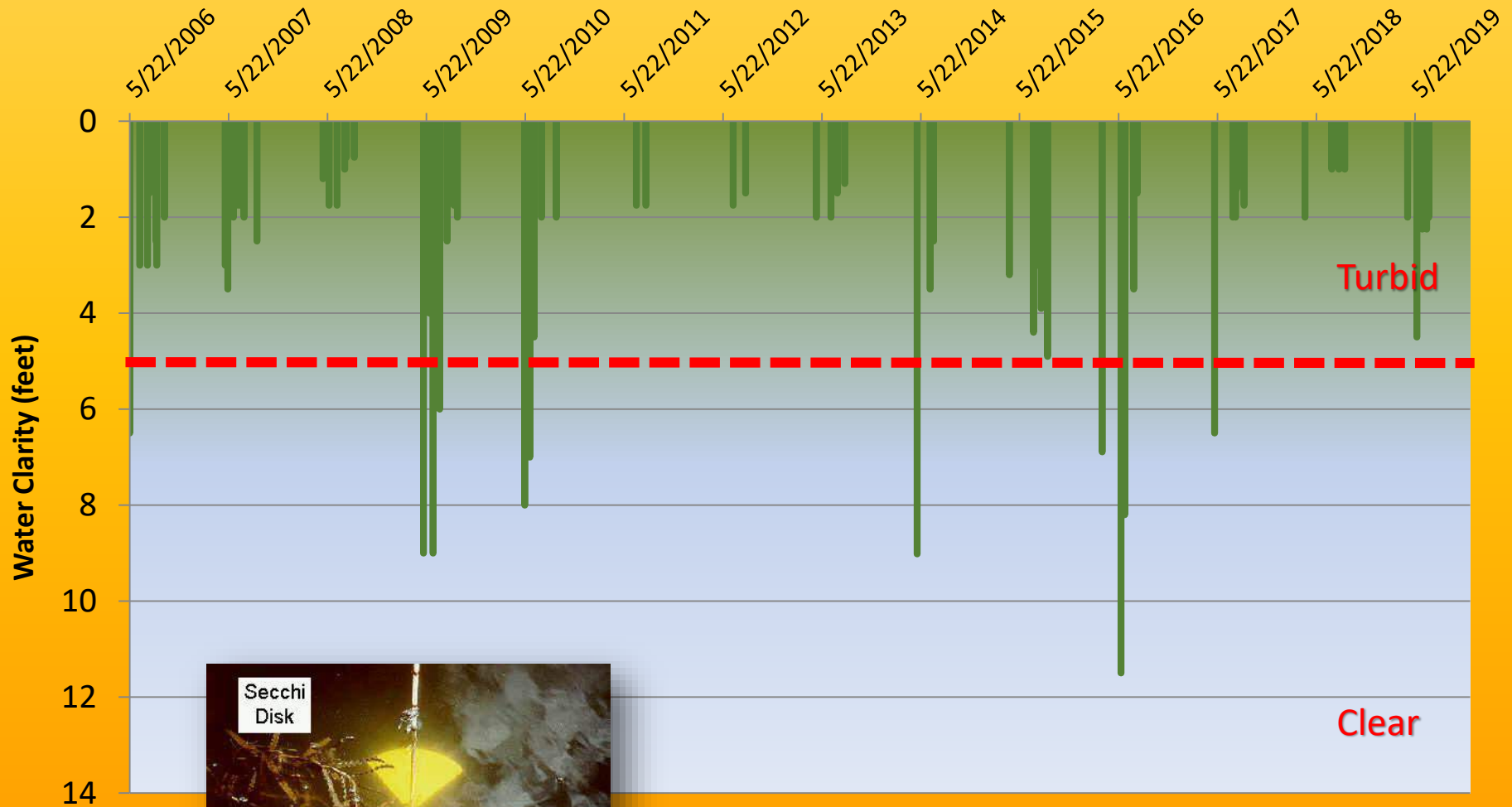
Electrofishing is not an effective method for sampling northern pike. Pike population data is best obtained using fyke nets set during spring spawning. In 2013 DNR stocked 9,197 (3-inch) northern pike and the Fox Lake Property Owners stocked 450 (13-inch) pike into Fox Lake.



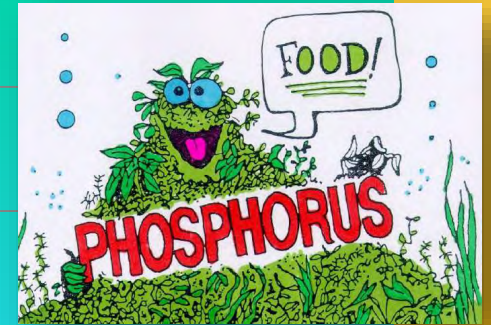
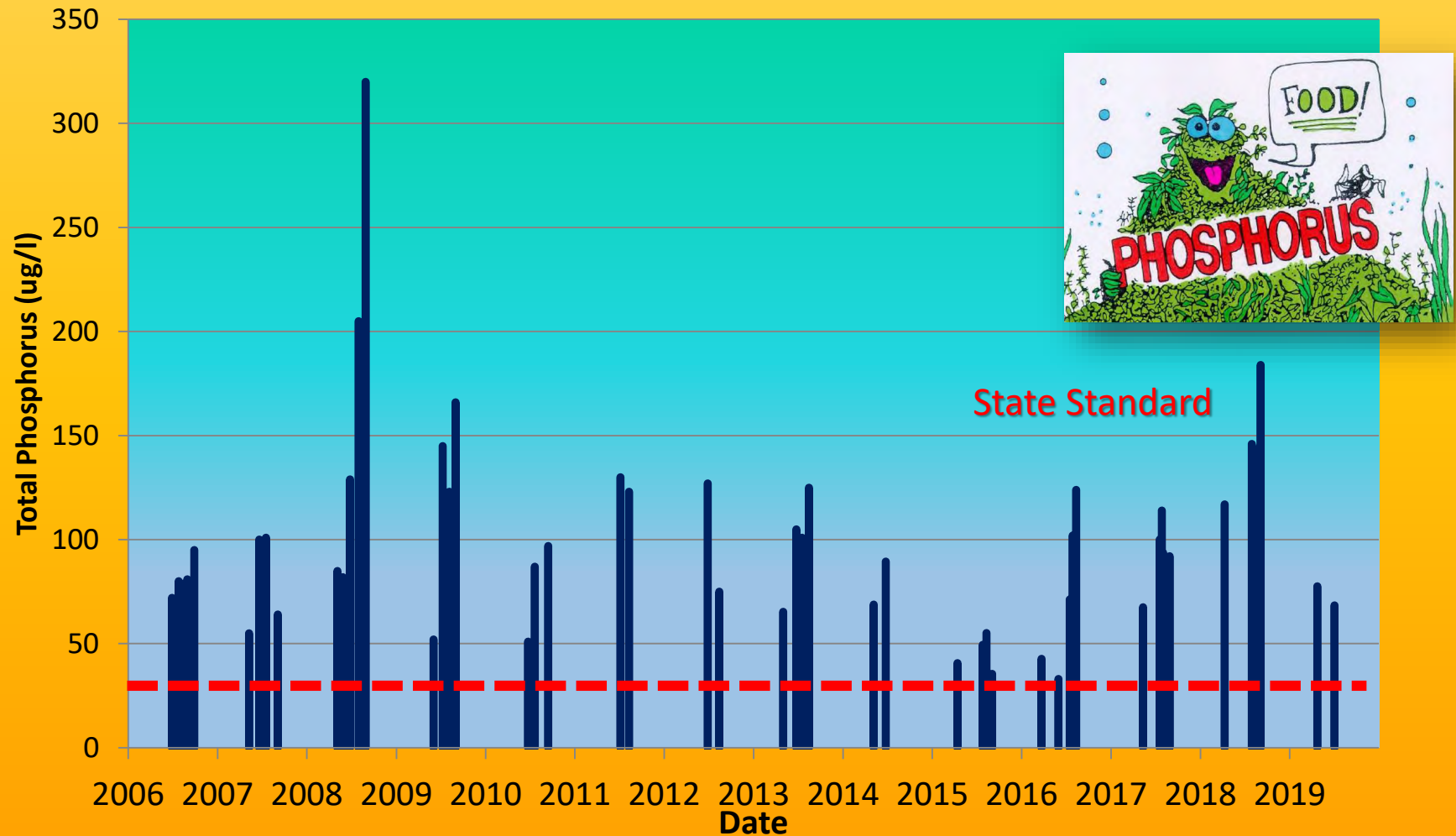
Water Quality Data (Chl a)



Water Quality Data (Water Clarity)



Water Quality Data (Phosphorus)



Fox Lake has Two States



Fox Lake

- Like a teeter totter, Fox Lake can flip from clear water and dense rooted aquatic plants to turbid conditions with algae dominating.



Fox Lake Restoration Plan

- The health of a lake is a function of the health of the aquatic ecosystem.



Fox Lake Restoration Plan

- For a healthy fishery we need:
 - habitat in the form of spawning, nursery and areas
 - Strong predator prey relationships
- For clear water we need:
 - Low nutrient levels
 - Habitat for zooplankton
 - Fish community not dominated by planktivorous fish



Importance of Aquatic Plants

- Provide refuge for fish.
- Provide refuge for zooplankton.
- Prevent re-suspension of bottom sediments by wind and boats.
- Tie nutrients that could be used by algae.



Importance of Aquatic Plants

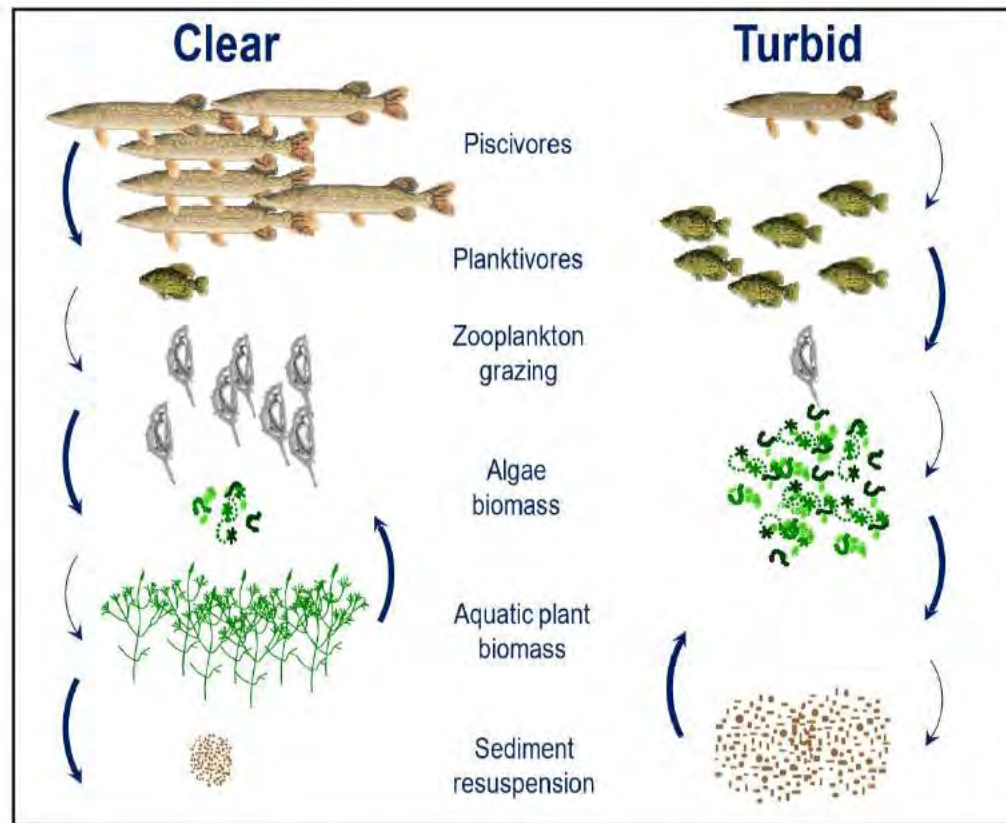
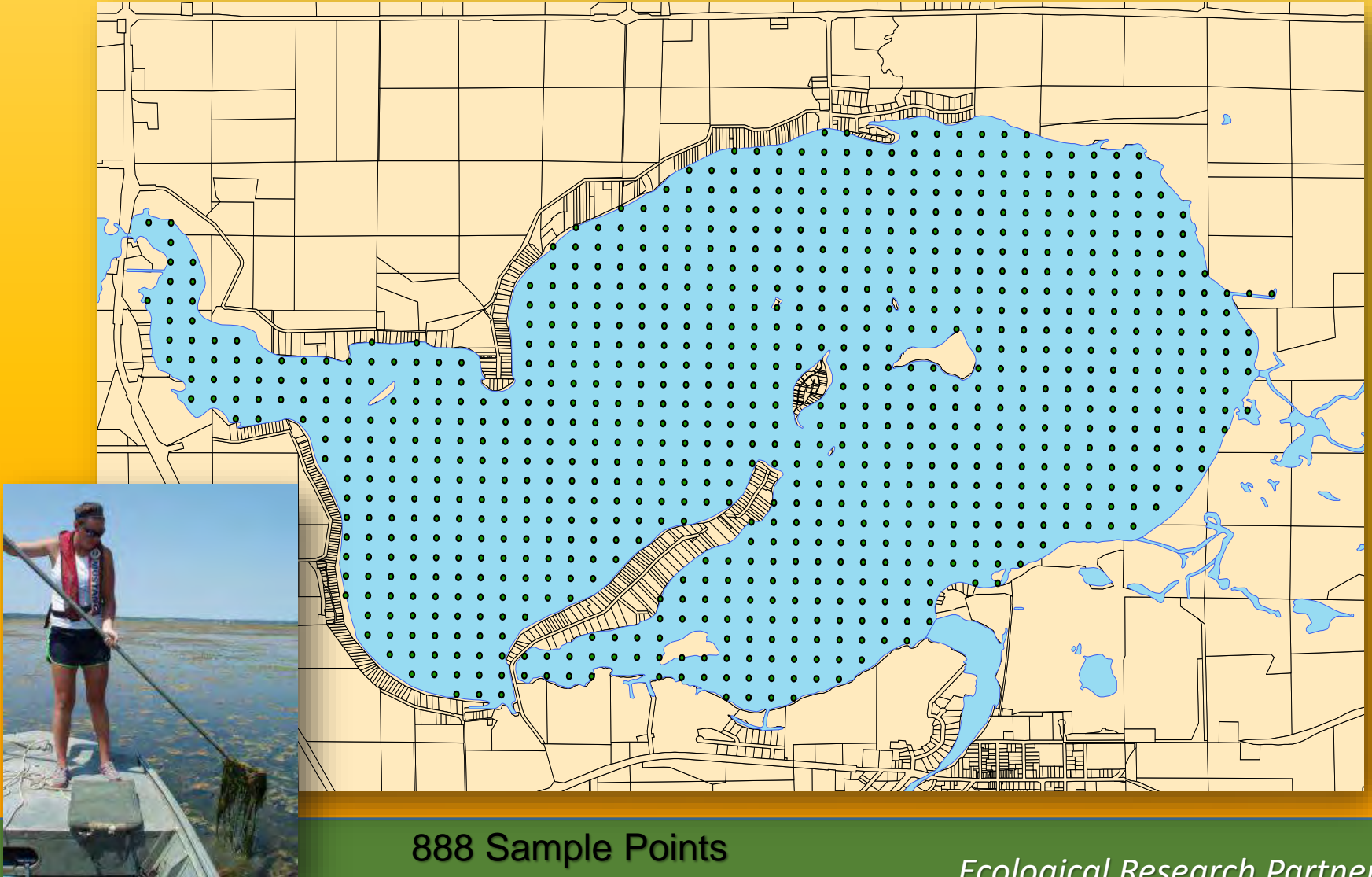


Figure 6
Species Composition in Clear and Turbid Water States²²

Rooted Aquatic Plants

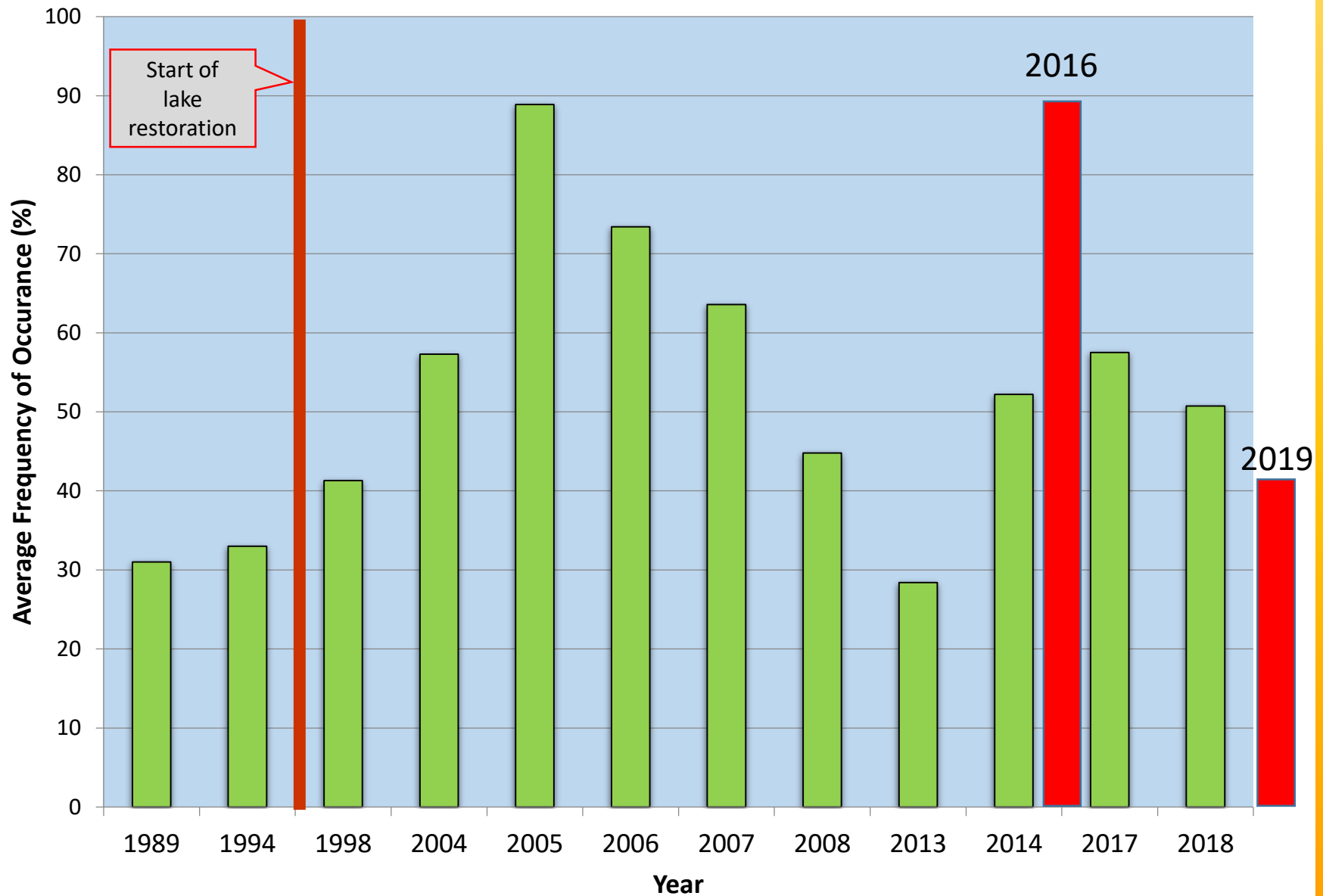


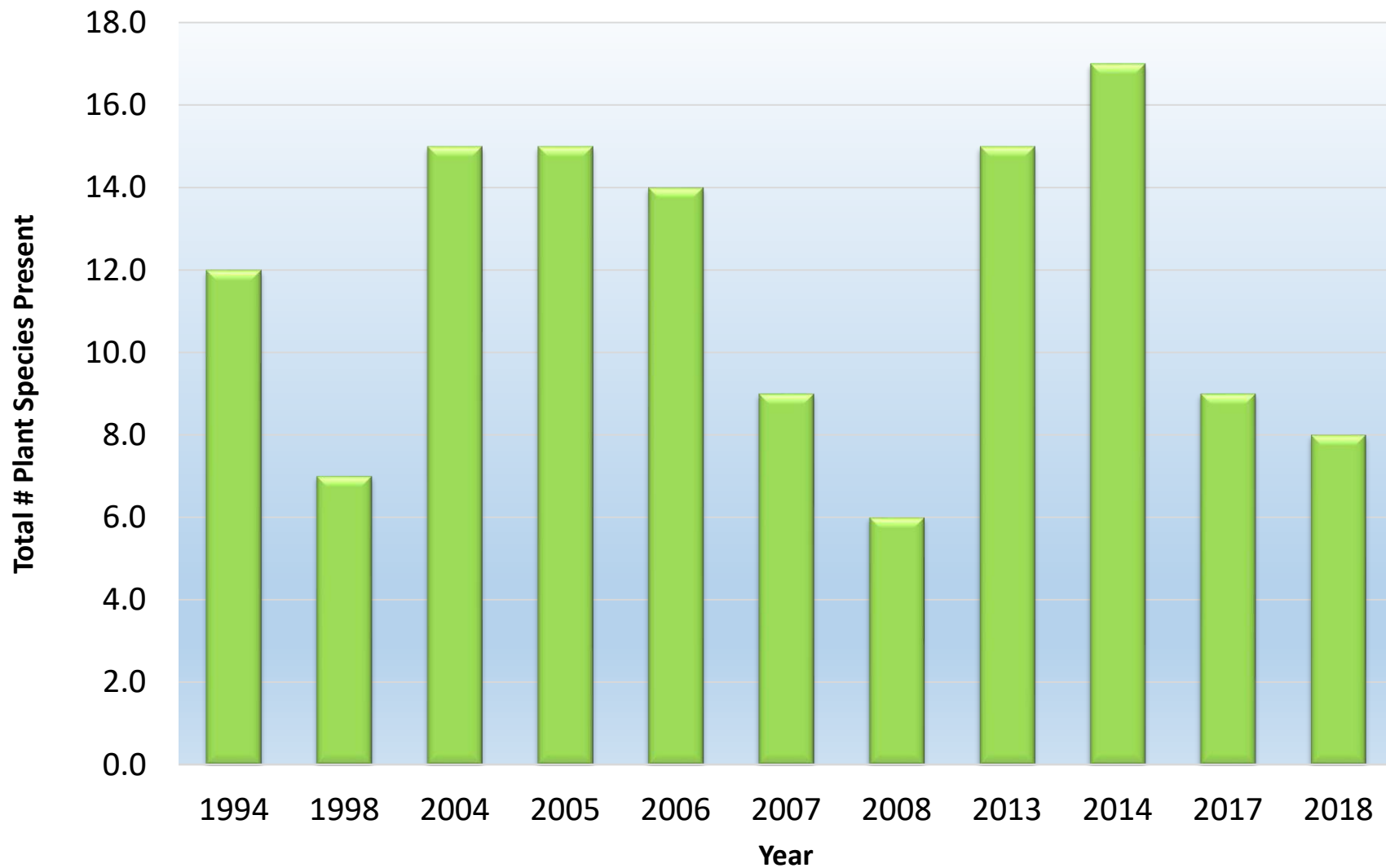
Aquatic Plant Surveys



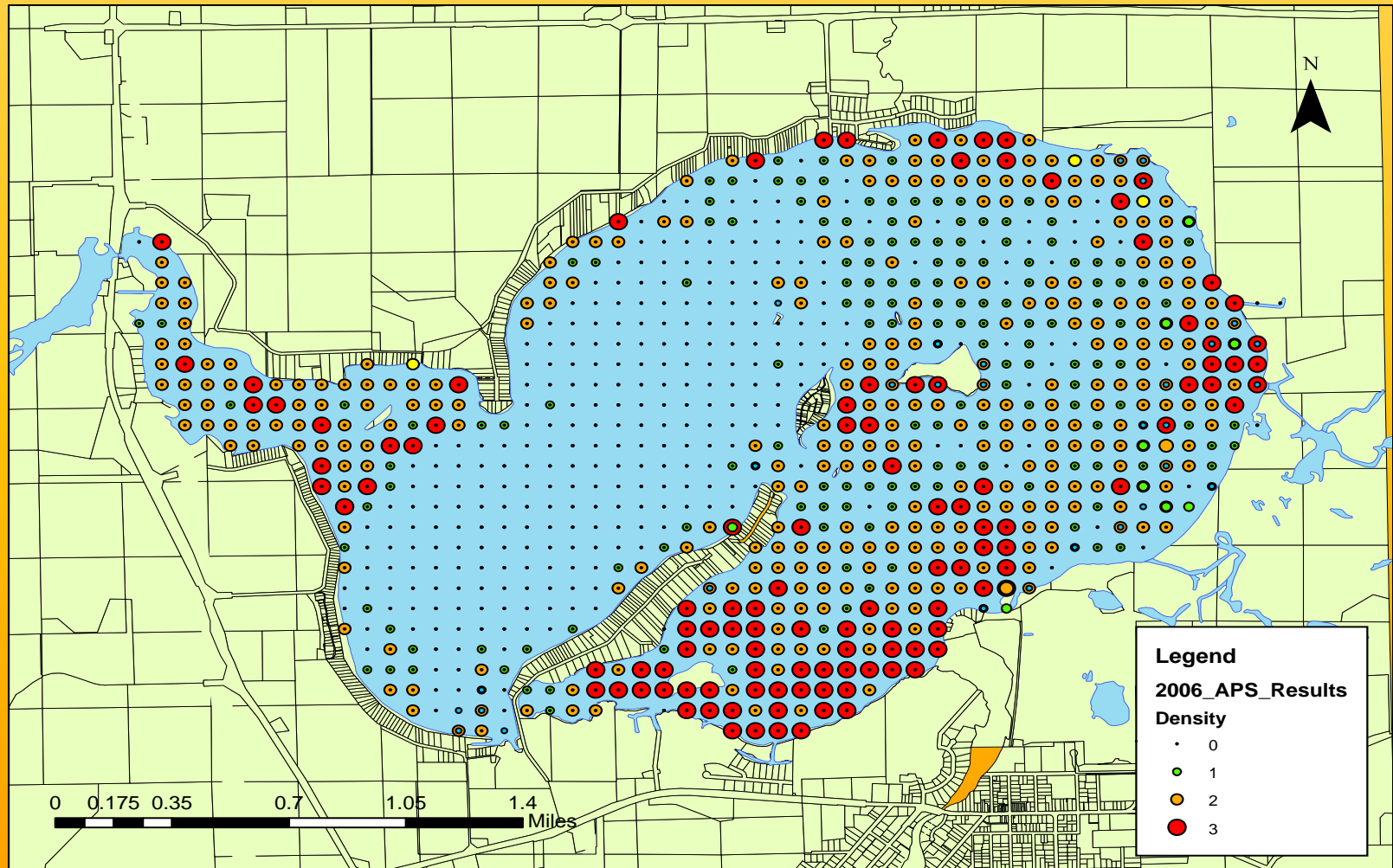
888 Sample Points

Ecological Research Partners, LLC.

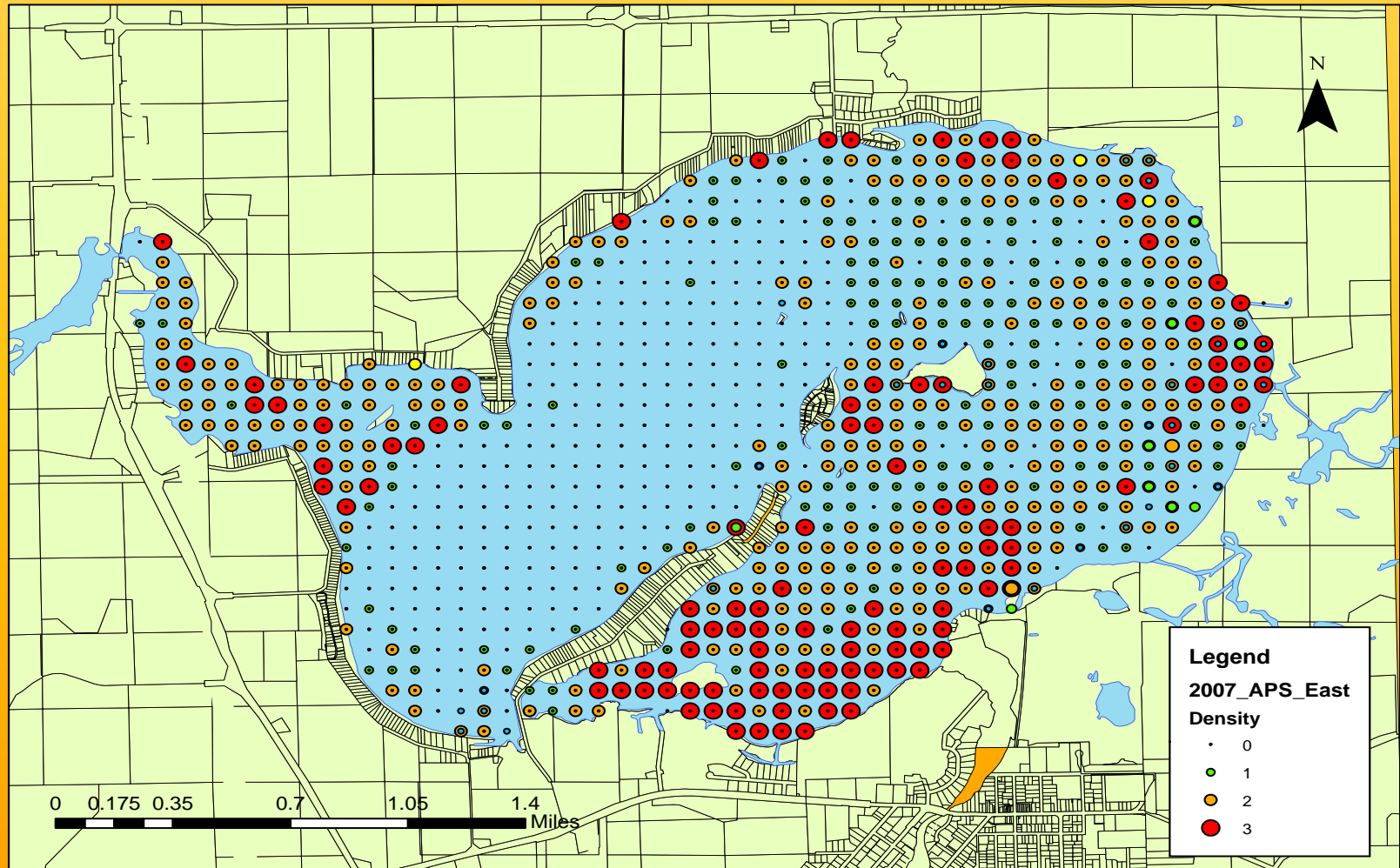




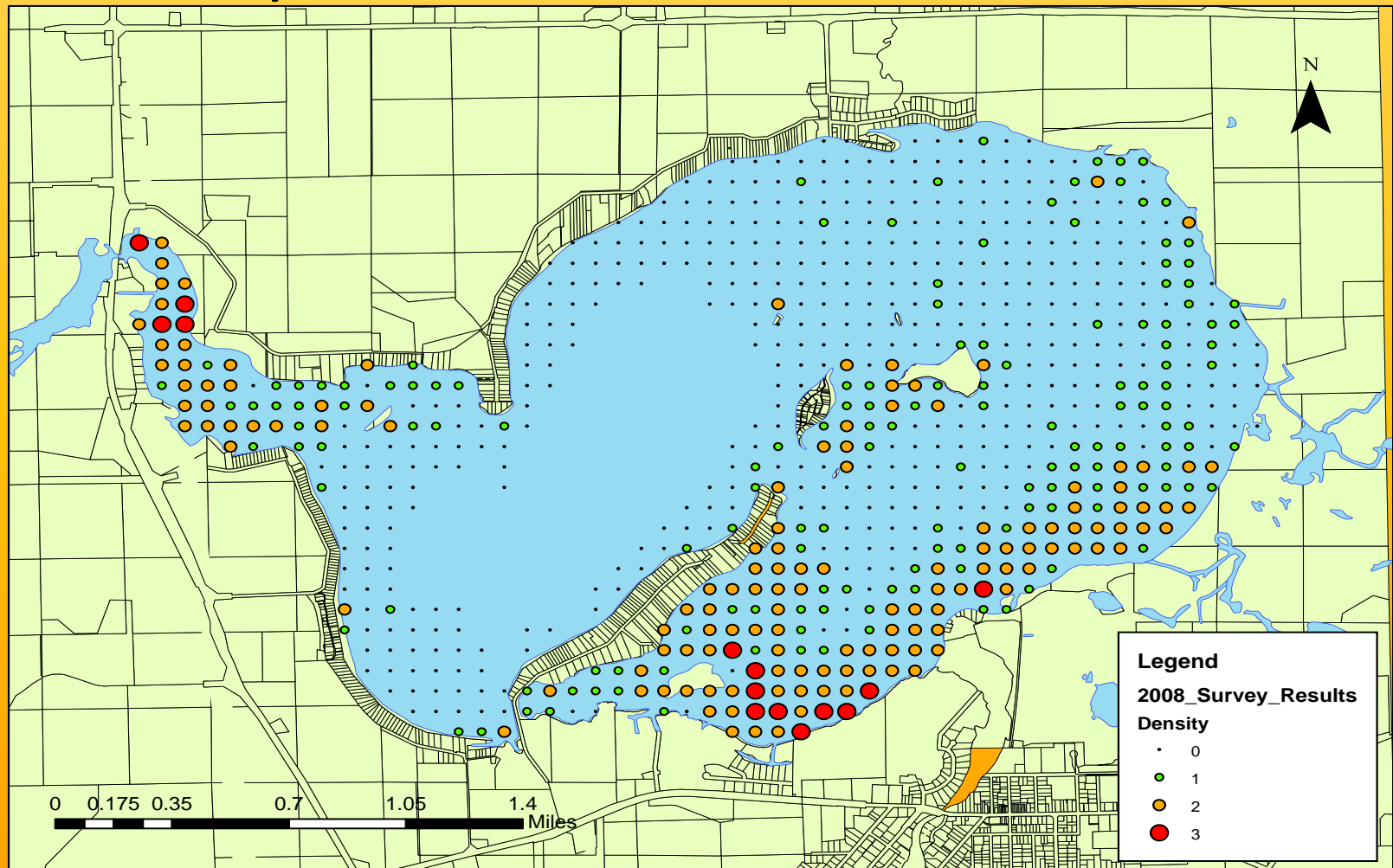
Density 2006



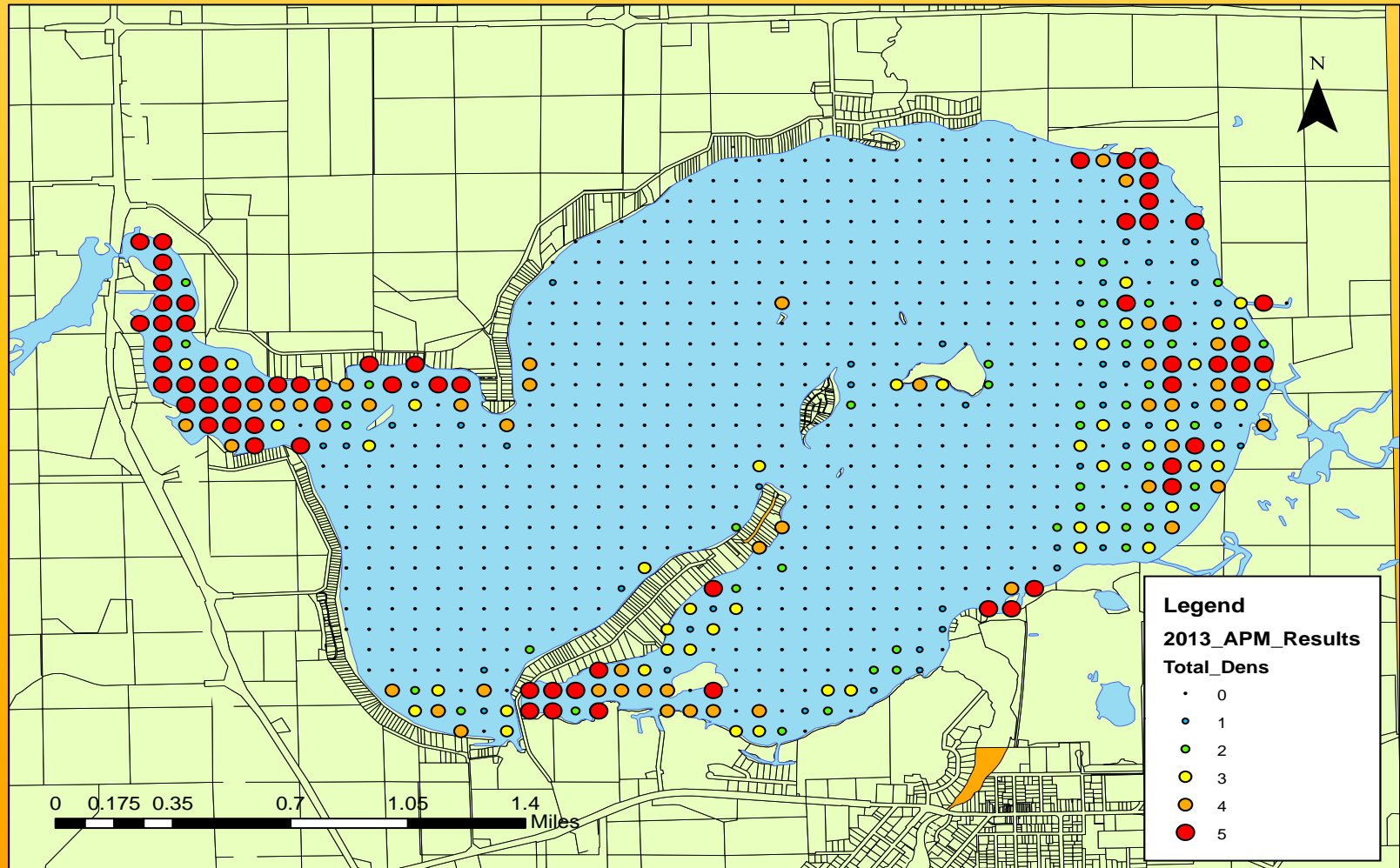
Density 2007



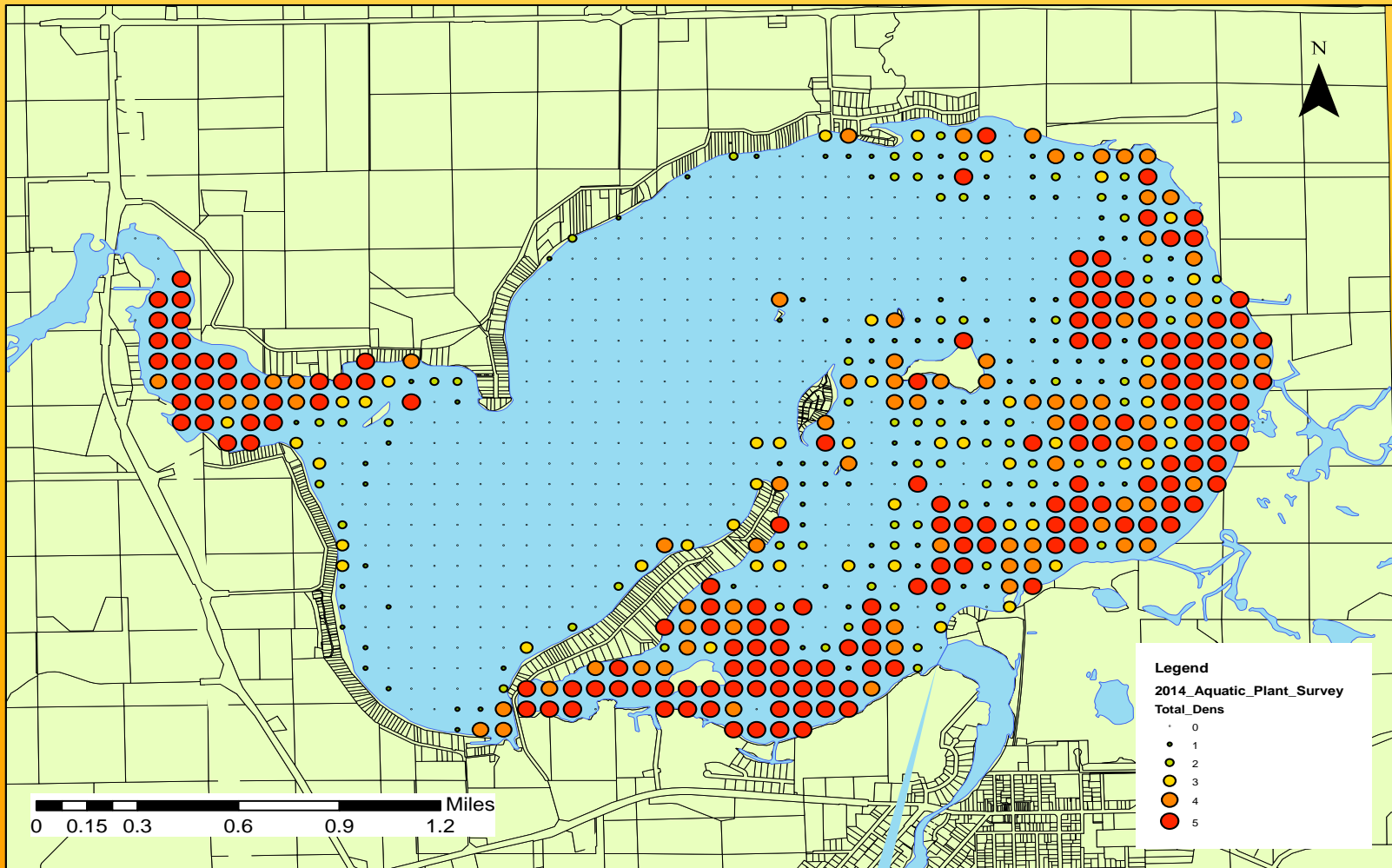
Density 2008



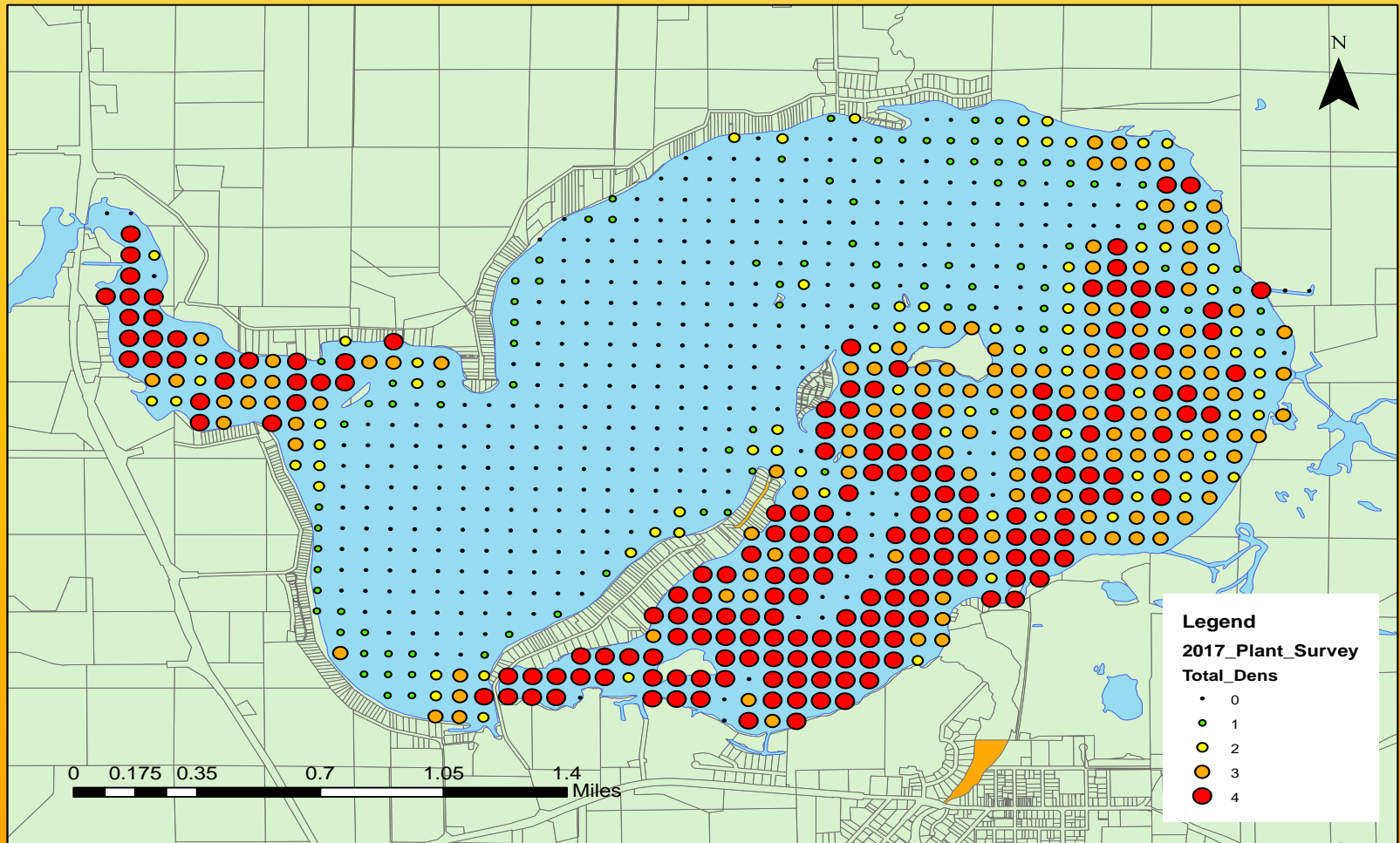
Density 2013



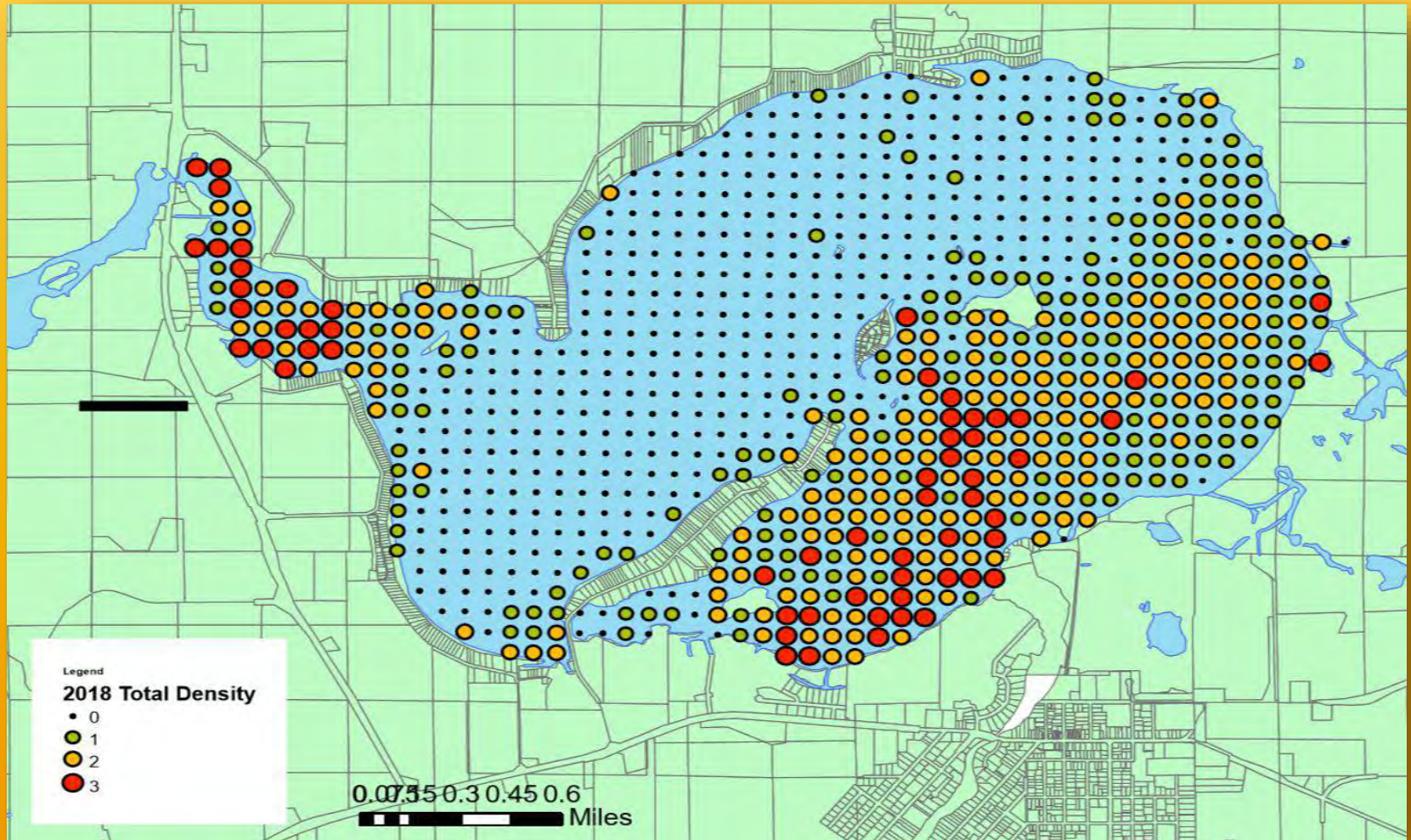
Density 2014

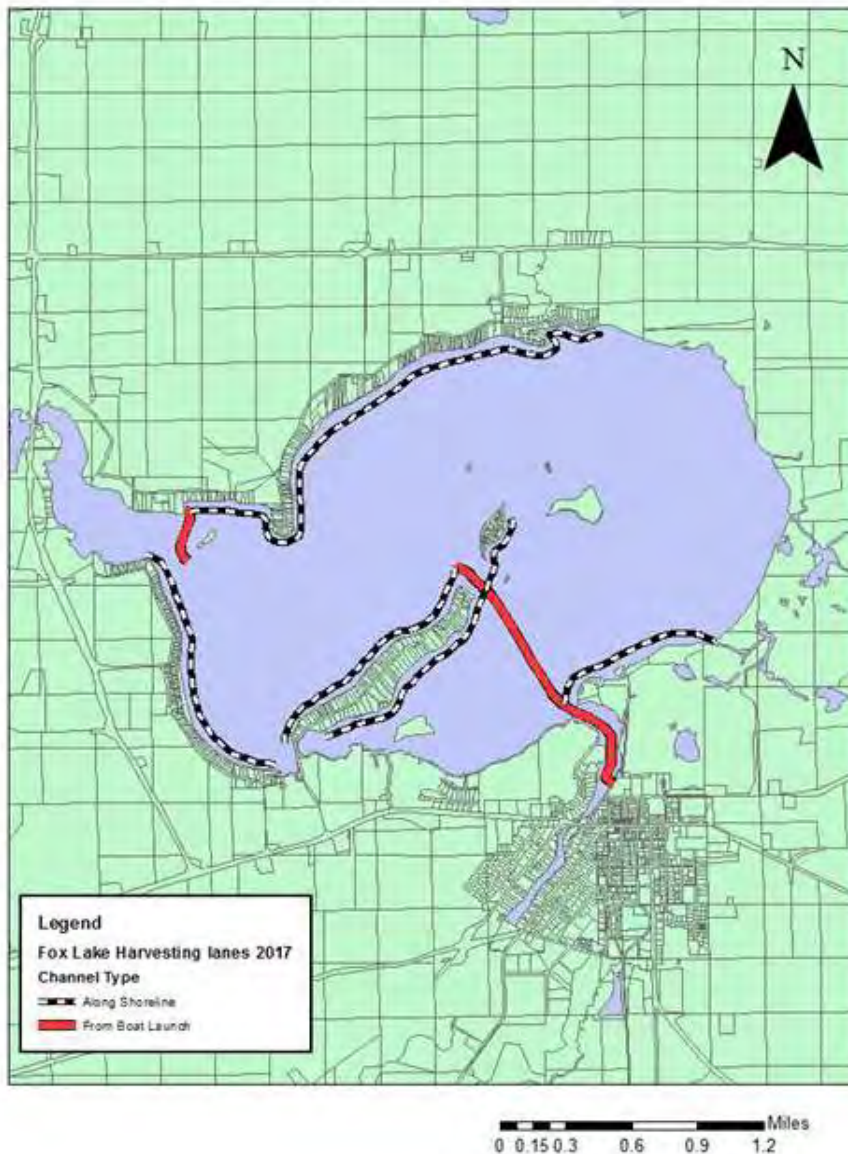


Density 2017



Density 2018





Harvesting Amounts:

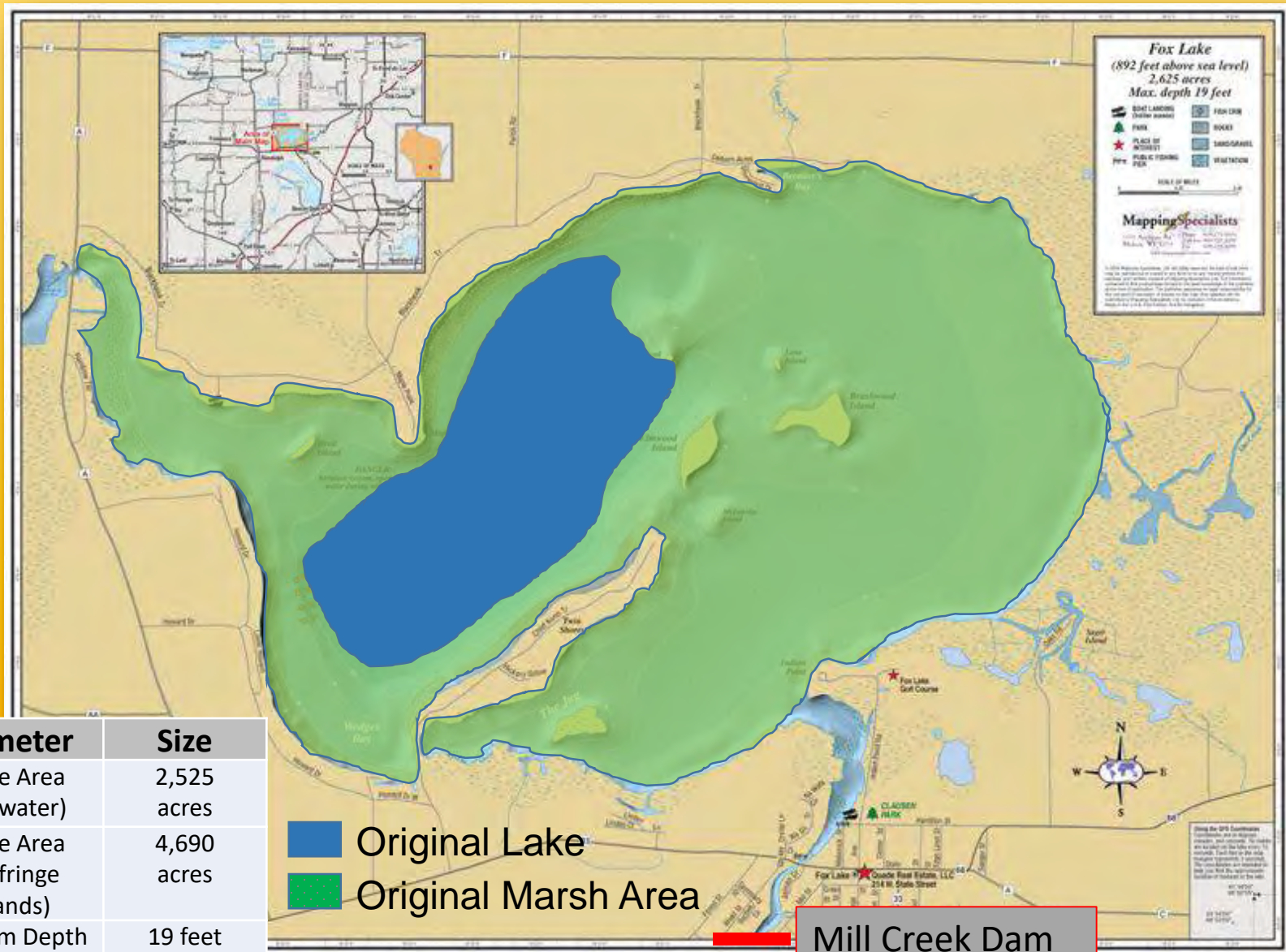
2016	488 cu-yds.
2017	256 cu-yds.
2018	144 cu-yds.
2019	36 cu-yds.



2019 only 9 of 37
people that applied
for herbicide
treatment were
allowed to treat.

Fox Lake Has Two States

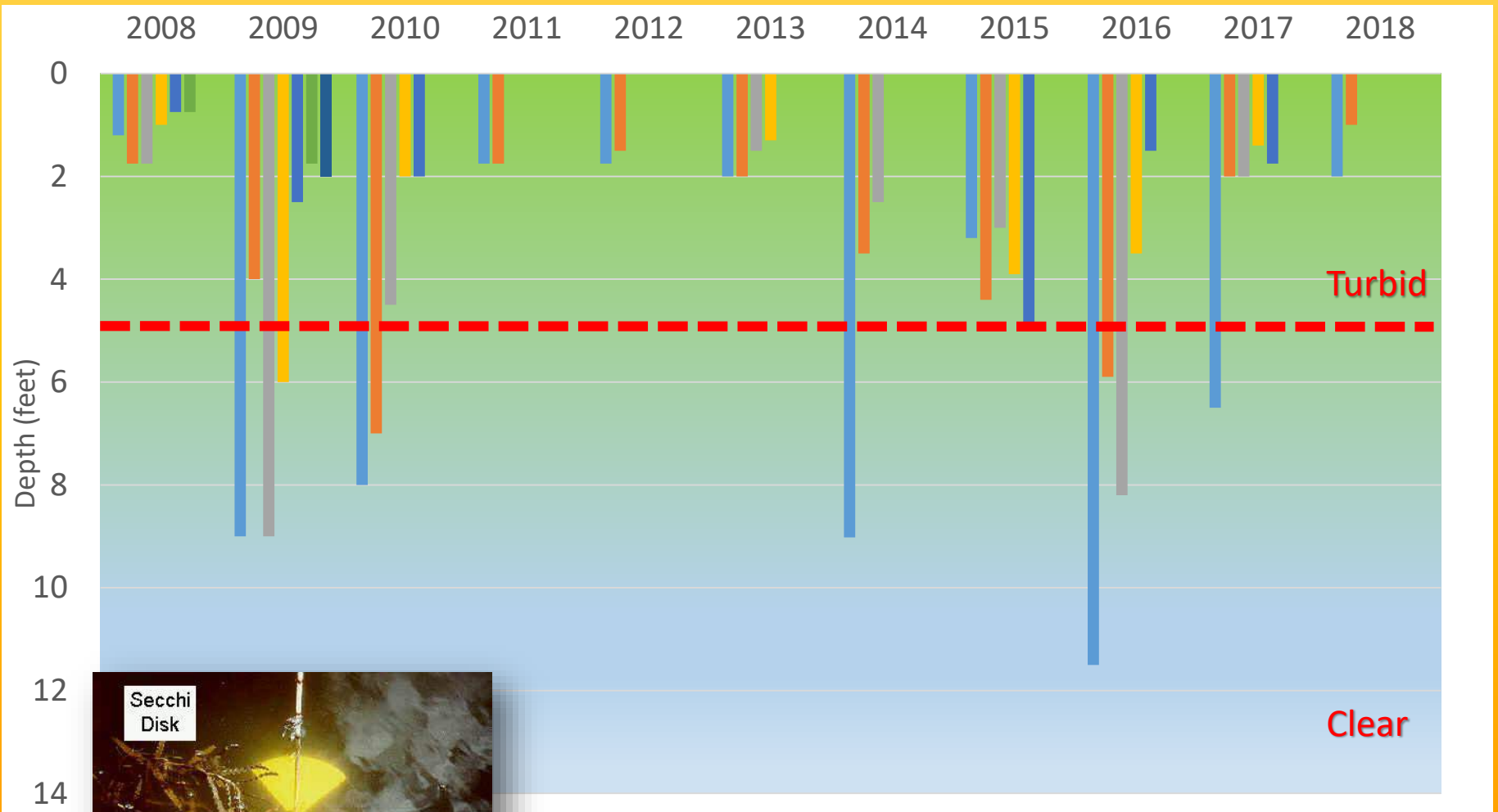




The type of aquatic plant density depends a lot on winter ice and spring water clarity



Water Quality Data (Water Clarity)



Relationship Between Spring Water Clarity and Rooted Aquatic Plant Abundance

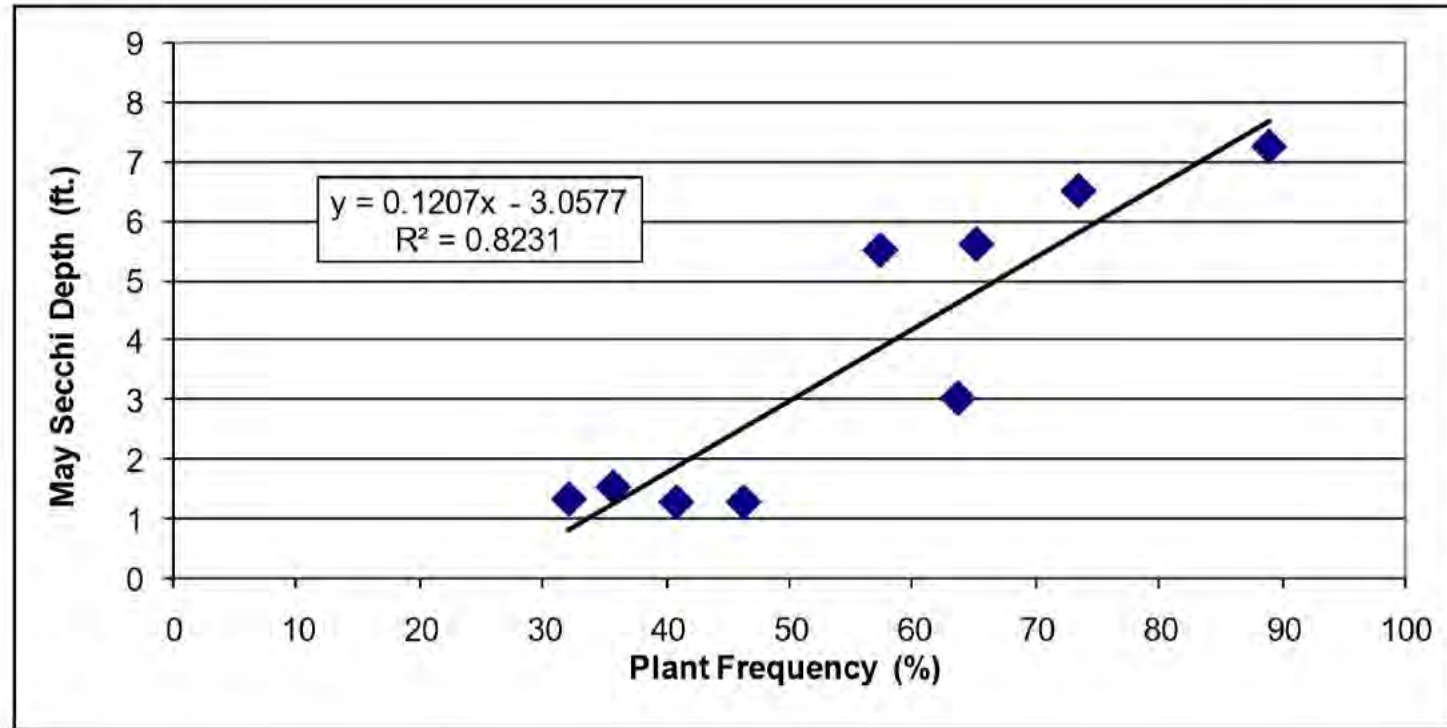


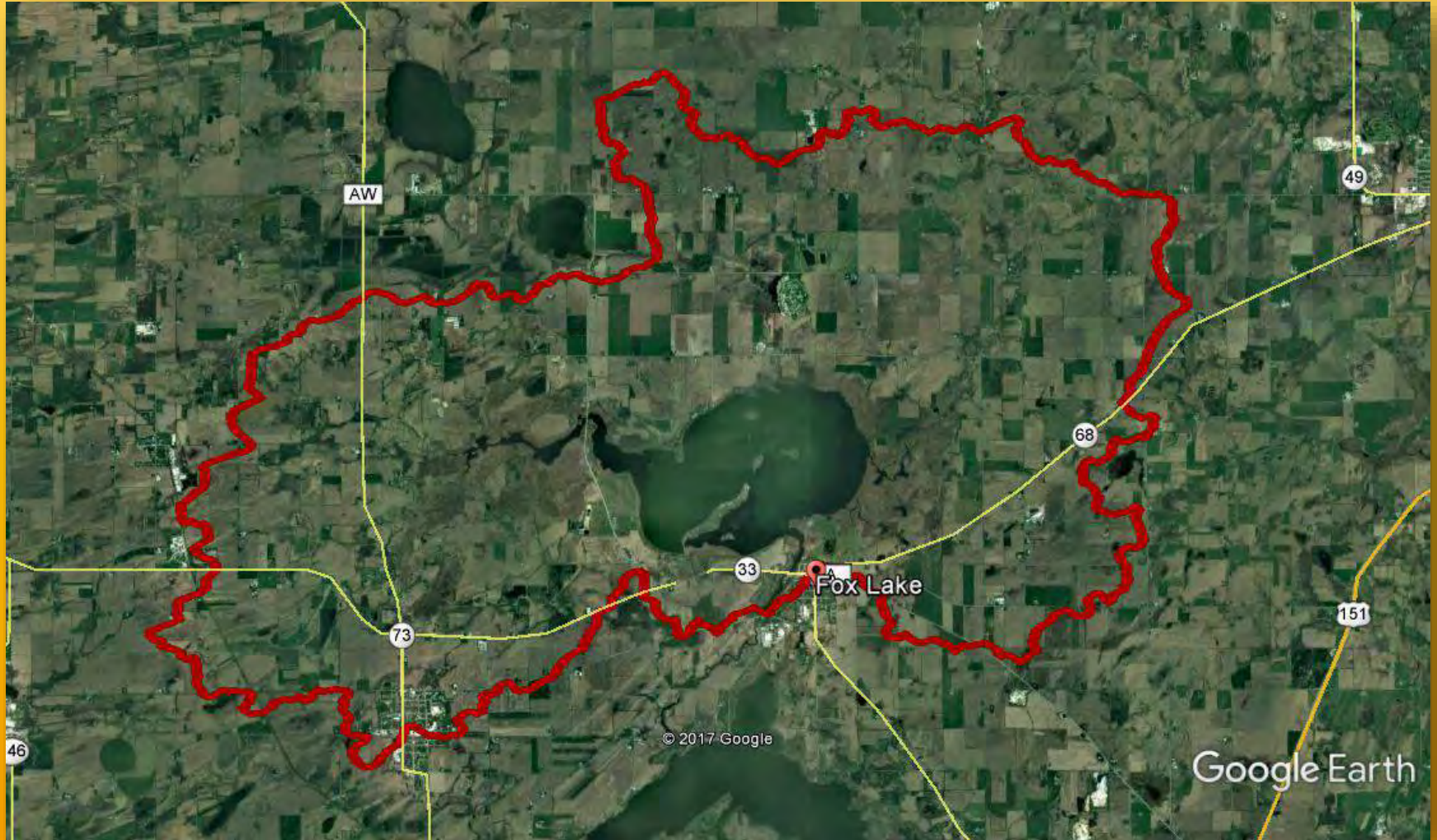
Figure 21

May Secchi depth versus Aquatic Plant Frequency for Fox Lake 1995-2008³⁵

The abundance of aquatic plants and algae is also driven by the amount of agricultural runoff and drain tile drainage.



38,778 acres



Agriculture 76%

Drainage Area to Lake Area Ratio = 15 to 1

Ecological Research Partners, LLC.

Relationship of Spring Rainfall and Rooted Plant Abundance

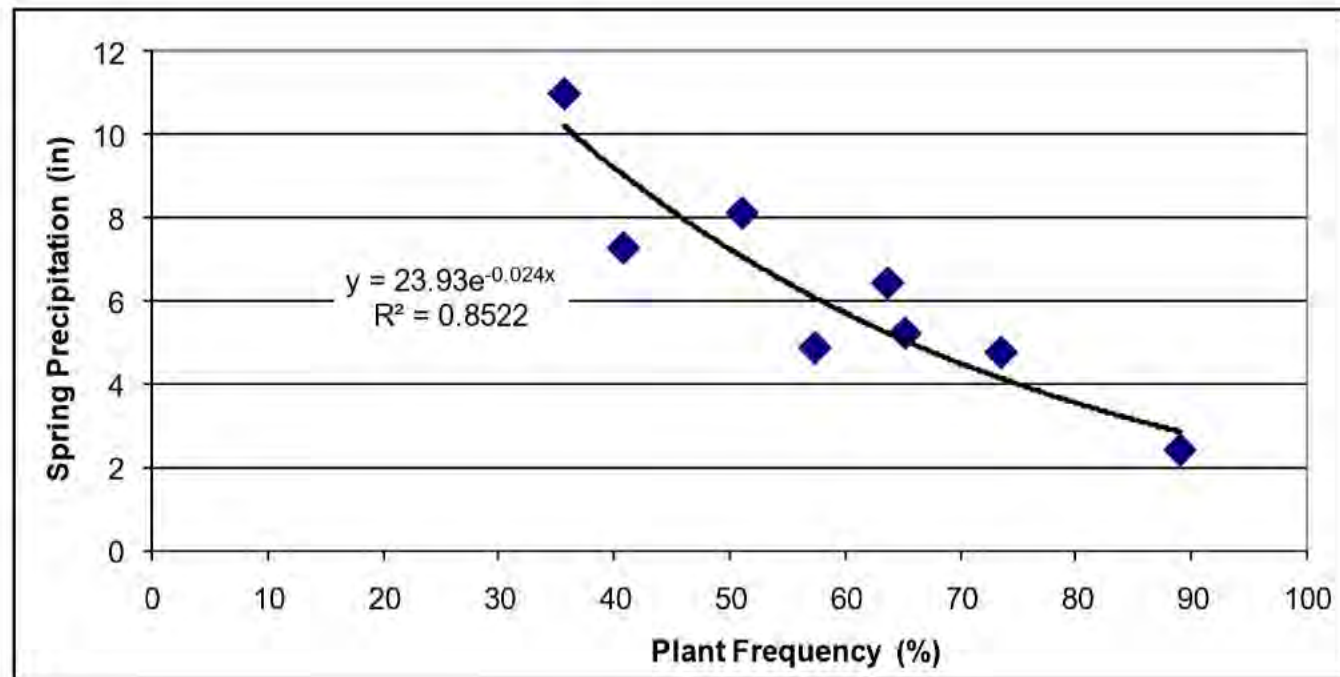


Figure 2

Aquatic Plant Frequency versus Spring Precipitation (March and April) for Fox Lake 1995-2007

Source: Hey and Associates, Inc., WDNR, and NOAA

- 2008
Management
Plan

Hey and Associates, Inc.

FOX LAKE MANAGEMENT STRATEGY
EVALUATION REPORT AND RECOMMENDATIONS
FOR FUTURE ACTION - 2008

Prepared for:

Fox Lake Inland Lake Protection and Rehabilitation District
and
Wisconsin Department of Natural Resources

Prepared by:

Hey and Associates, Inc.
and
University of Wisconsin--Milwaukee

May 2008

PN: 04141

240 Regency Court, Suite 301
Brookfield, Wisconsin 53045
Office (262) 796-0440 Fax (262) 796-0445

2008 Management Plan Major Recommendations

<i>Fishery Management</i>				
1. Continued stocking of game fish	\$5,000/year	WDNR	FLILPRD/ other local groups	Annual
2. Continued fall electroshocking surveys	\$2,500/year	WDNR	WDNR	Annual
3. Comprehensive fish surveys	\$50,000/every 3 years	WDNR	WDNR	2009 then every 3 years



- FOX LAKE LONG-RANGE (2007-2012) AQUATIC PLANT MANAGEMENT PLAN
 - (Focused on controlling nuisance rooted aquatic plants while protecting the lake fishery)

FOX LAKE LONG-RANGE (2007-2010/12) AQUATIC
PLANT MANAGEMENT PLAN



PREPARED FOR:

THE FOX LAKE INLAND LAKE PROTECTION AND REHABILITATION DISTRICT
AND THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES

NOVEMBER 8, 2006

Hey and Associates, Inc.
Water Resources, Wetlands and Ecology

- FOX LAKE LONG-RANGE (2014-2018) AQUATIC PLANT MANAGEMENT PLAN
 - (Focused on the loss of rooted aquatic plants and how to get them back in the lake)

**FOX LAKE LONG-RANGE AQUATIC PLANT
MANAGEMENT PLAN UPDATE (2014-2018)**



PREPARED FOR:

THE FOX LAKE INLAND LAKE PROTECTION AND REHABILITATION
DISTRICT AND THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES

JUNE 15, 2014

- FOX LAKE LONG-RANGE (2018-2022) AQUATIC PLANT MANAGEMENT PLAN
 - (Recognized that Fox Lake has two states, unlike most lakes, and we need a plan that could adapt to different conditions)

***FOX LAKE LONG-RANGE AQUATIC PLANT
MANAGEMENT PLAN UPDATE (2018-2022)***



PREPARED FOR:

***THE FOX LAKE INLAND LAKE PROTECTION AND REHABILITATION
DISTRICT AND THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES***

DECEMBER 14, 2017

Adaptive Management Strategy



Abundant

- Very dense rooted aquatic plants found at more than 70 % of the historic plant sampling sites.
- Plant abundance that is causing interference in lake-wide navigation.
- Plant community with invasive species found at greater than 30 % of the historic plant sampling sites



Moderate

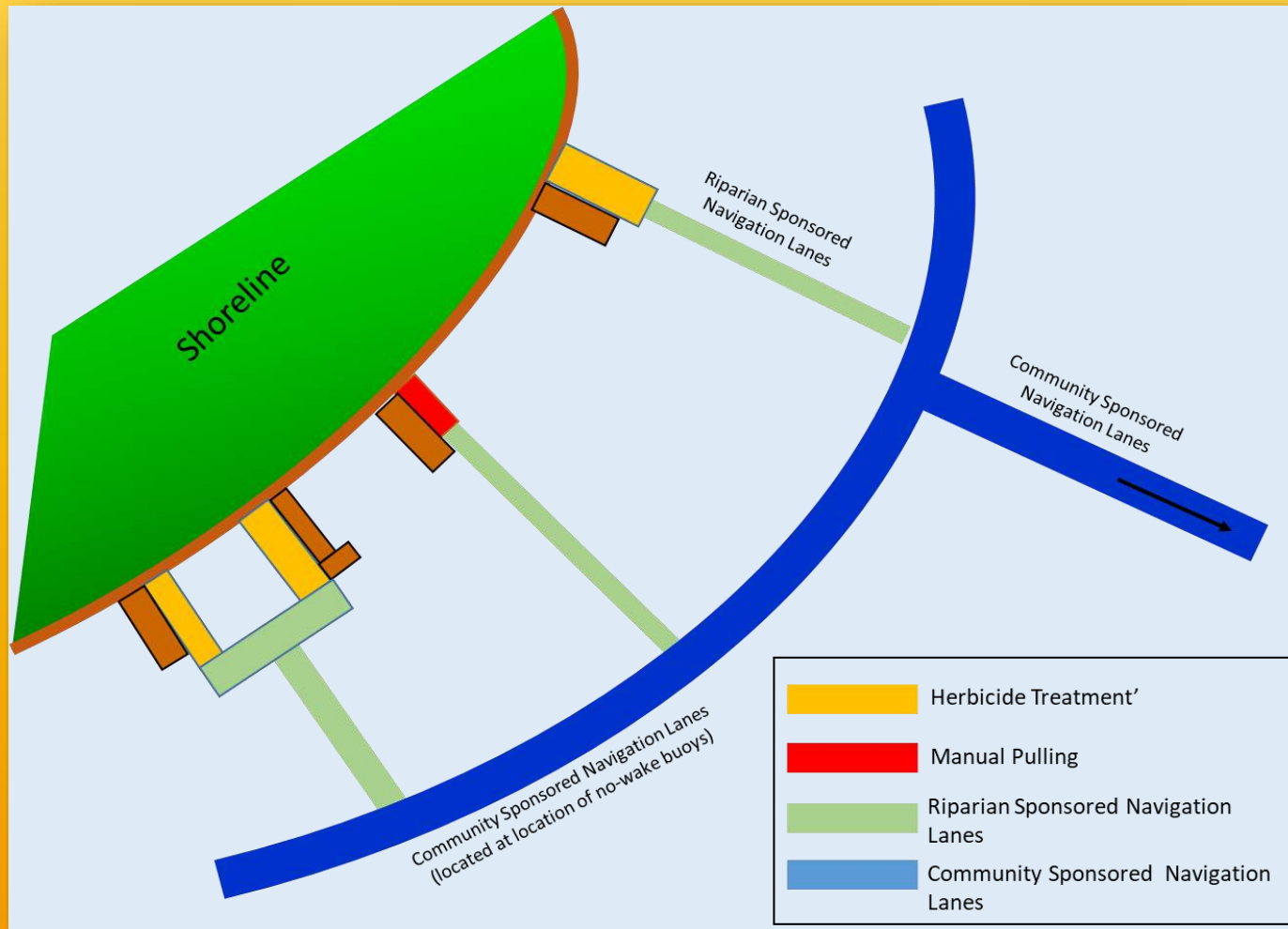
- Moderate density of rooted aquatic plants found at between 40 and 70 % the historic plant sampling sites.
- Limited interference in lake-wide navigation.
- Limited abundance of invasive species. Found at less than 30 percent of the historic plant sampling sites.



Sparse

- Sparse rooted aquatic plants with plants found at less than 40% of the historic plant sampling sites.
- Fishery in decline due to lack of habitat created by rooted aquatic plants.
- Poor water clarity due abundant of algae.

Integrated Aquatic Plant Management Strategy



2008 Management Plan Major Recommendations

Recommendation	Estimated Cost	Implementing Agency	Funding Source	Implementation Schedule
<i>In-lake Nutrient Control</i>				
1. Conduct alum treatment feasibility analysis	\$10,000	FLILPRD/WDNR	FLILPRD/Lake Planning Grant	2008
2. Conduct alum demonstration projects	~\$25,000	FLILIPRD/WDNR	FLILRPD/Lake Protection Grant	2008/2009
3. Alum treatment to promote clear water conditions and aquatic plant growth	\$50,000 per treatment	FLILRPD/WDNR	FLILRPD/Lake Protection Grant	As needed basis depending on climate, lake condition and results of alum feasibility study
4. Alum treatment to seal bottom sediments	\$500,000/every 8 to 12 years	FLILPRD/WDNR	FLILPRD/Lake Protection Grant	Dependent on results of alum feasibility study

2008 Management Plan Major Recommendations



LAKE PLANNING GRANT REPORT LPL-1227

Environmental Feasibility Report for a Lake-wide Low Dose
Aluminum Sulfate Treatment on Fox Lake, Dodge County, WI



Prepared for:
Fox Lake Inland Lake Protection and Rehabilitation District
W10543 Highway F
Fox Lake, WI 53933

October 7, 2008

PN: 08071

*240 Regency Court, Suite 301
Brookfield, Wisconsin 53045
Office (262) 796-0440 Fax (262) 796-0445*

Spring Alum Treatment

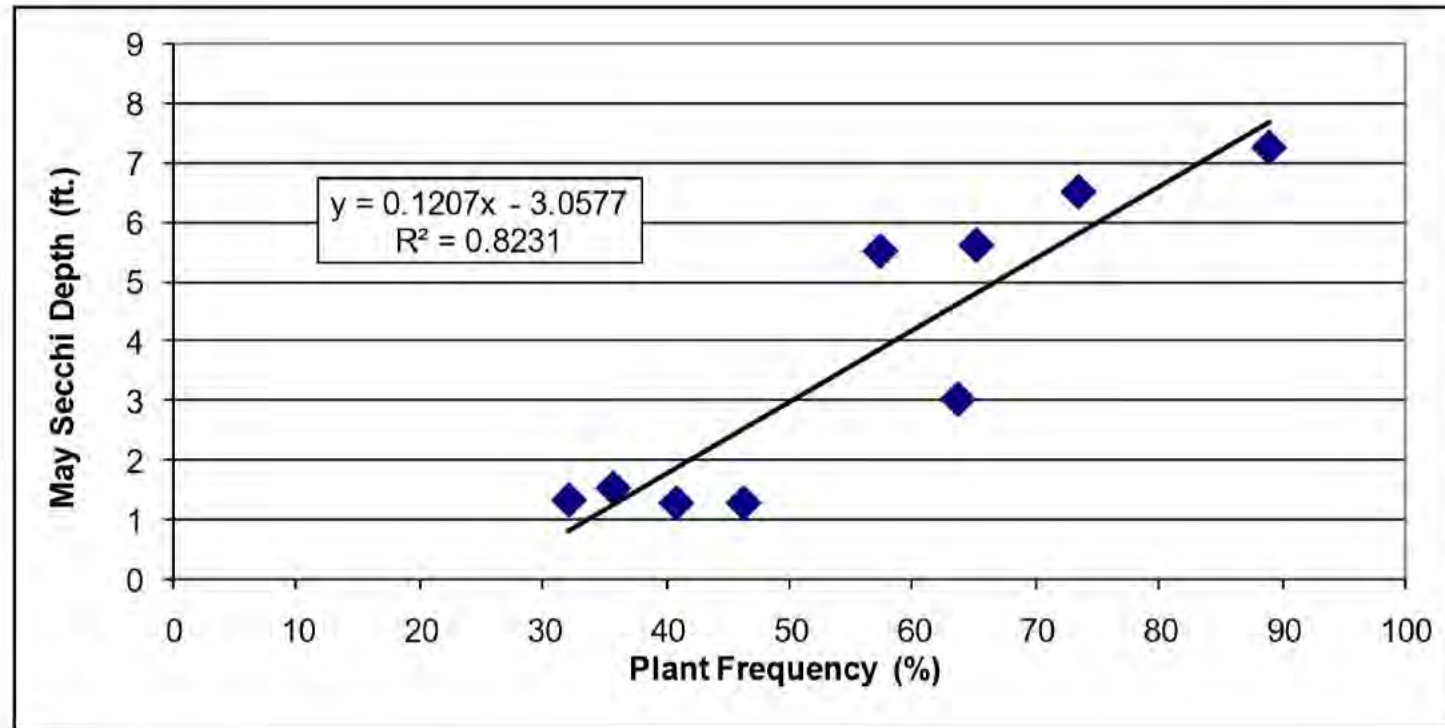


Figure 21

May Secchi depth versus Aquatic Plant Frequency for Fox Lake 1995-2008³⁵

2008 Management Plan Major Recommendations

Recommendation	Estimated Cost	Implementing Agency	Funding Source	Implementation Schedule
<i>Watershed Sediment and Nutrient Control</i>				
1. Implement barnyard manure management on critical farms	\$120,000	Landowner/Dodge County/DATCP/NRCS	ASCS, State and Local Landowners	2009
2. Implement conservation practices on agricultural fields	\$15,000/year	Landowner/Dodge County/DATCP/NRCS	ASCS, State and Local Landowners	2009

2008 Management Plan Major Recommendations

Recommendation	Estimated Cost	Implementing Agency	Funding Source	Implementation Schedule
Public Education				
1. Continue quarterly newsletter	\$5,000/year	FLILPRD	FLILPRD	Annual
2. Conduct two education forums per year	\$3,000/year	FLILPRD	FLILPRD	Annual
Monitoring				
1. In-lake water quality	\$5,000/year	FLILPRD/WDNR	FLILPRD/Lake Planning Grant Program	Annual
2. Tributary runoff	\$4,000/subwatershed assessment	FLILPRD/WDNR	FLILPRD/Lake Planning Grant Program	2008
3. Aquatic plants	\$10,000/every year	FLILPRD/WDNR	FLILPRD/Lake Planning Grant Program (APM Plan Updates)	Annual until APM plan update in 2010-2012 then as recommended

Activities for 2019 and 2020

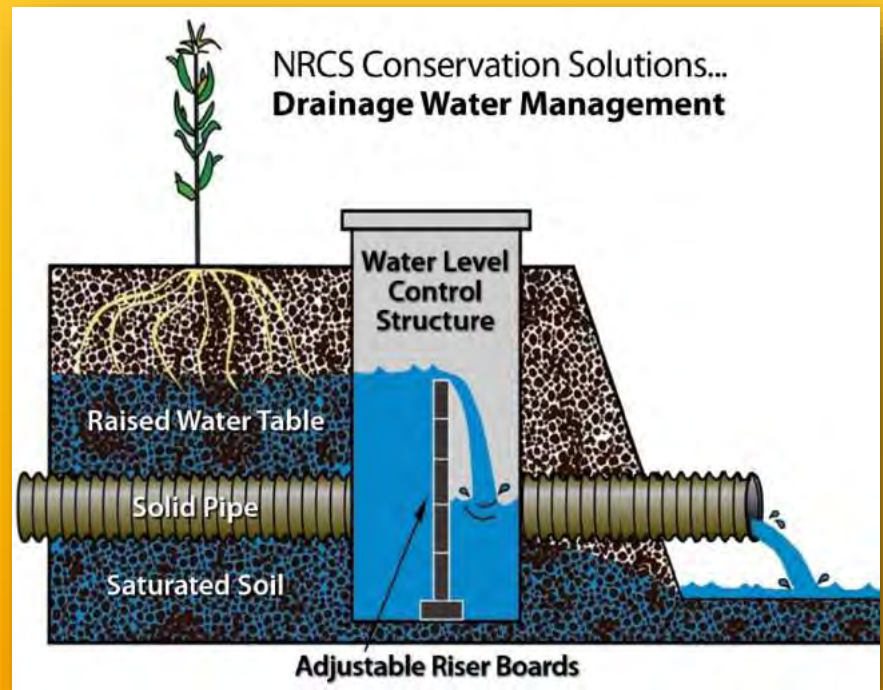
Aquatic Plant Management

- Continue aquatic herbicide and harvesting programs.



Watershed Management

- Work with the Wisconsin Department of Corrections on the installation of a tile treatment system at the Fox Lake Correctional Facility Farm.



Watershed Management

- Work with local farmers on the installation of winter cover crops to help reduce erosion and hold nutrients on fields.



Watershed Management

- Project will be in cooperation with the Fox Lake Property Owners Association and Dodge County Healthy Soils Healthy Water.
- Plan to work with 7 to 10 farmers to plant between 600 and 700 acres in cover crops (~\$12,000).



Wastewater Treatment

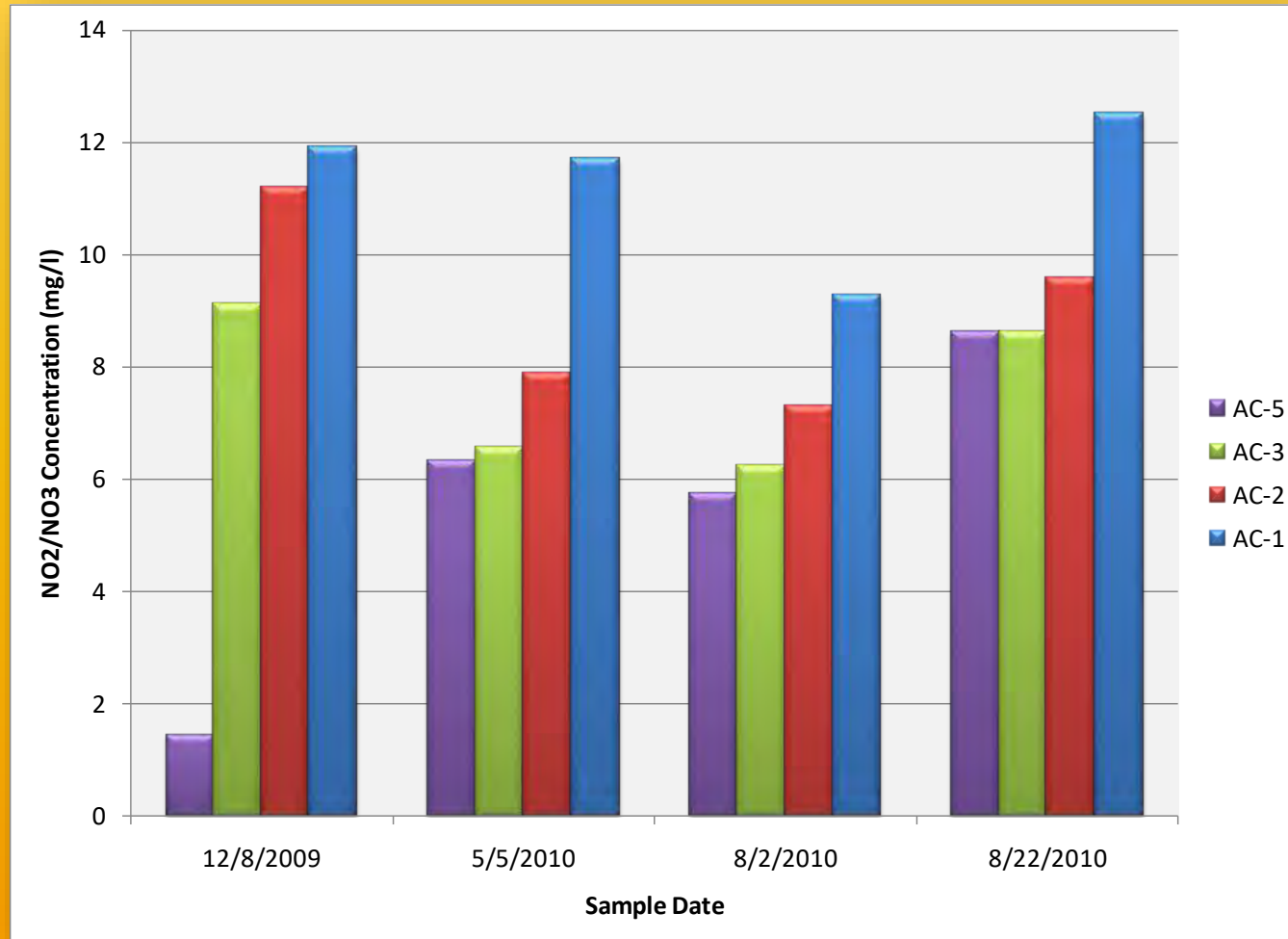
- Maintain and operate the sewage collection and treatment system.



Discussion:



Relationship of NO_2/NO_3 Concentrations from Upstream to Downstream by Sample Date Alto Creek



Relationship of Total Suspended Solids Concentrations from Upstream to Downstream by Sample Date Alto Creek

