

# **GLP UPDATE: INDIANA HYDRILLA ERADICATION & STARRY STONEWORT BATTLE**

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INDIANA DEPT. OF NATURAL RESOURCES**

# INVASIVE SPECIES MOVE FAST!!

❖ Who or What was knocking at our door?

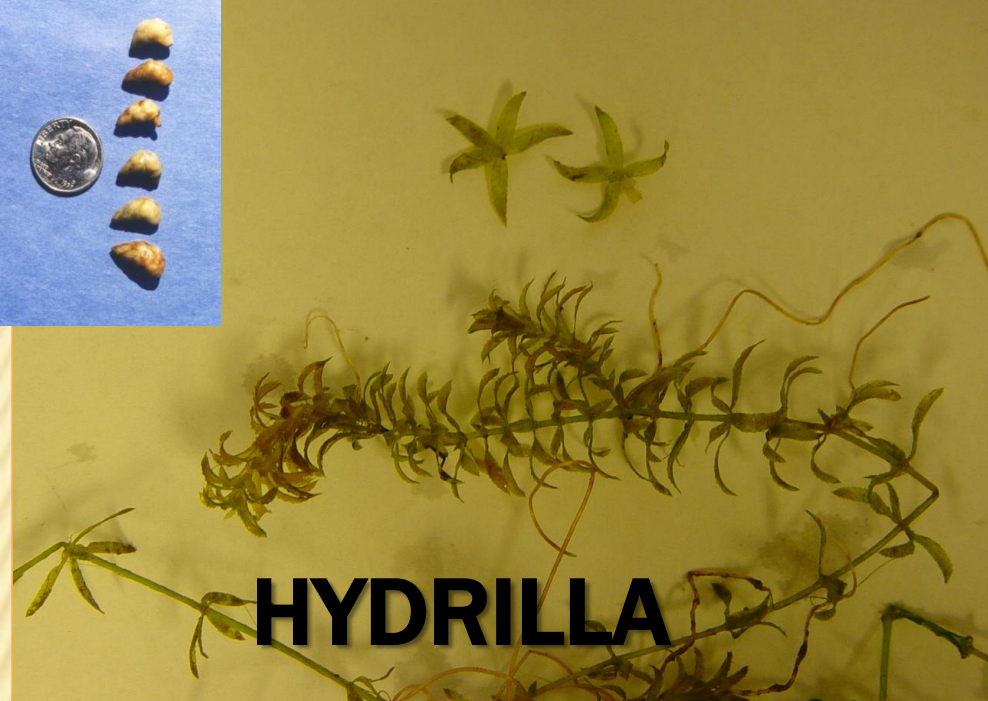




**STARRY STONEWORT**



**HYDRILLA**



**ELIMINATED**

**EGERIA DENSA**



**ELIMINATED**

**PARROT FEATHER**

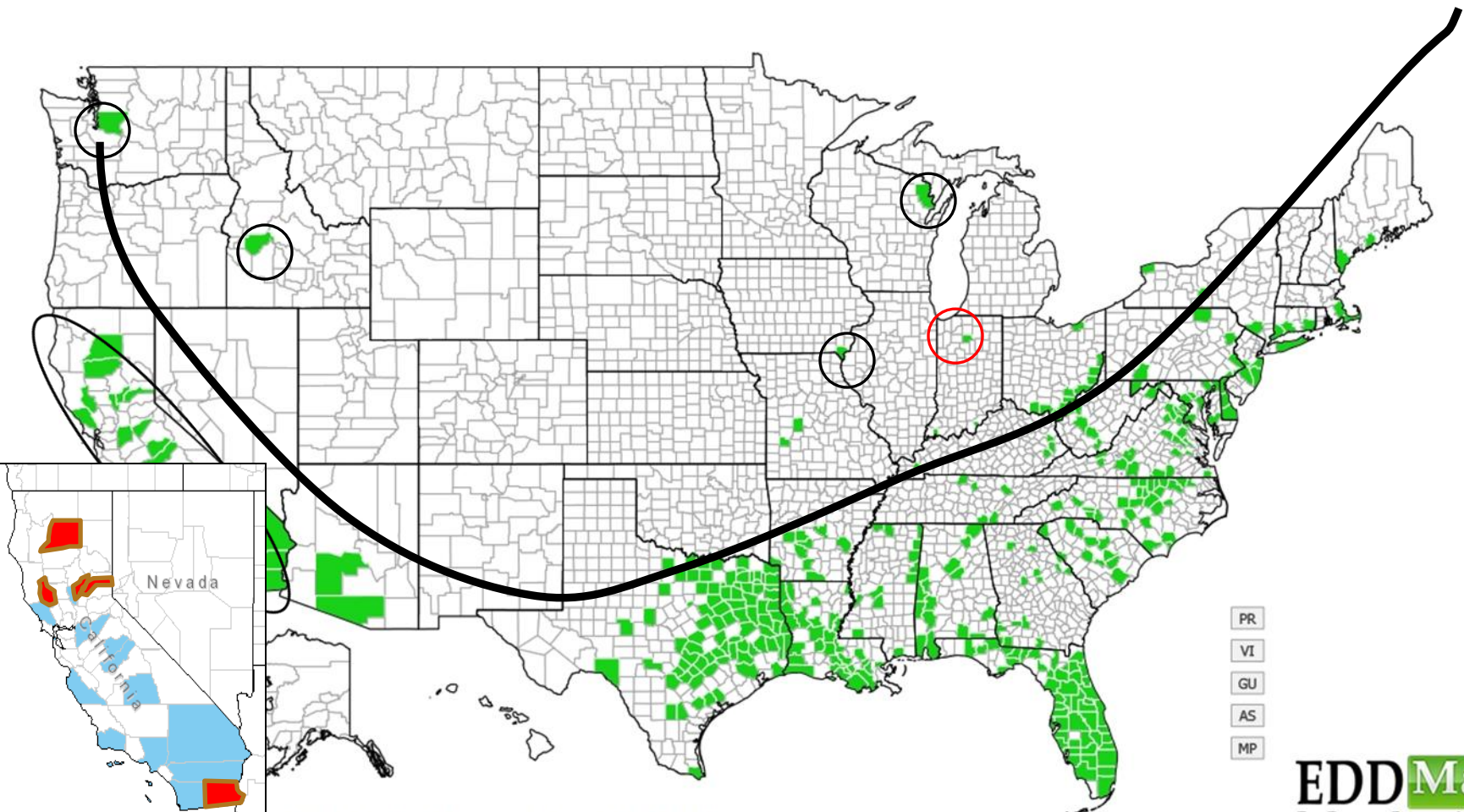
# LAKE MANITOU

- ❖ **Hydrilla verticillata Eradication project**
- ❖ **8 years of treatment and <\$2,300,000**
- ❖ **809 acre lake in Fulton County**
- ❖ **\$2900/acre+**
- ❖ **Still going**
- ❖ **<40mi to GL basin waters**



# THE CHOICE TO PUSH BACK

*Hydrilla verticillata*



er 7, 2013 - Map generated: August 27, 2014

**EDD MapS**  
Early Detection & Distribution Mapping System

## Long-Term Value of Lake Manitou Hydrilla Eradication (2006 – 2014)

75-mile radius of Manitou  
4,024 waterbodies (Lake Michigan  
and some MI inland lakes)

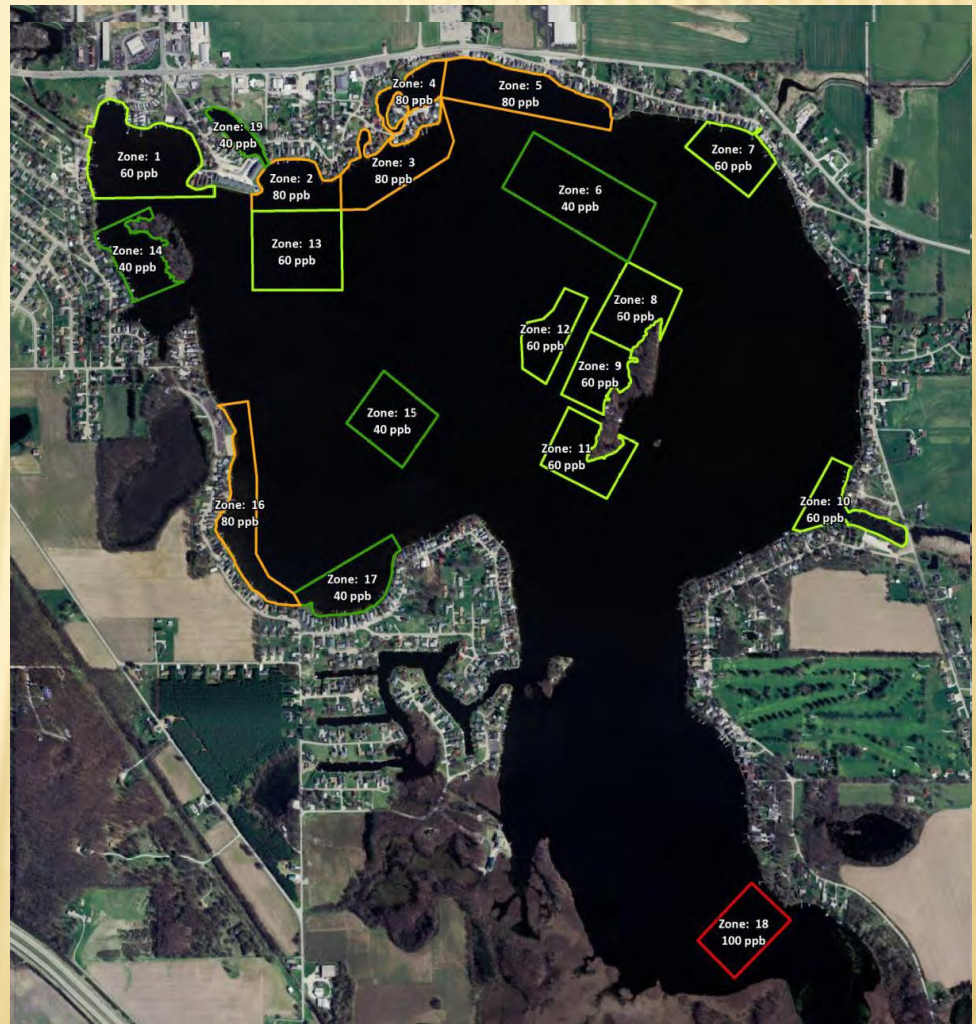
# REACTION AND DECISIVE ACTION

- Discovery in fall of 2006
- Closure of boat ramps and inspections of equipment preformed through early 2008
- Followed by spring ramp closure prior to spring treatments
- Hydrilla reduced and ramps returned to year round accessibility from 2011 to present.
- This was one of the most important steps in containing the spread to any of the other 4000 lakes w/ 75mi.

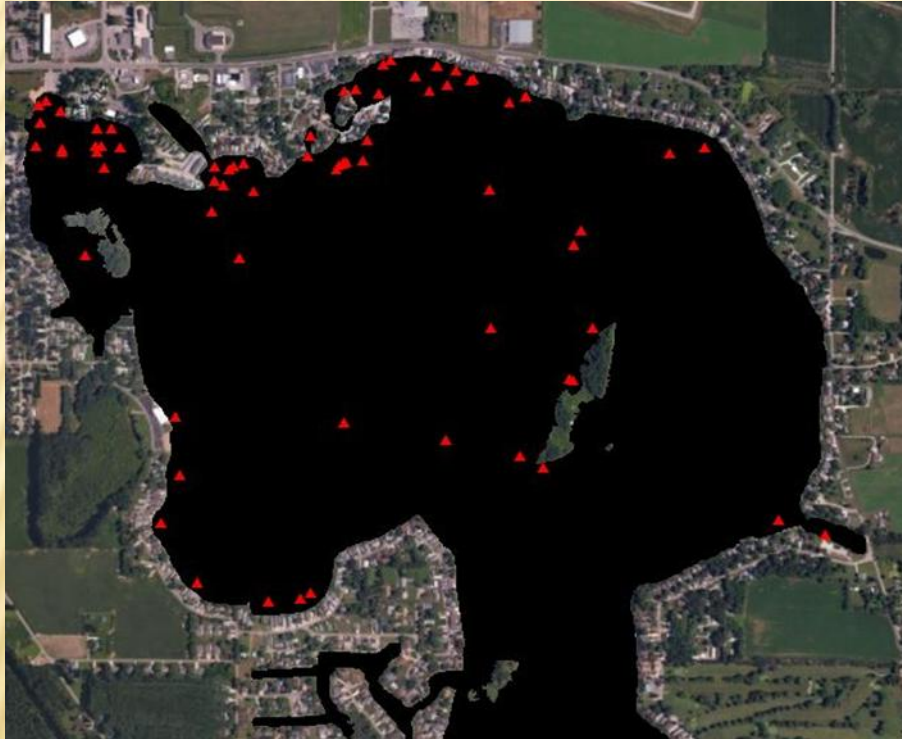


# INITIAL HERBICIDE SELECTION / EXECUTION

- ❖ 2007-2012
- ❖ Lakewide Sonar application
- ❖ Maintain Lakewide Sonar Concentration
- ❖ Initial objectives were to maintain >6ppb for 180 days but refined to increase selectivity of herbicide
- ❖ Initial Sonar application preformed in mid May with initial application to 6 ppb maintaining 2.5-5 ppb throughout the season



# 2014 TREATMENT DESIGN



2006-2014 Hydrilla sightings



2014 Granular Sonar PR prescription

# SURVEY DESIGN

- ❖ **Critical to any successful plant treatment**
- ❖ **Visual plant reconnaissance surveys**
- ❖ **Herbicide concentration and water quality monitoring**



# SURVEY DESIGN AND ADJUSTMENTS

- ❖ Objective of assessing plant tuber density and attrition.
- ❖ 2007-2011 tuber Sampling
  - ❖ Initial widespread sampling
  - ❖ Establishment of 5 permanent stations
  - ❖ Baseline sampling prior to Sonar application
  - ❖ Fall 2011 surveys-99.5% reduction



# FROM TUBER ASSESSMENT TO DIVER SURVEY

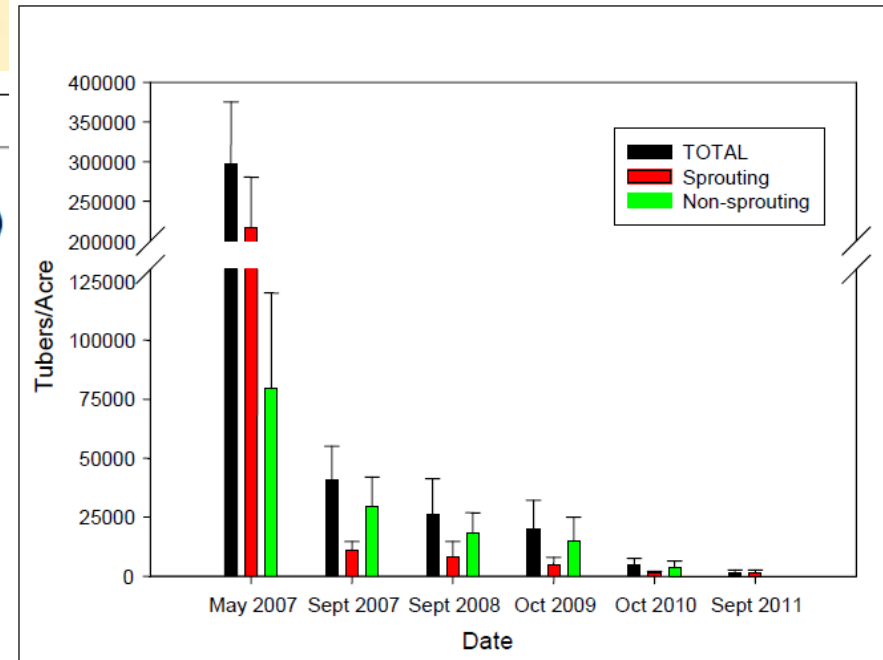
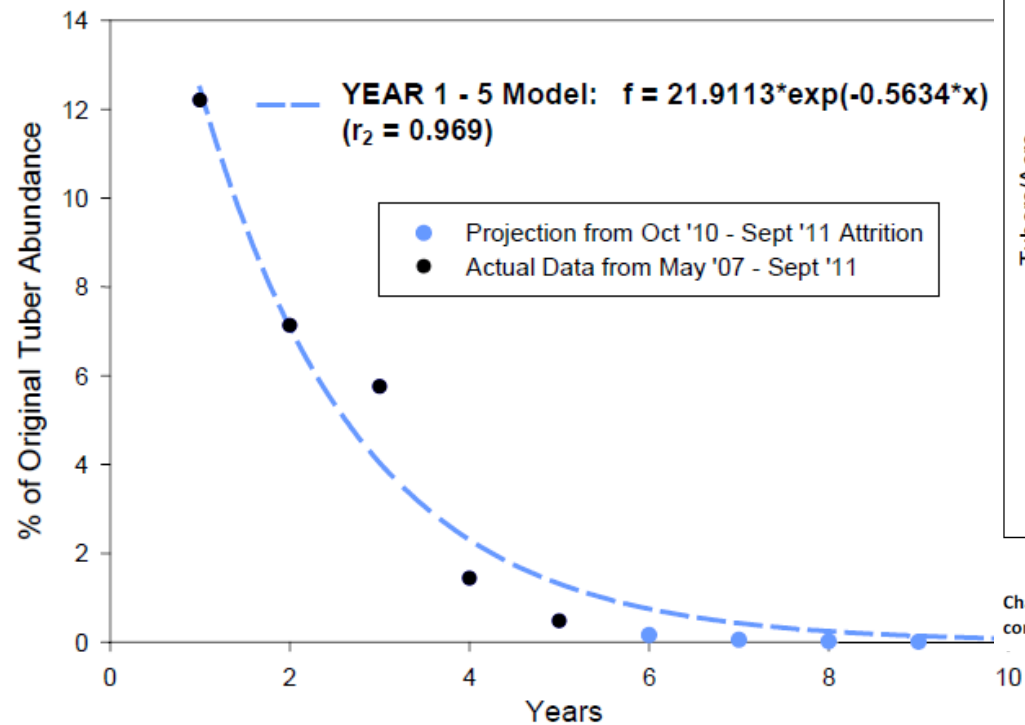


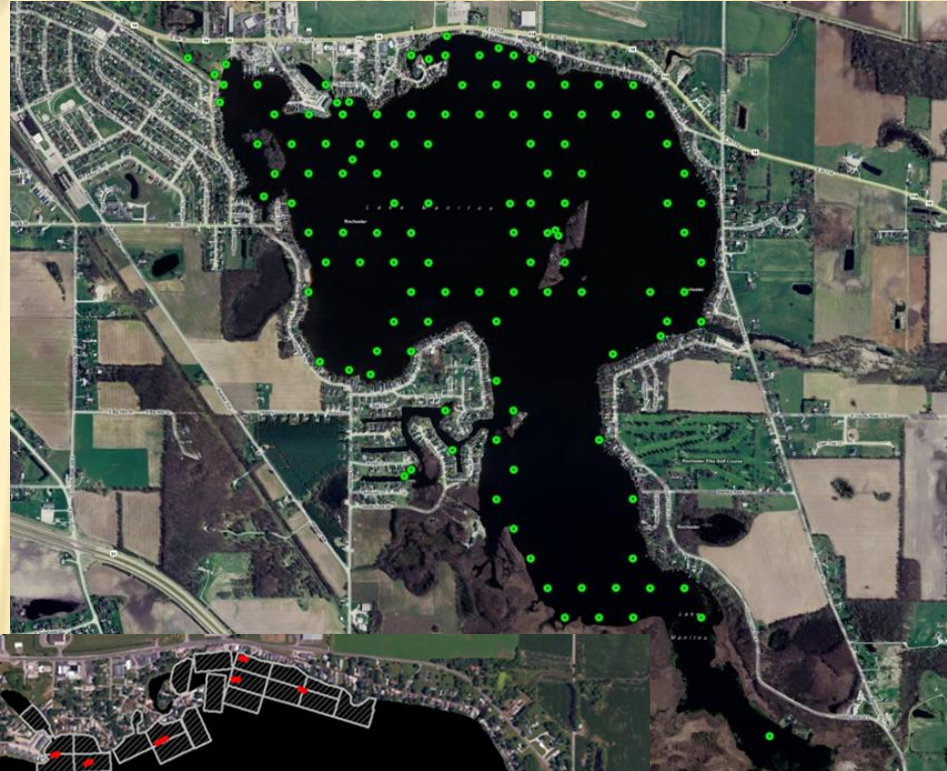
Chart 2.2.1. Overall changes in monoecious hydrilla tuber abundance in Lake Manitou following five consecutive years of Sonar treatments (sprouting + non-sprouting = total).

Chart 2.2.2. The attrition rate of hydrilla tubers on Lake Manitou based on 2011 Results and 2012 Projections. Year 1 (88%), Year 2 (42%), Year 3 (19%), Year 4 (75%), and Year 5 (67%) reductions (black dots) are from actual data and include both sprouted and unsprouted tubers; all subsequent reductions (years 6 through 10 – blue dots) were based on reductions observed during year five (Oct '10 – Sept '11: 67%). The blue dotted line represents predicted attrition rate based on non-linear regression analysis incorporating Year 1 – 5 data.



# SURVEY DESIGN AND ADJUSTMENTS

- ❖ Point intercept plant sampling spring and late summer (122 pts.)
- ❖ Intensive Diver survey designed to maximize detection 2011-14
  - ❖ 140,000 ft<sup>2</sup>- 466,000 ft<sup>2</sup>
  - ❖ ~20 plants in 2012
  - ❖ 4 plants in 2013
  - ❖ **0 plants in 2014**



# STARRY STONEWORT



- ❖ IDENTIFIABLE BY MAT FORMATION, STAR SHAPED RHIZOIDS AND “RAGGED” LOOK
- ❖ RAPIDLY SPREADING IN STATE OF MICHIGAN AND EXPANDED INTO NE INDIANA
- ❖ COLONIZES VIA FRAGMENTS AND SPORES
- ❖ SUCCEPTIBLE TO A RANGE OF CHELATED COPPER AND COPPER HYDROTHOL MIXES
- ❖ WILL DOMINATE IN VARIETY OF ORGANIC AND INORGANIC SUBSTRATES
- ❖ CONFIRMED IN HUNDREDS OF LAKES IN MICHIGAN AND 8 LAKES IN INDIANA.

## Muskgrass (*Chara, spp.*)



*Muskgrass*



**Starry Stonewort - *Nitellopsis Obtusa***

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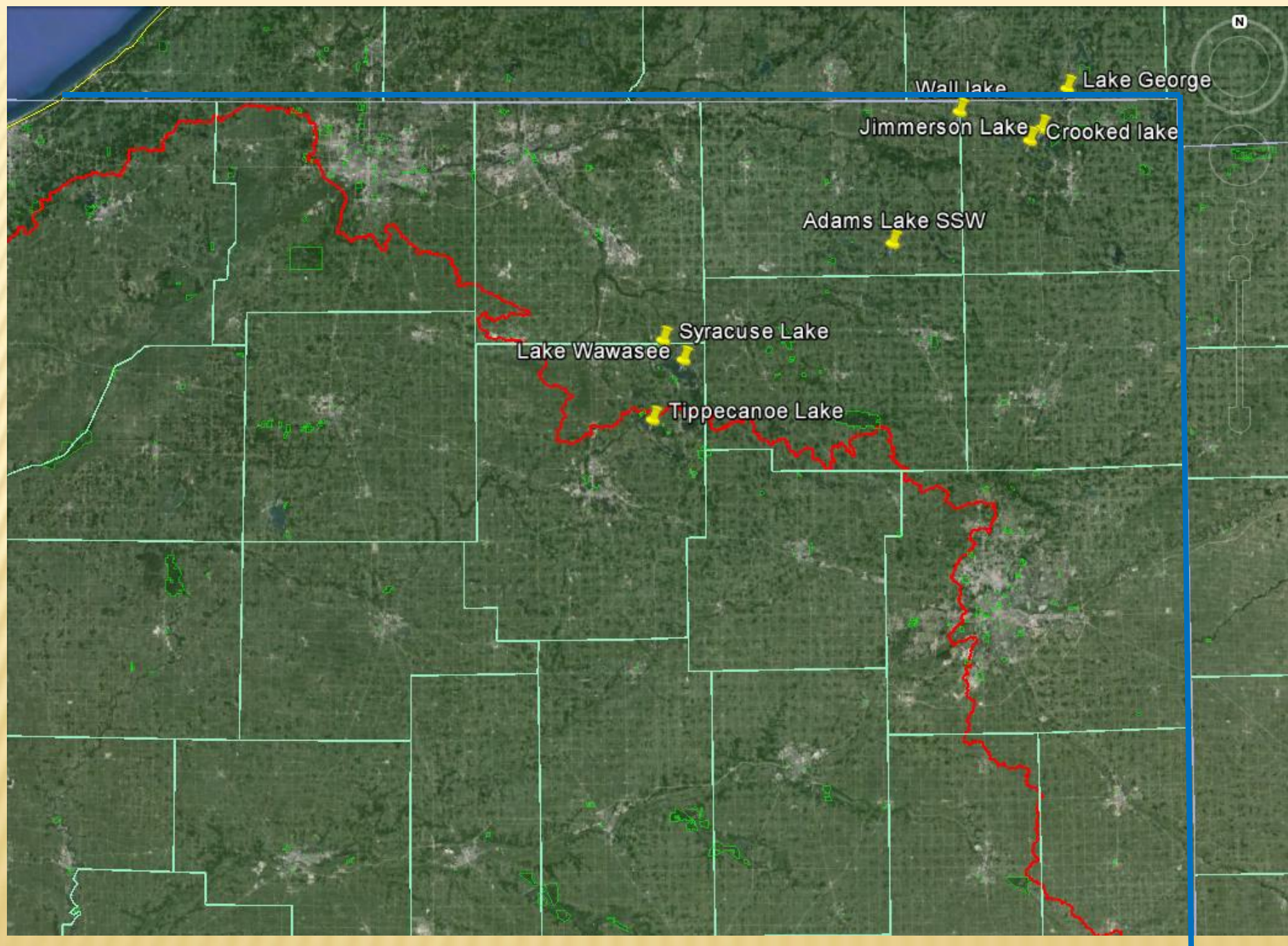
Illinois

Indiana

Kentucky

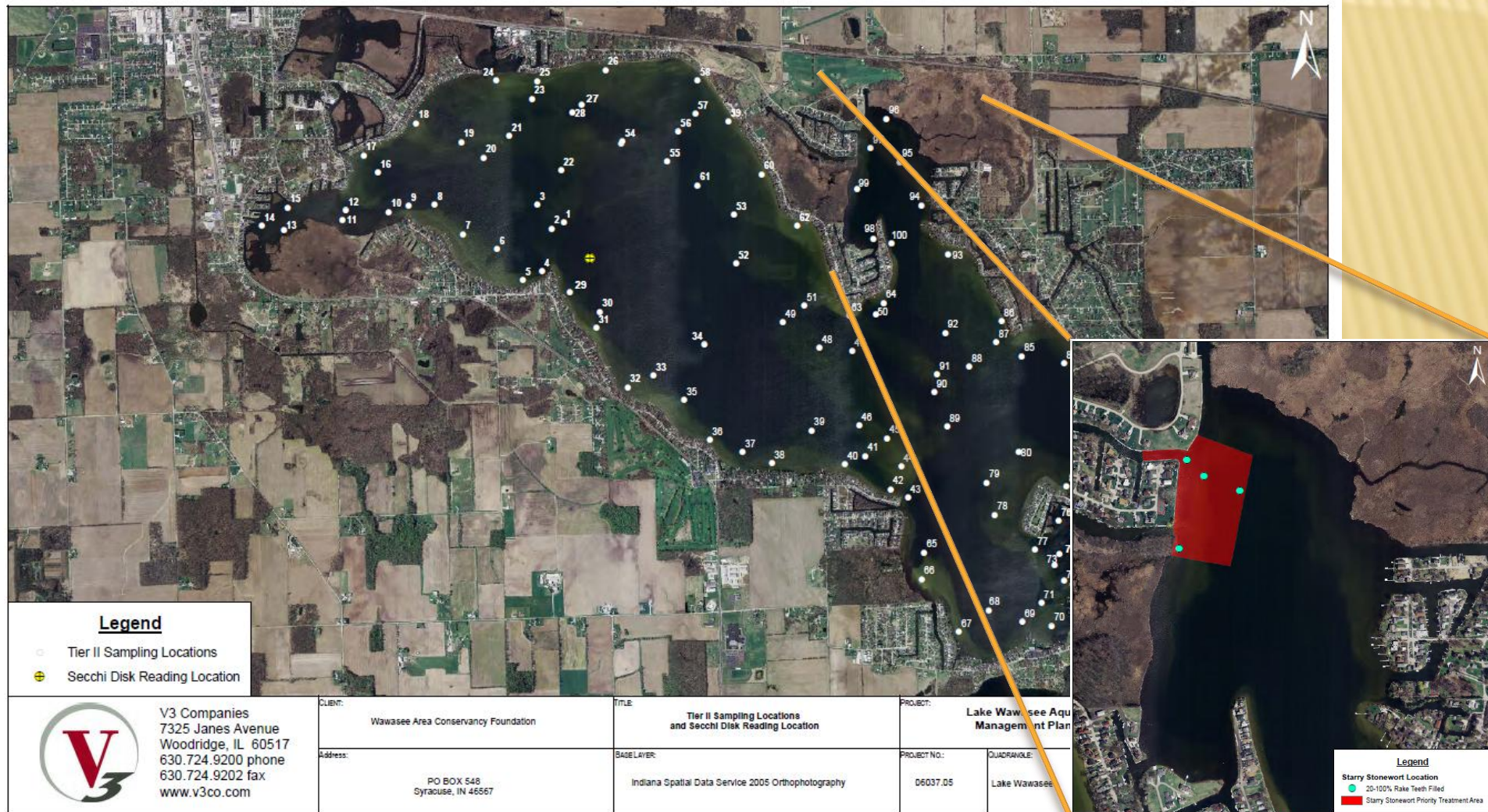
Wall lake  
Jimmerson Lake  
Grooked lake  
Adams Lake SSW

Lake Wawasee  
Syracuse Lake  
Tippecanoe Lake



# LAKE WAWASEE 2008

Lake Wawasee has 3,060 surface acres with a maximum depth of 77 feet and an average depth of 22 feet. SSW first detected in 2008.



# LAKE WAWASEE SSW BEDS

- ❖ Fall 2009
  - ❖ 15 ac.
- ❖ Fall 2010
  - ❖ 20+ ac.
- ❖ Fall 2011
  - ❖ 56 ac.
- ❖ Fall 2012
  - ❖ 159 ac.



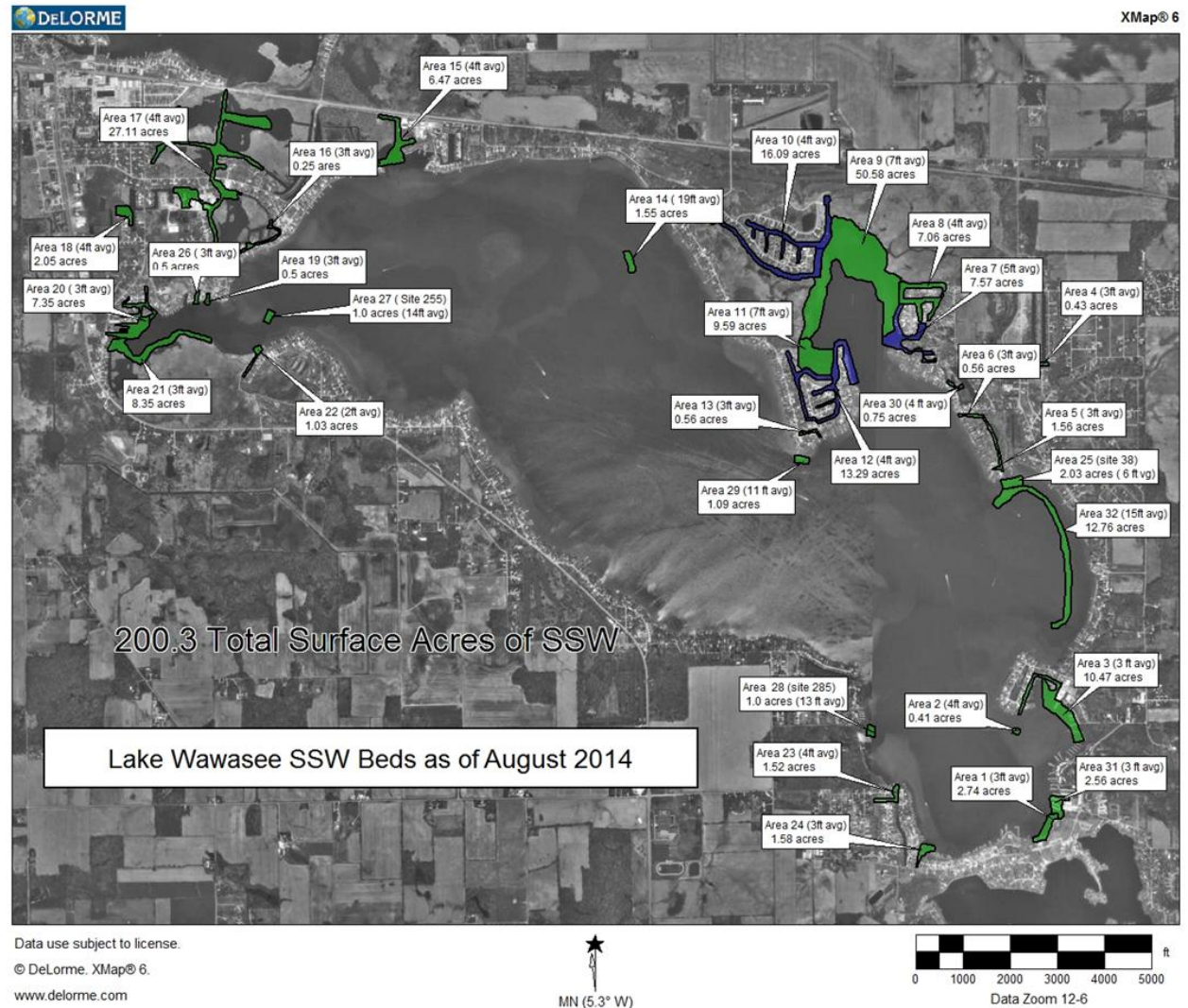
# DECISIVE ACTION A MUST

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- ✗ 2008 no treatment
- ✗ 2009 treatment delayed until later in season
- ✗ Ineffective and unsure treatment strategy
  - + Herbicide choice and concentration < optimal
  - + Nautique .8 ppm – tested varying rates of Cutrine Ultra and Hydrothol
  - + Komeen Crystal trial in 2013
  - + Best control so far 2.4 gallons Cutrine Ultra/ 1 Qt Hydrothol 191-. per ac/ft
  - + Timing of treatment ? critical
  - + Repeated treatments a necessity to obtain suppression

# SSW WIDELY DISTRIBUTED

- ❖ Fall 2014
- ❖ 200.3 ac.



# WALL LAKE

- ❖ Aggressive treatment
- ❖ Wide treatment areas
  - ❖ Small patches/single plants
- ❖ Multiple treatments
- ❖ Effective control

| Year | Acres of Starry Stonewort |
|------|---------------------------|
| 2010 | 2                         |
| 2011 | 2                         |
| 2012 | 4.83                      |
| 2013 | 6.08                      |
| 2014 | 7.83                      |



**Figure 2** Wall Lake stony stony growth and treatment areas for 2014. Blue areas were treated on 7/15/14, 8/7/14, and 9/30/14. Pink areas were noted later in the season and treated on 9/30/14.

# GOALS FOR 2015 AND 2016

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- ✖ Continue prioritized IDNR funding to surveys and suppression of SSW
- ✖ Continued application of Cutrine Ultra / hydrothol 191 mix
- ✖ Working with plant control applicator testing the application of Clipper (*flumioxazin*)
- ✖ Partnering with Clemson University and Allied Biochemists (algal challenge test)

# NEED FOR NEW SCIENCE AND TOOLS

- ❖ **Changes in Aquatic Plant Communities**
- ❖ **Changes in Nutrients, Dissolved oxygen, Water Clarity**
- ❖ **Changes in Fish Populations: Distribution, Growth, Condition, Recruitment, Reproduction**
- ❖ **Variability between Lakes and Growth Patterns**
- ❖ **Changes in Aquatic Habitat and Diversity**
- ❖ **Vulnerability to different Herbicides and Optimal**

# EARLY DETECTION AND REPORTING

- ❖ Every state has a reporting mechanism
- ❖ Online forms, hotlines, even reporting smartphone applications.
- ❖ MISIN, EDDMaps, USGS NAS (plants)



Call 1-**866 NO EXOTIC**  
(1-866-663-9684).

ONLINE REPORTING

[www.invasivespecies.in.gov](http://www.invasivespecies.in.gov)

- ❖ Eradication of a species before complete establishment and spread will have long term positive effects.
- ❖ Cost associated with decisive action of quarantine and eradication programs is minimal in relation to long term cost of regional establishment.
- ❖ Decisive timing, a well defined plan, patience, and defined funding
- ❖ Collaboration among agency's, regions, and with plant control professionals a must for development of Tools and Strategies.



SePRO, IDNR staff, Aquatic Control, Inc.,  
Aquatic  
Weed Control, Inc., and ReMetrix LLC

**ANY QUESTIONS?**

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