Selective early spring control of Eurasian watermilfoil

Objective

- Control Eurasian watermilfoil (dicot) and reduce annual management
- Protect the native aquatic plant community and increase diversity

Application Timing/Phenology

Early Spring Herbicide Applications

- Exotic species small and most vulnerable
- Native species are dormant
- Minimal microbial degradation

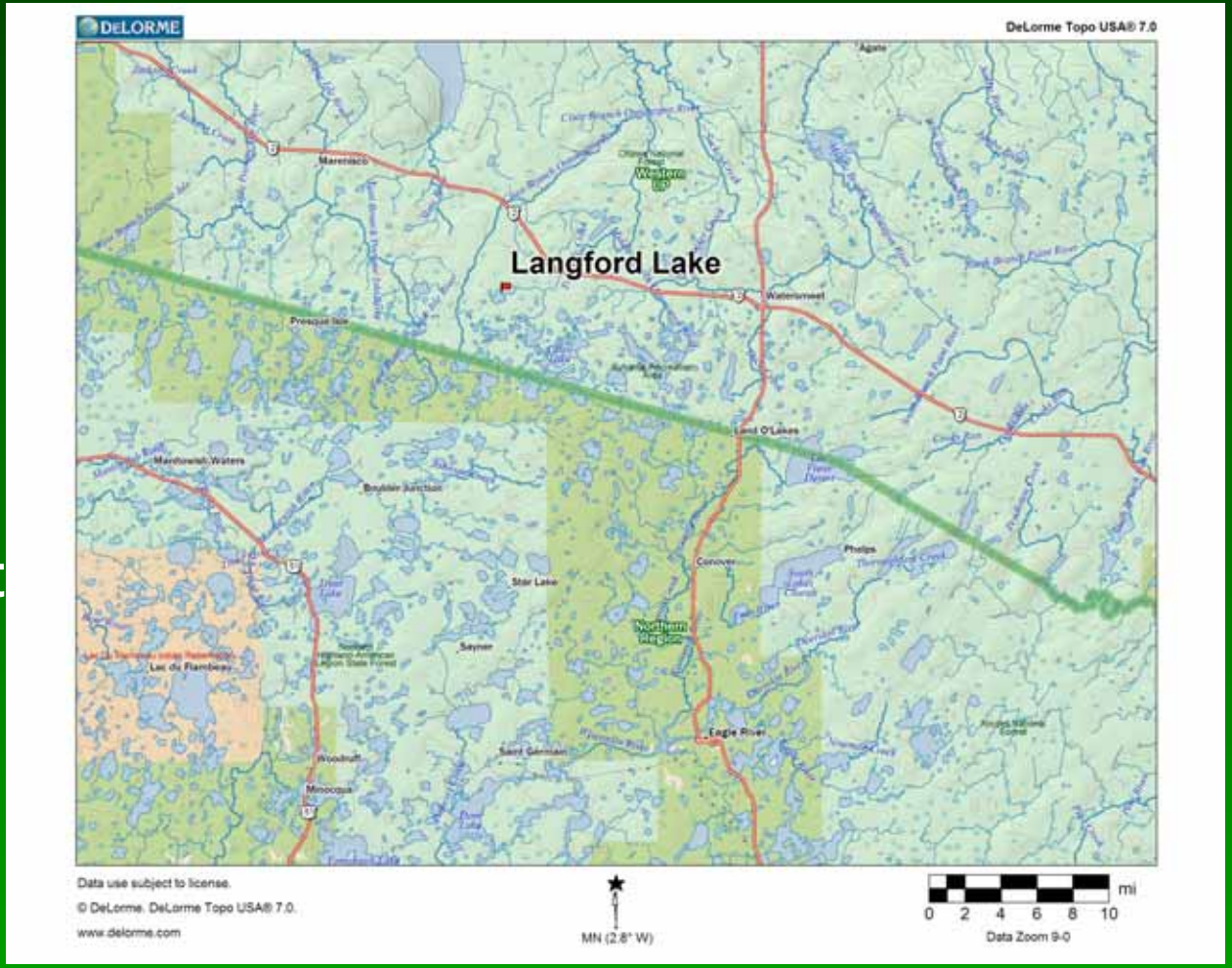
Blackhawk Lake, Eagan, MN

Selective early spring control of Eurasian watermilfoil using granular 2,4-D (Navigate)

Langford Lake

Gogebic County, MI

- **USAERDC**
- **USFS**
- **Applied Biochemist**
- **Marine Biochemist**
- **Nufarm**



US Army Corps of Engineers

Engineer Research and Development Center

Eurasian watermilfoil, July 2002

US Army Corps of Engineers

Engineer Research and Development Center

Eurasian watermilfoil, August 2006

Langford Lake, Native Dicots

Bidens beckii

Brasenia schreberi

Ceratophyllum demersum

Myriophyllum farwellii

Myriophyllum tenellum

Nymphaea odorata

Nuphar advena

Isoetes sp

Erioculum aquaticum

Littorella uniflora

Utricularia intermedia

Utricularia giba

Utricularia vulgaris

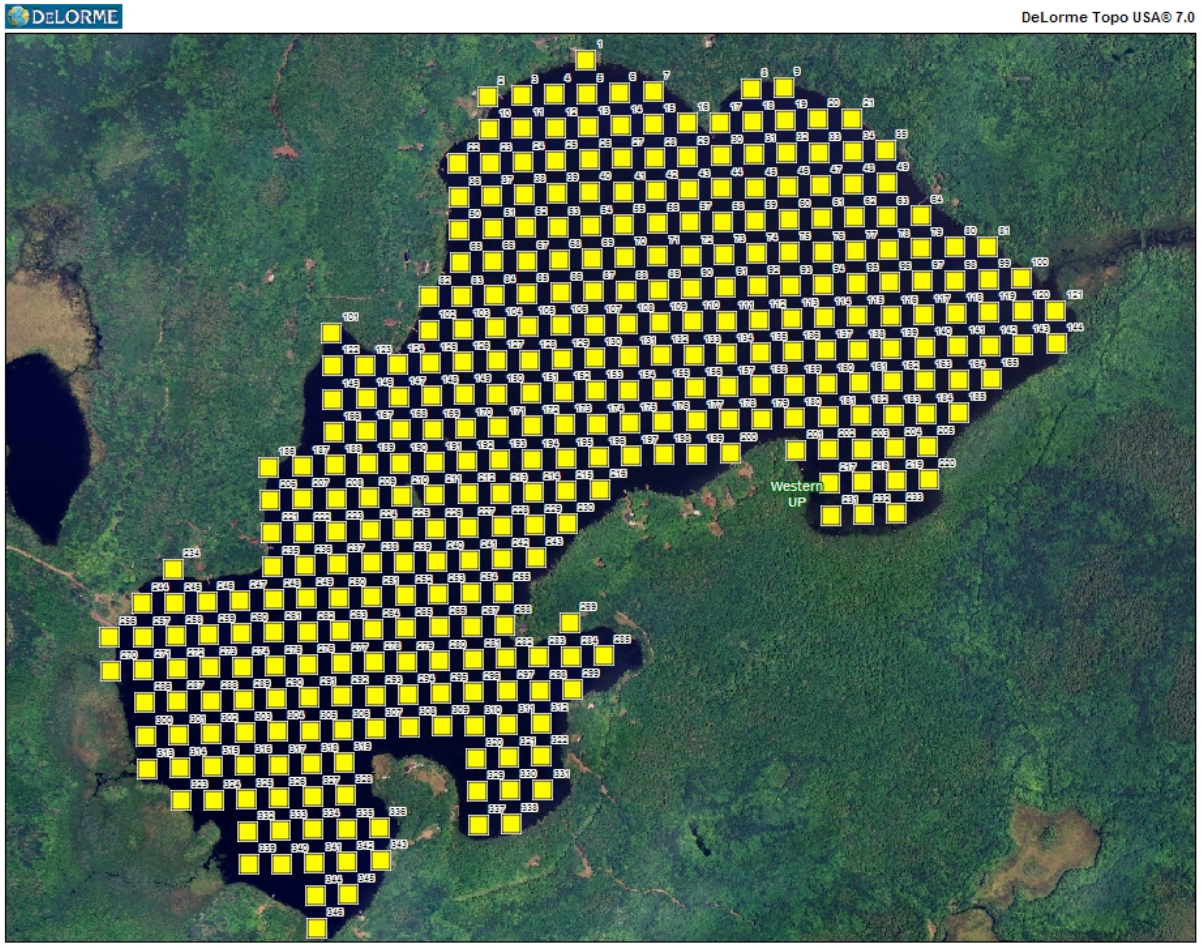
Lobelia dortmana

Approach

- Long term, whole lake management of aquatic plant communities (3 to 5 year study)
- Apply 2,4-D as Navigate (granular) at 150 lbs/acre at depths greater than 5 ft
- Apply in early spring as water temperatures approach 15°C
- Evaluate plant communities in June and August

Point Intercept sample grid, 75x75 m

476 acres



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Early Spring Survey Methods

Hydro Acoustics

Marine Biochemist

US Army Corps of Engineers

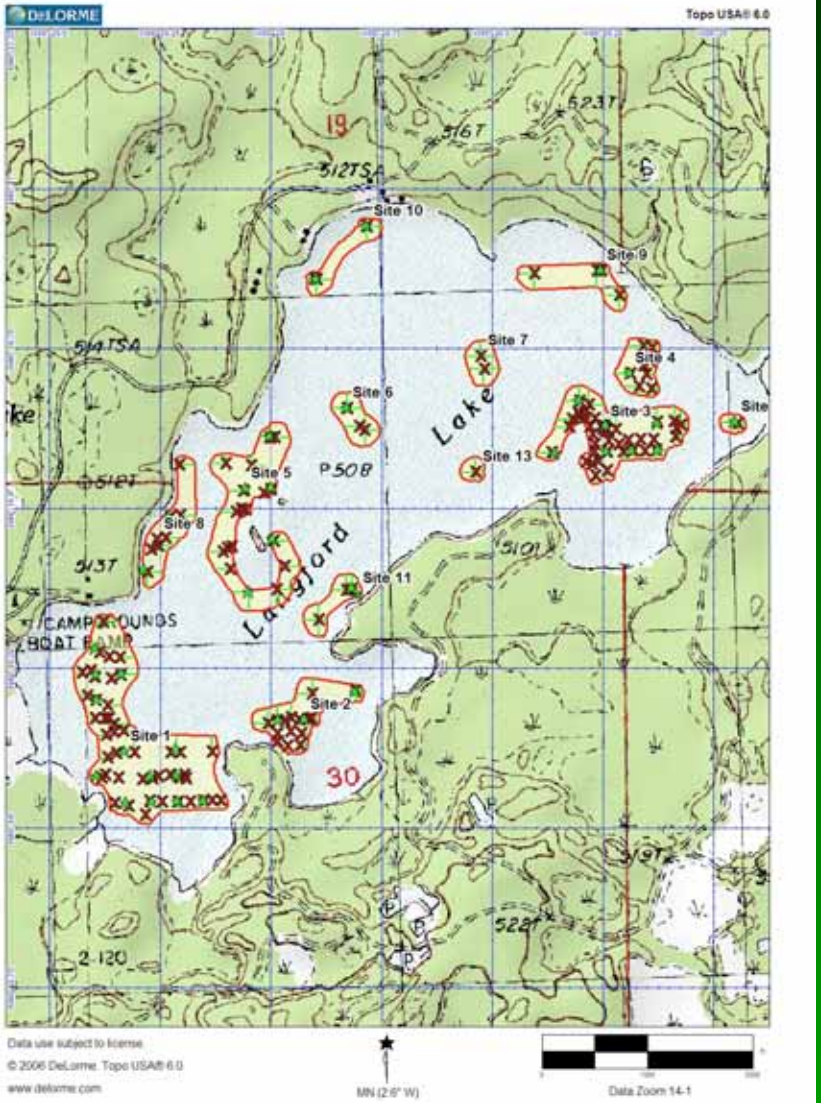
Engineer Research and Development Center

Early Spring Survey Methods

US Army Corps
of Engineers

Engineer Research and Development Center

Langford Lake, 2007 Treatment Areas



116 acres

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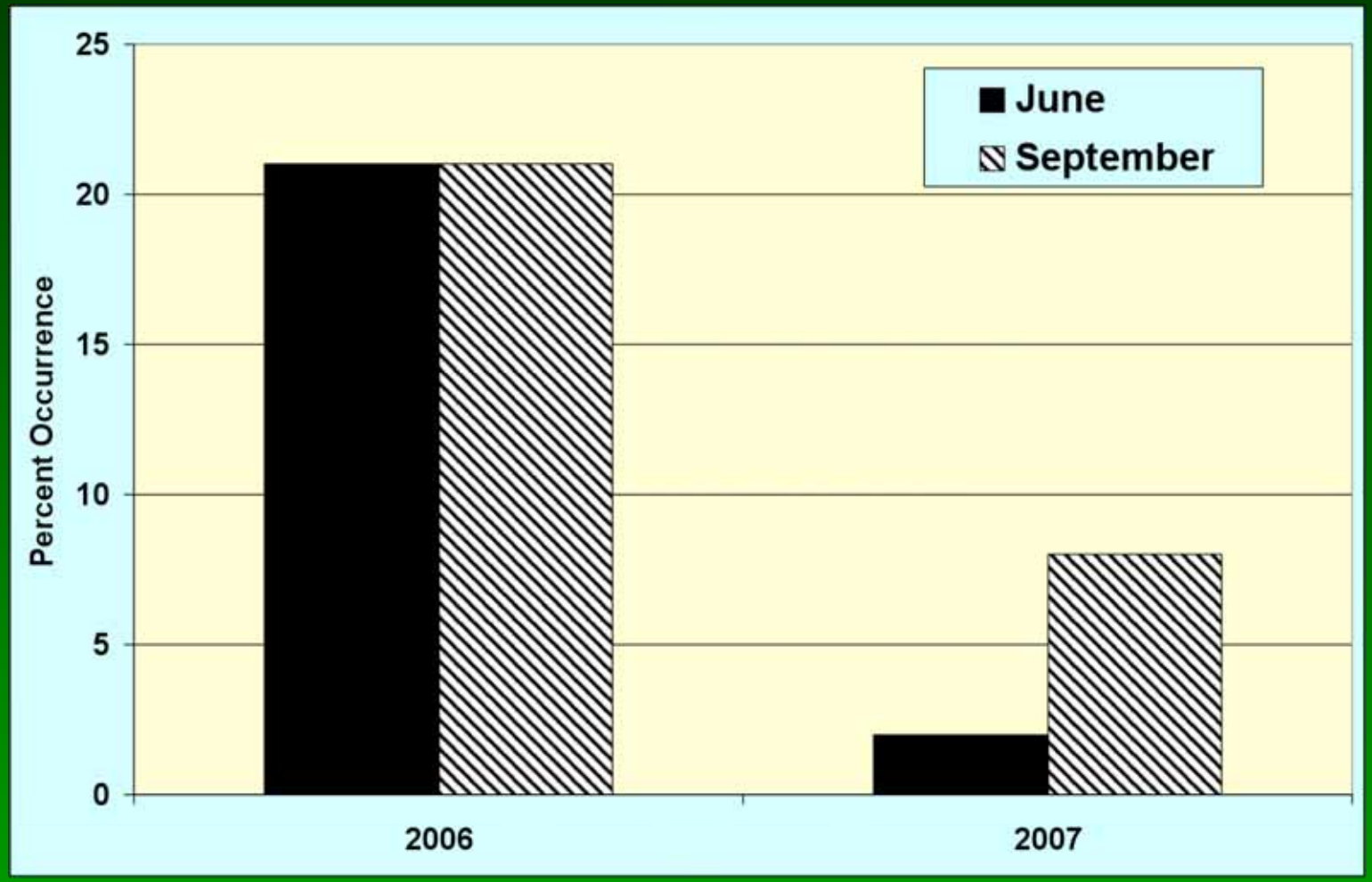
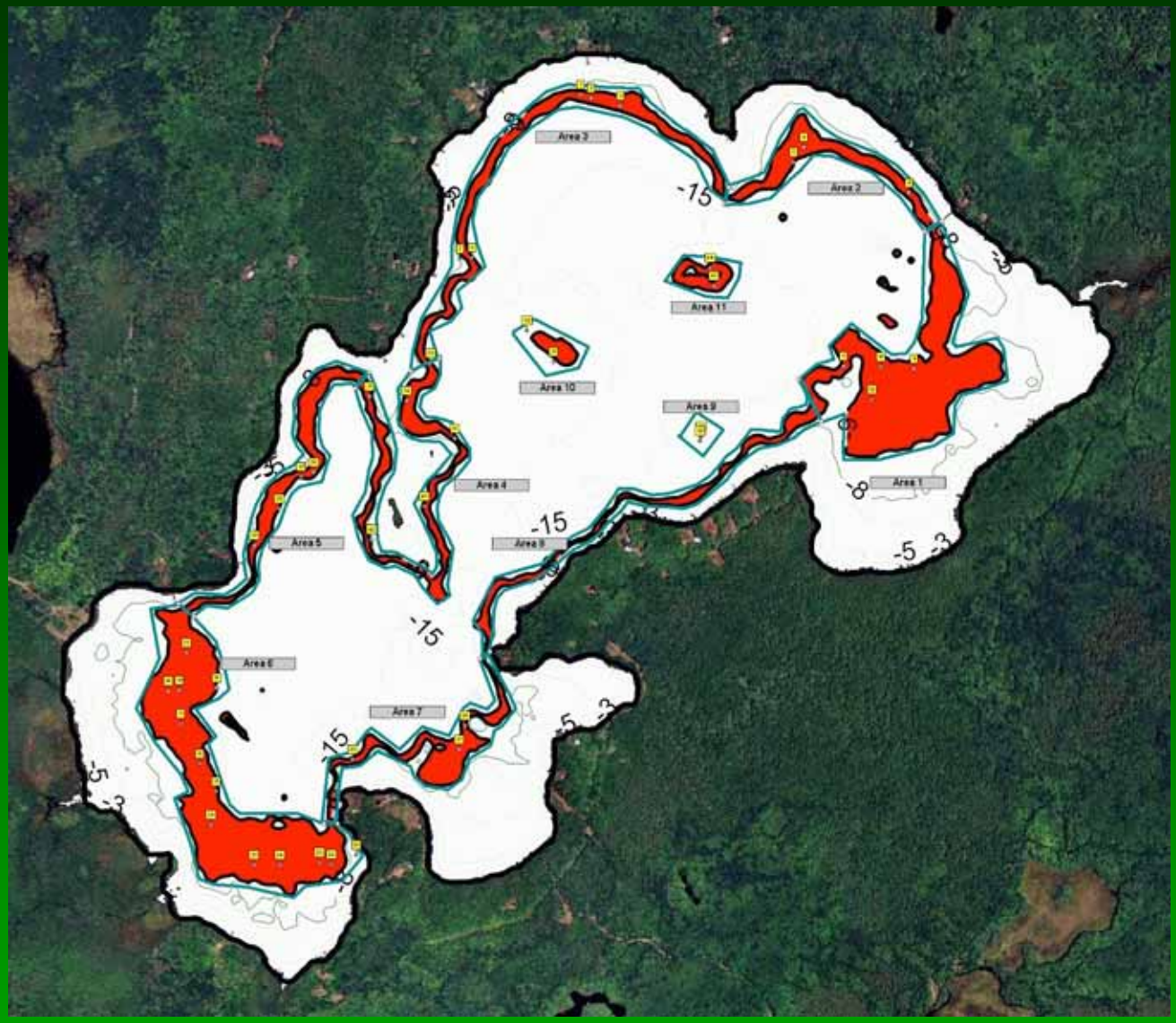
Eurasian watermilfoil
2007 Percent Occurrence

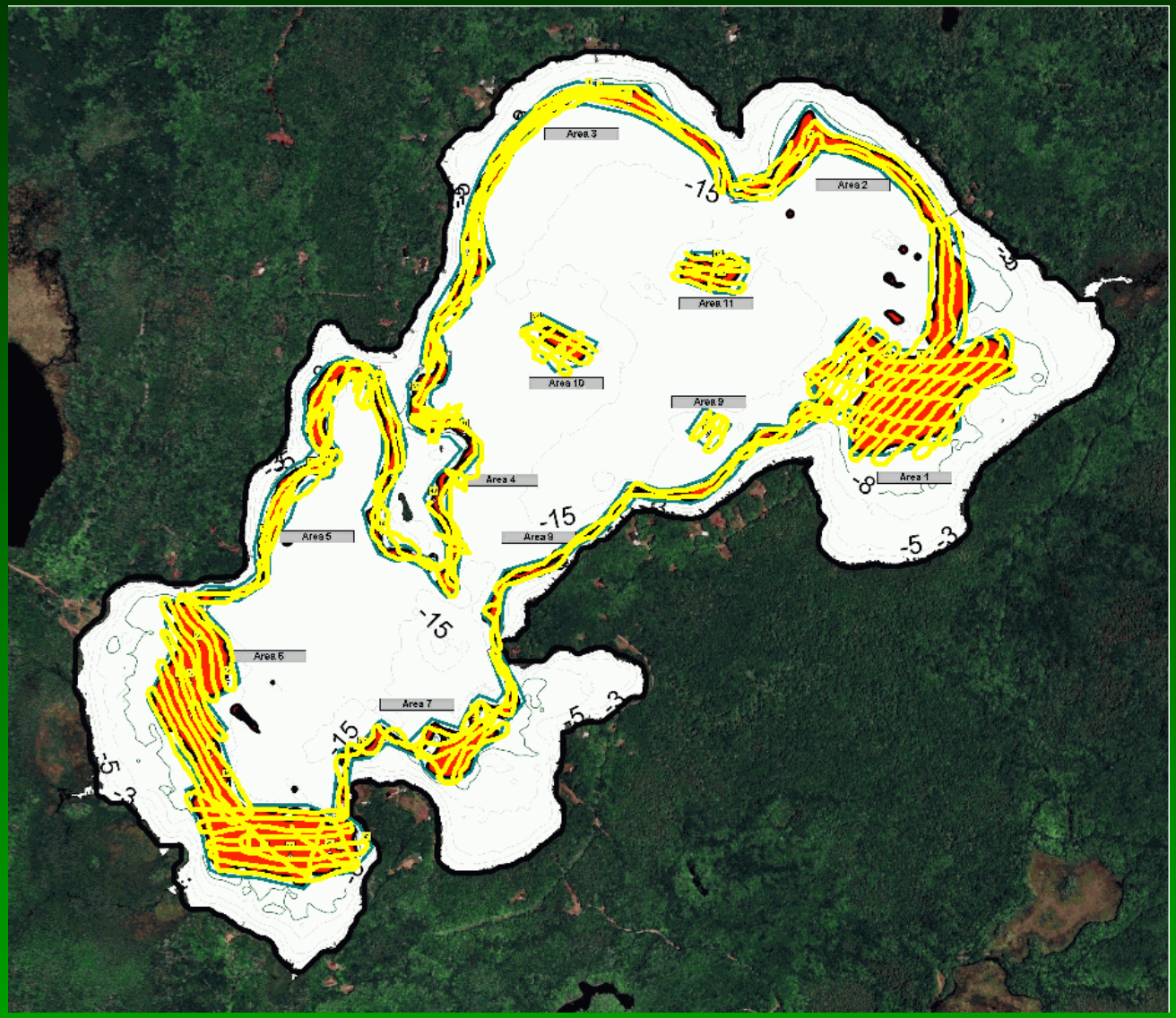


2008 Survey

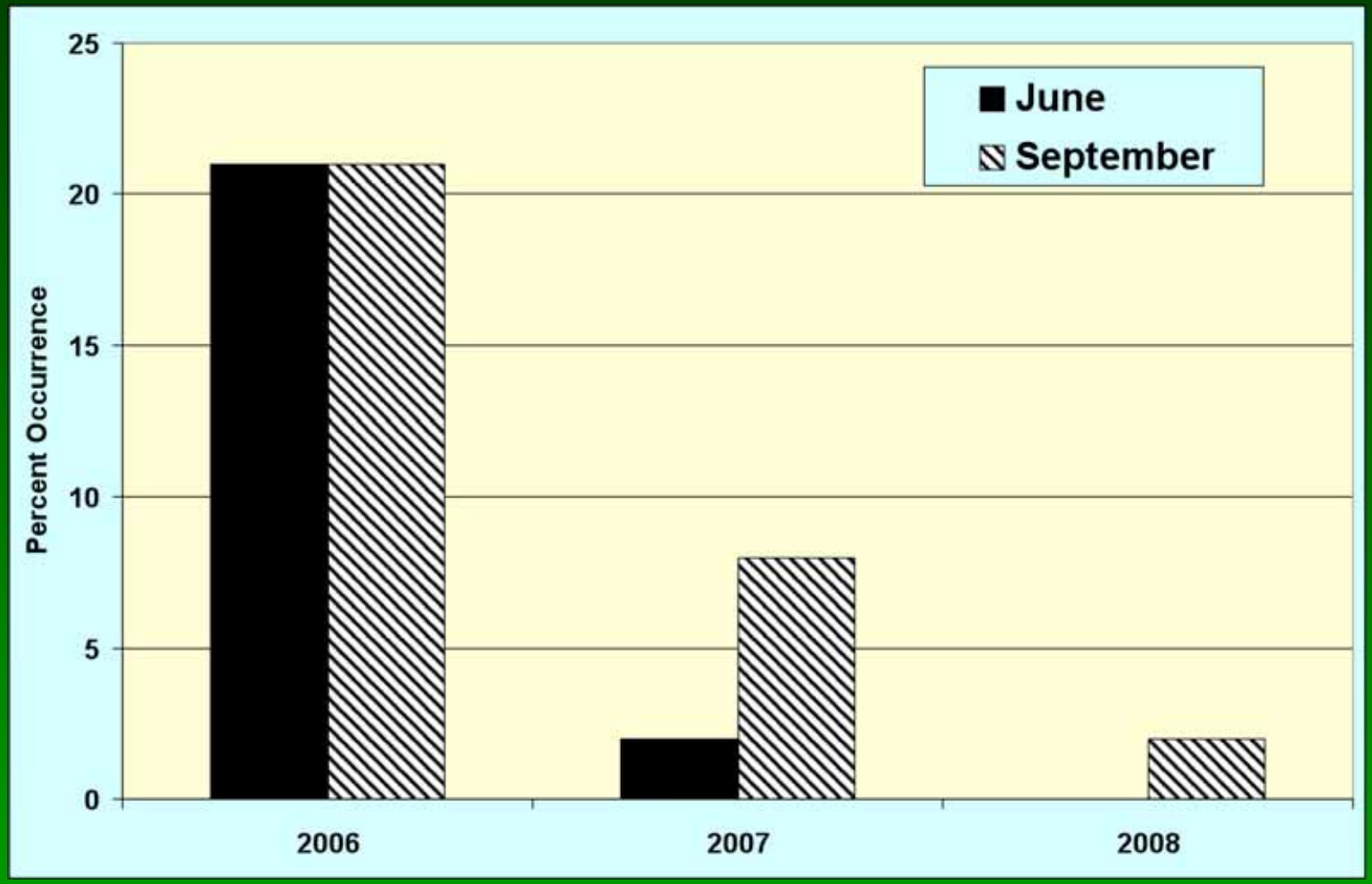

Area 3
Area 2
Area 11
Area 10
Area 9
Area 4
Area 1
Area 5
Area 8
Area 6
Area 7
-15
-5
-3

2008 Treatment Areas

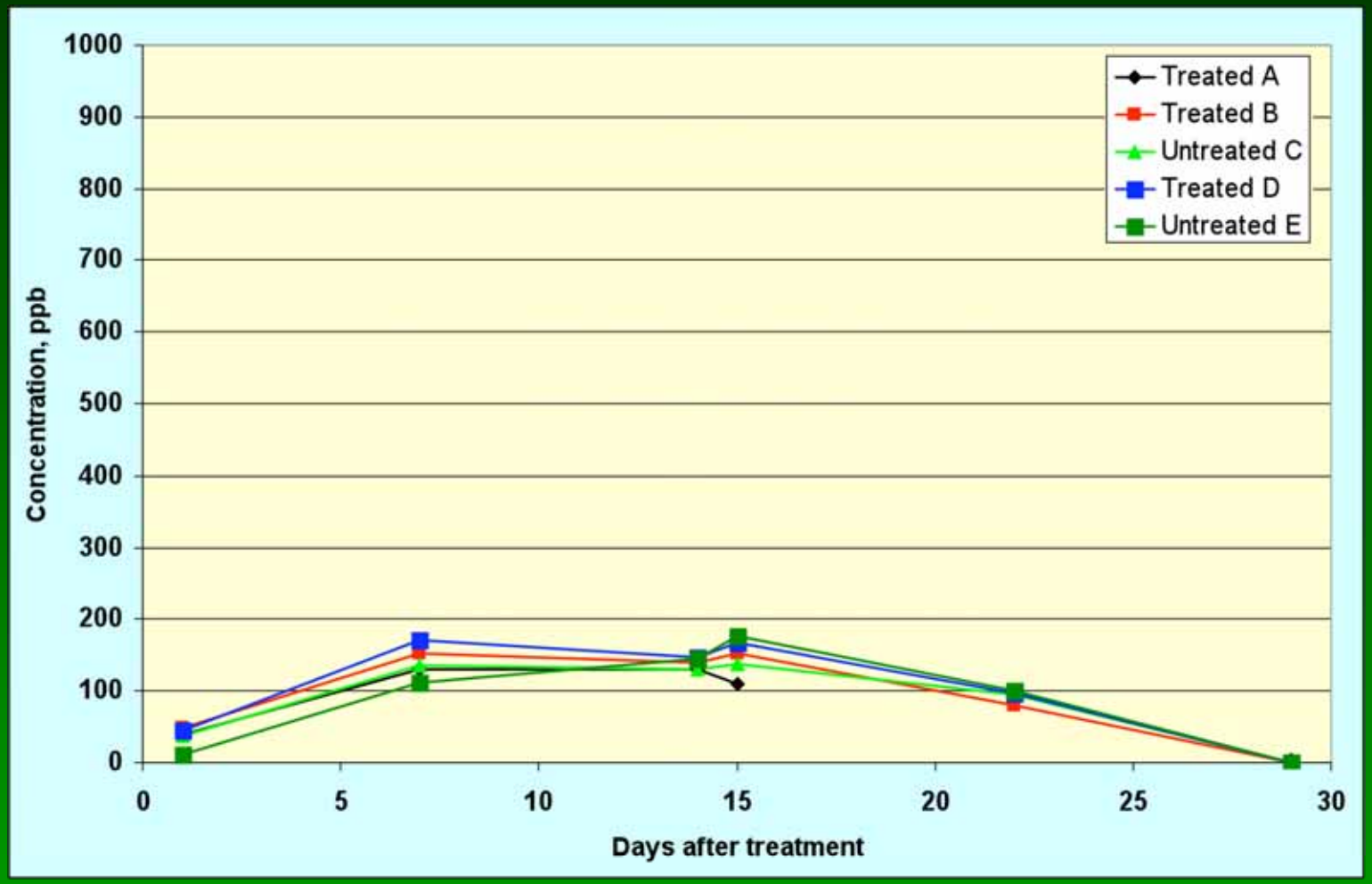
111 acres



Eurasian watermilfoil
2007-2008 Percent Occurrence



2008 Residue data



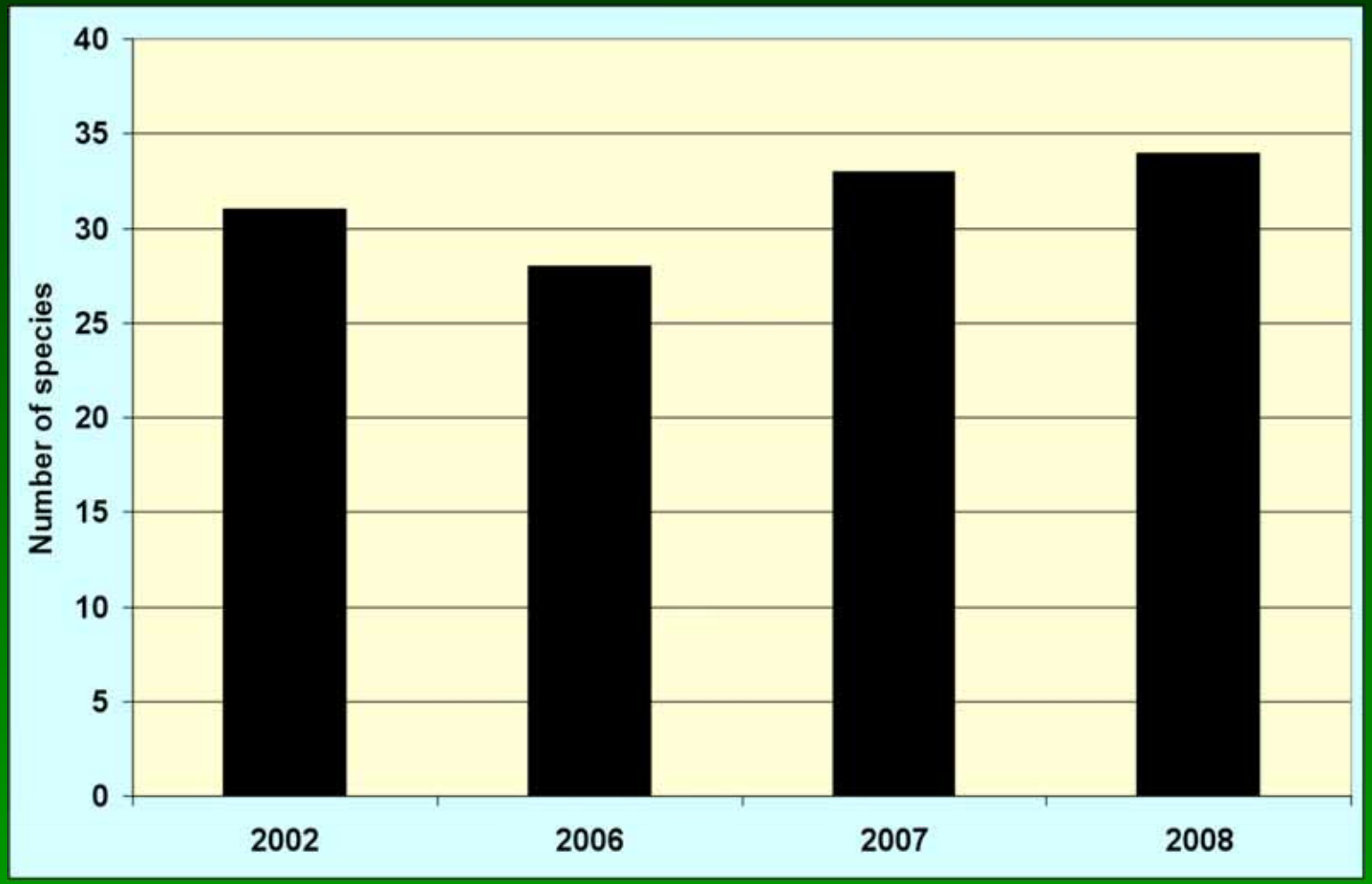
Eurasian watermilfoil, Sept 2008 fall treatment

US Army Corps of Engineers

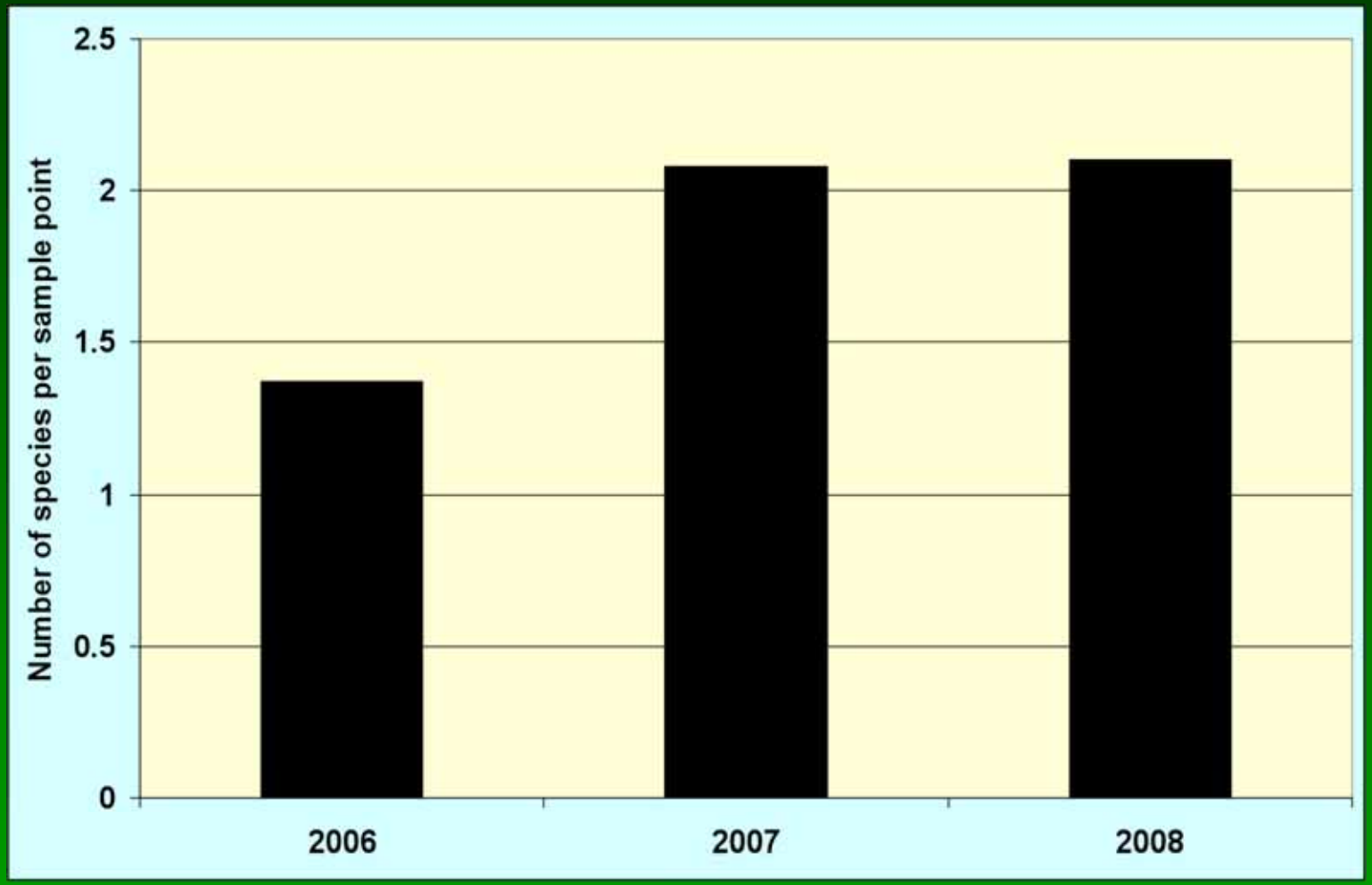
Engineer Research and Development Center

2008 fall treatment
< 5 acres

Total native plant species



Native plant species per sample point



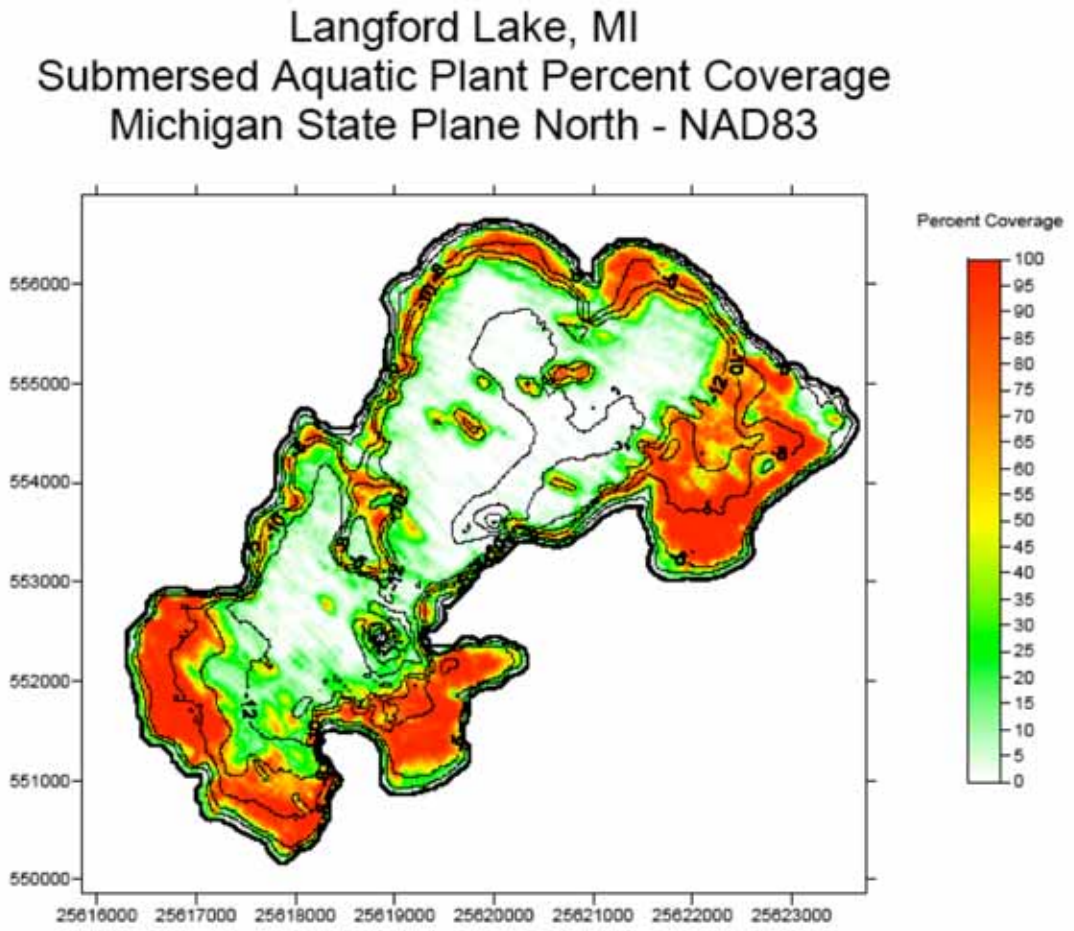
2007 Plant Coverage
hydro acoustic survey

Jim

Kanneberg

Marine

Biochemist



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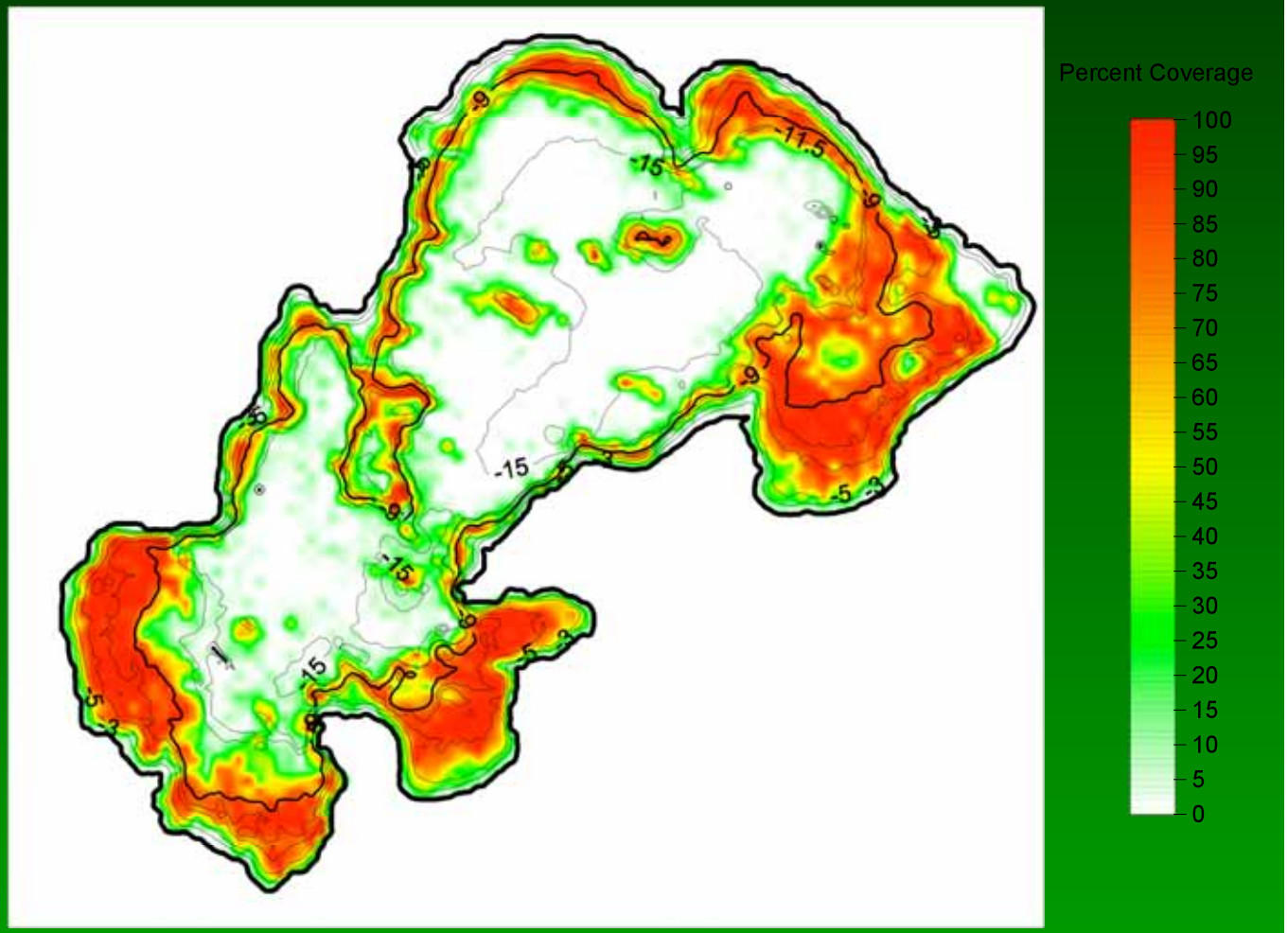
2008 Plant Coverage
hydro acoustic survey

Jim Kanneberg

Marine Biochemist



US Army Corps of Engineers

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Selective early spring control of Eurasian watermilfoil, liquid 2,4-D
Tomahawk and Sandbar Lakes, Bayfield Co.

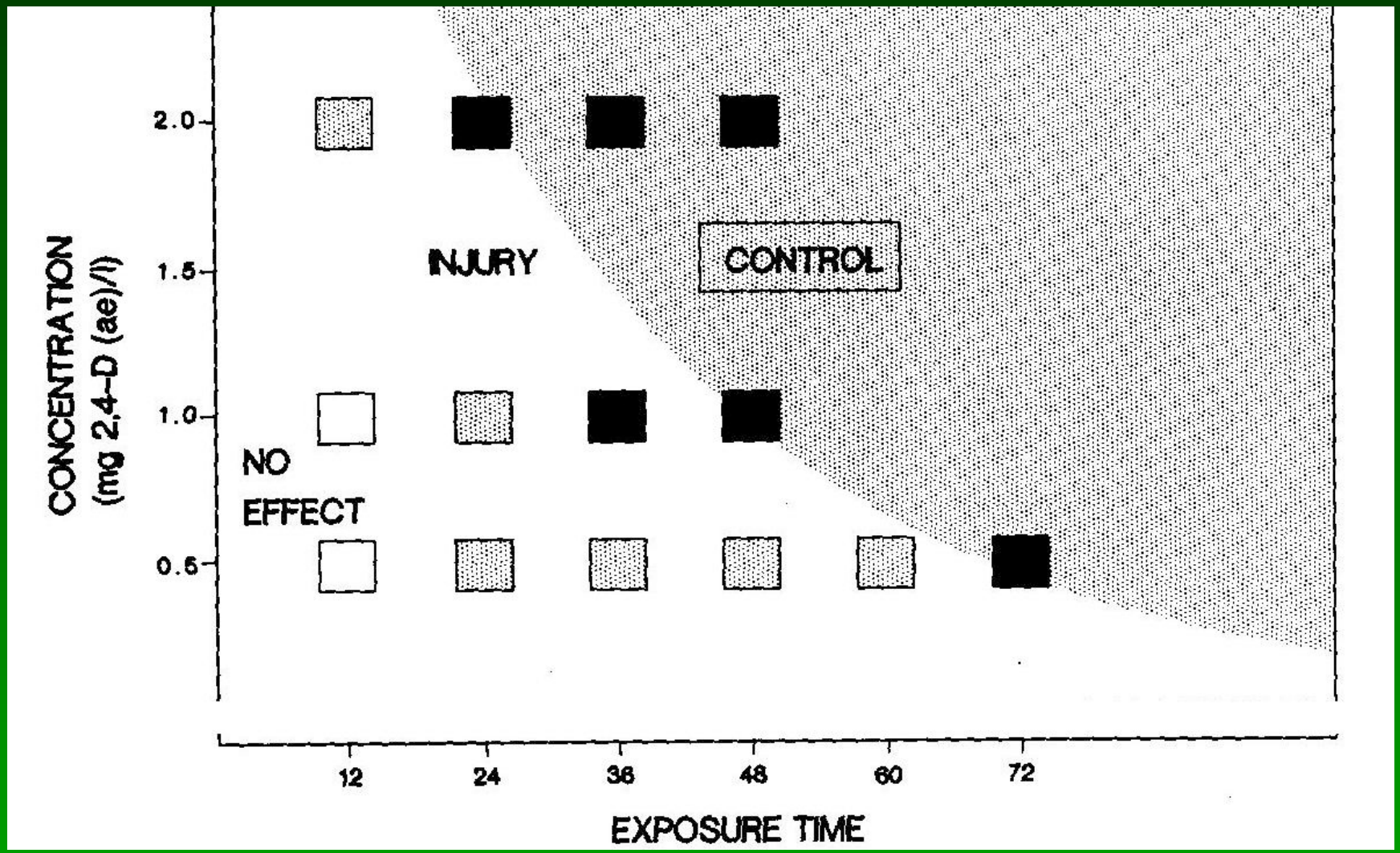
- WI Department of Natural Resources
- US Army Corps of Engineers
- Town of Barnes
- Volunteers

Field Demonstrations
Tomahawk and Sandbar Lakes

Approach

- Long term, whole lake management of aquatic plant communities (5 year study)
- Apply low dose 2,4-D (0.5 mg/L ai) to entire lake in early spring, 2008
- Follow up maintenance treatments, 2009-
- Collect pre treatment data 2007
- Evaluate plant community density and diversity

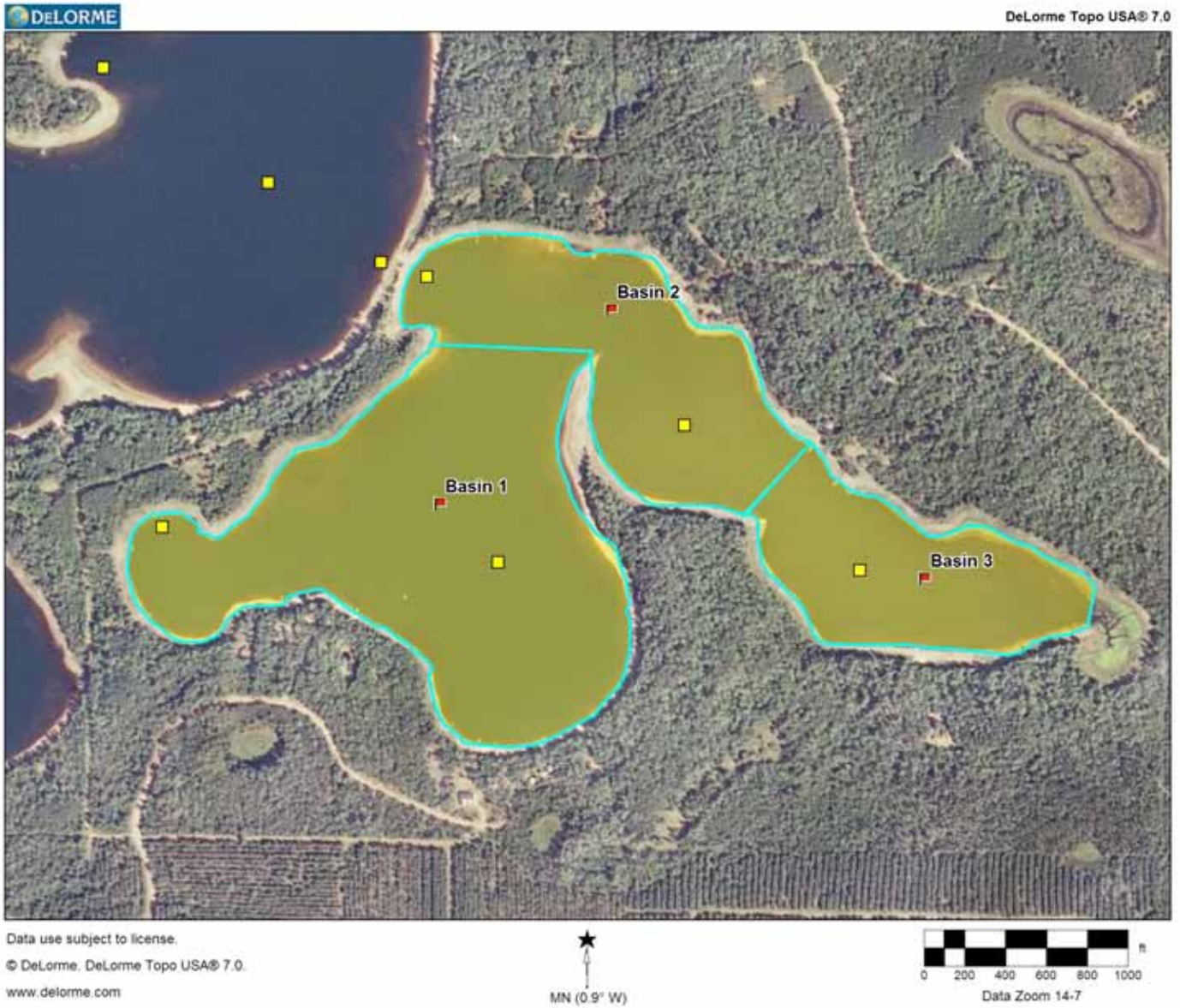
Concentration/Exposure Time Relationship 2,4-D



Barnes Project
Areas Treated 2008

Tomahawk	134 acres	0.5 mg/L ae 2,4-D applied May 20
Sandbar	118 acres	untreated reference

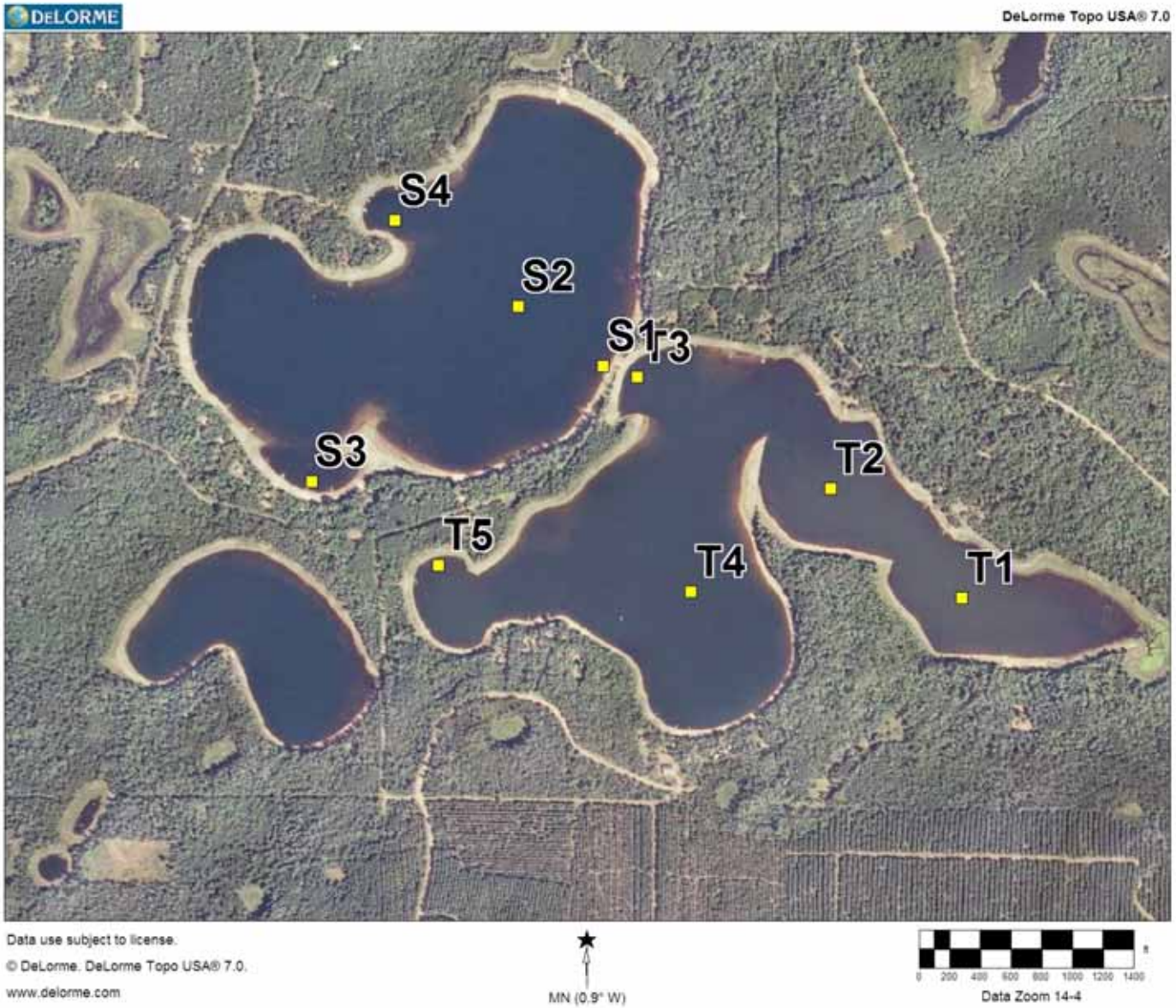
Tomahawk Treated Area



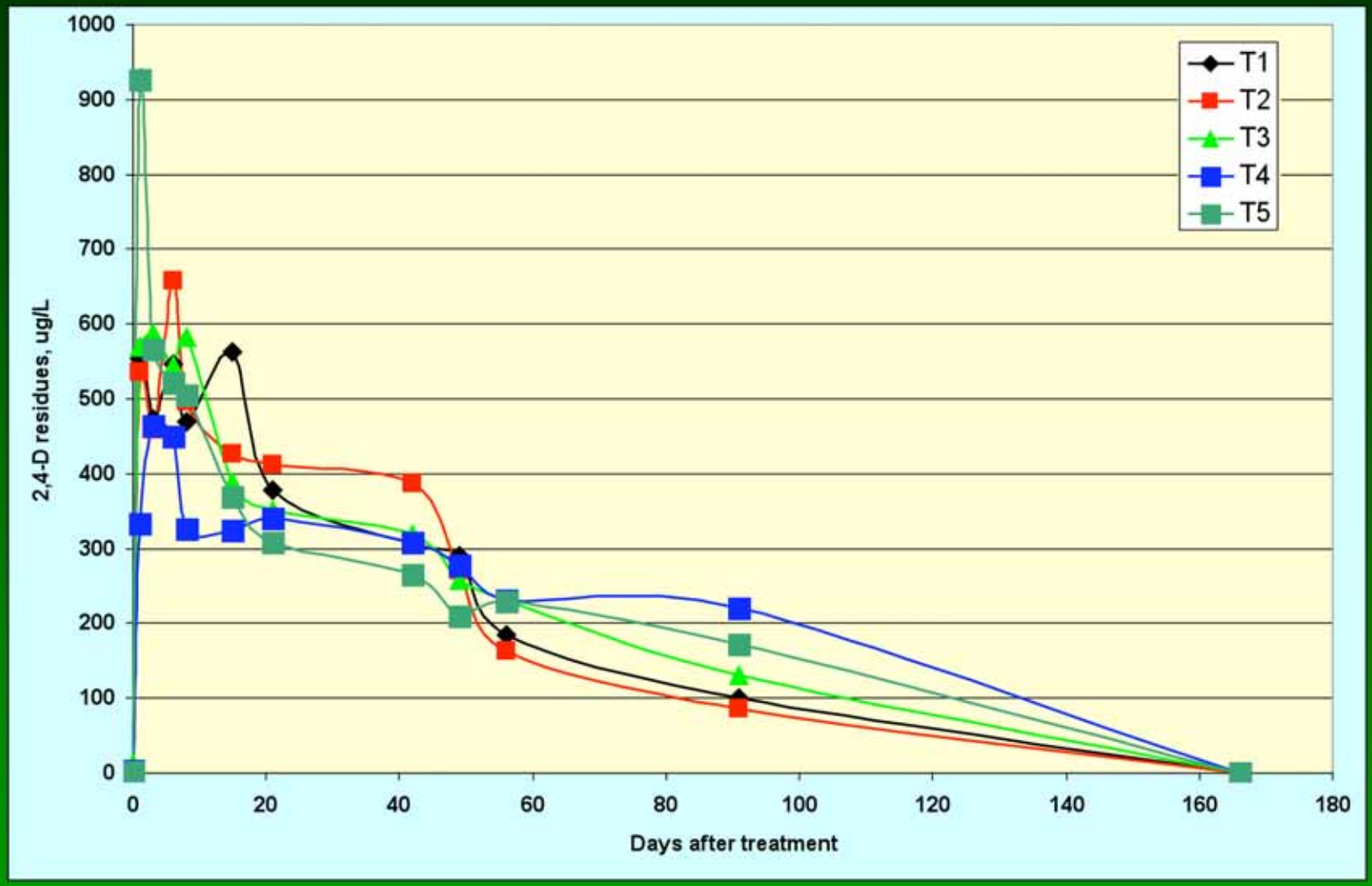
Data Collection

- 2,4-D residues
- EWM and native plant occurrence
- Plant densities, biomass and hydro acoustics

Residue Sample Locations



Tomahawk 2,4-D Residues



Sandbar and ground water residues

Sandbar Lake **NO DETECT**

Ground water **NO DETECT**

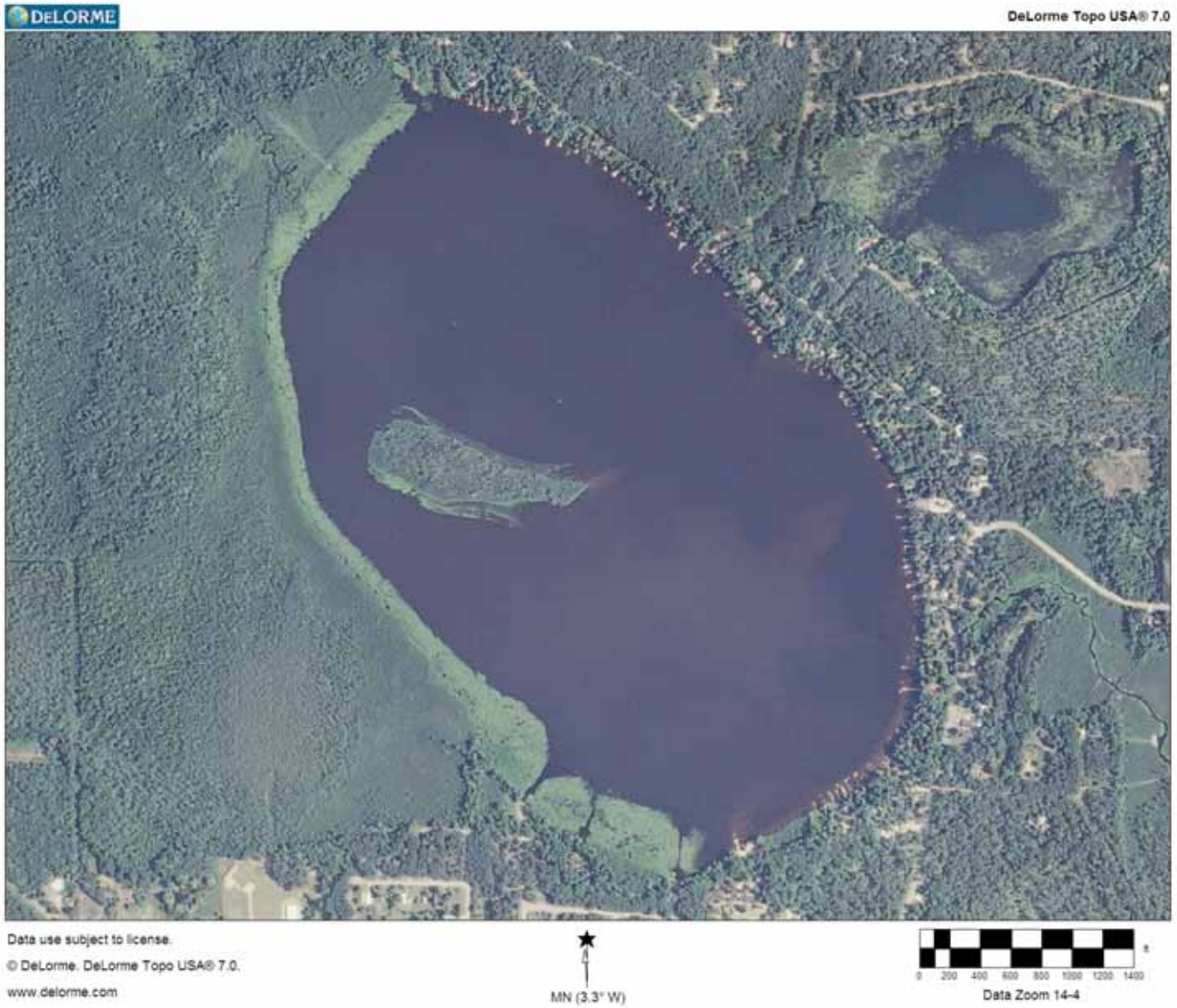
Summary of First Year Post Treatment Tomahawk Lake Plant Occurrence Data

Eurasian watermilfoil NO DETECT

Significantly reduce native plants

Loon Lake, Shawano County, WI

450 acres



Hybrid milfoil

Herbicide applications

2006 Aquathol K (1 mg/L) + 2,4-D (0.5 mg/L): 40 acres?

2007 Aquathol K (1 mg/L) + 2,4-D (0.5 mg/L): 80 acres

2008 Aquathol K (1.5 mg/L + 2,4-D (0.75 mg/L): 80 acres

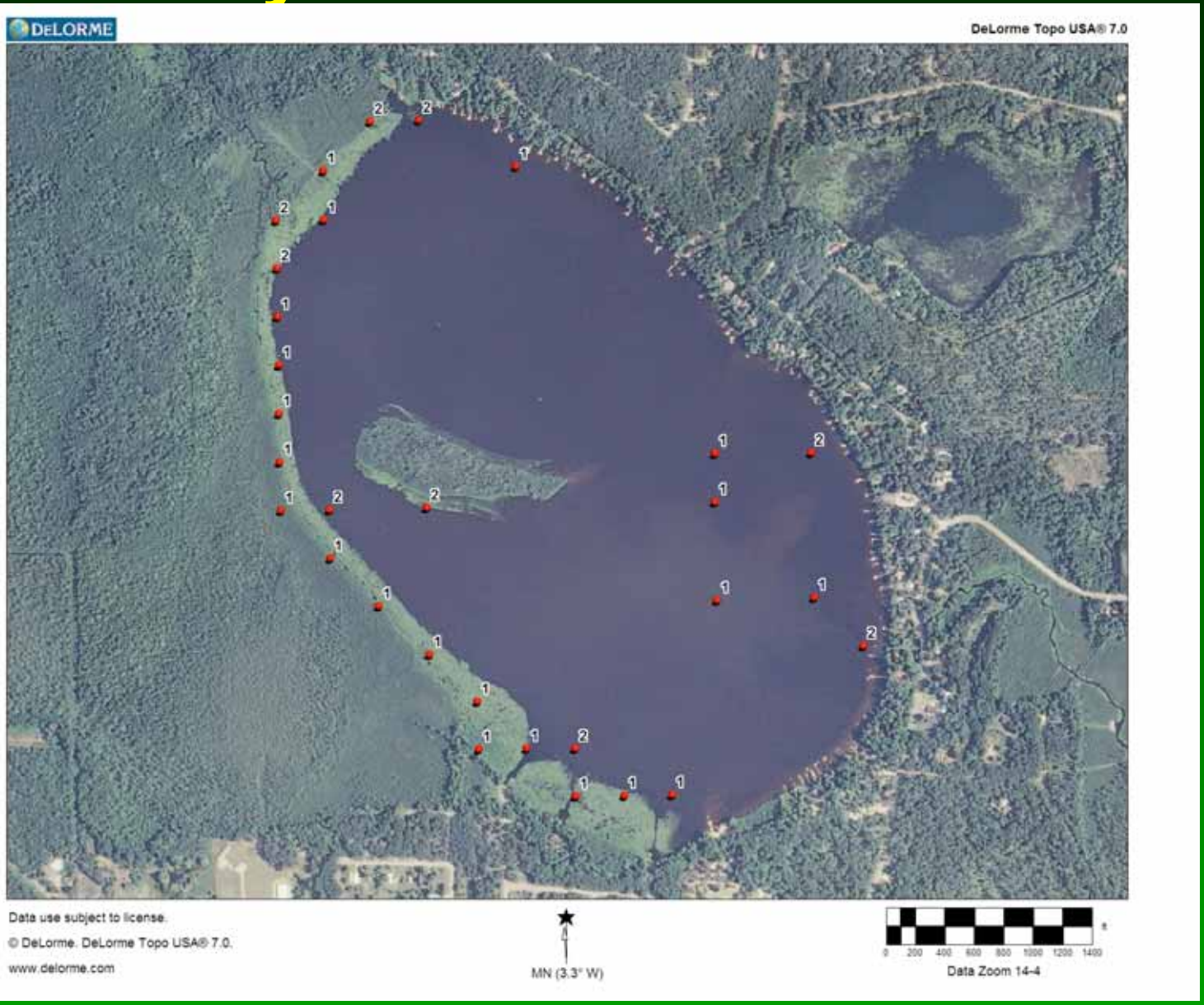
Loon Lake, Shawano County, WI hybrid milfoil occurrence

August 2008, WI DNR, 13%

October 2008, ERDC, 21%

Hybrid milfoil, recovery

Oct 2008 hybrid milfoil distribution

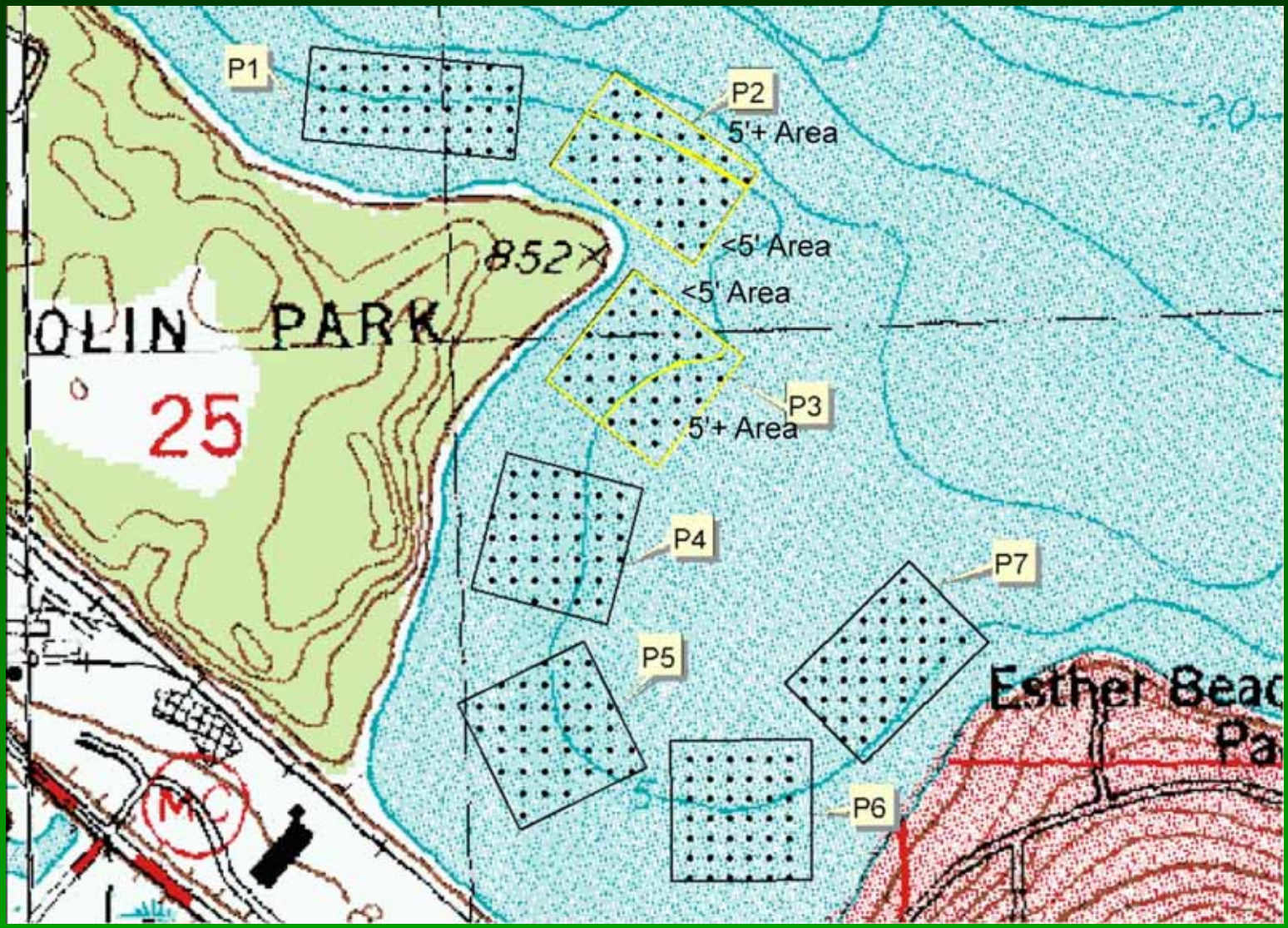


Monona Lake, Dane County, WI
Turville Bay

2,4-D Herbicide Treatments

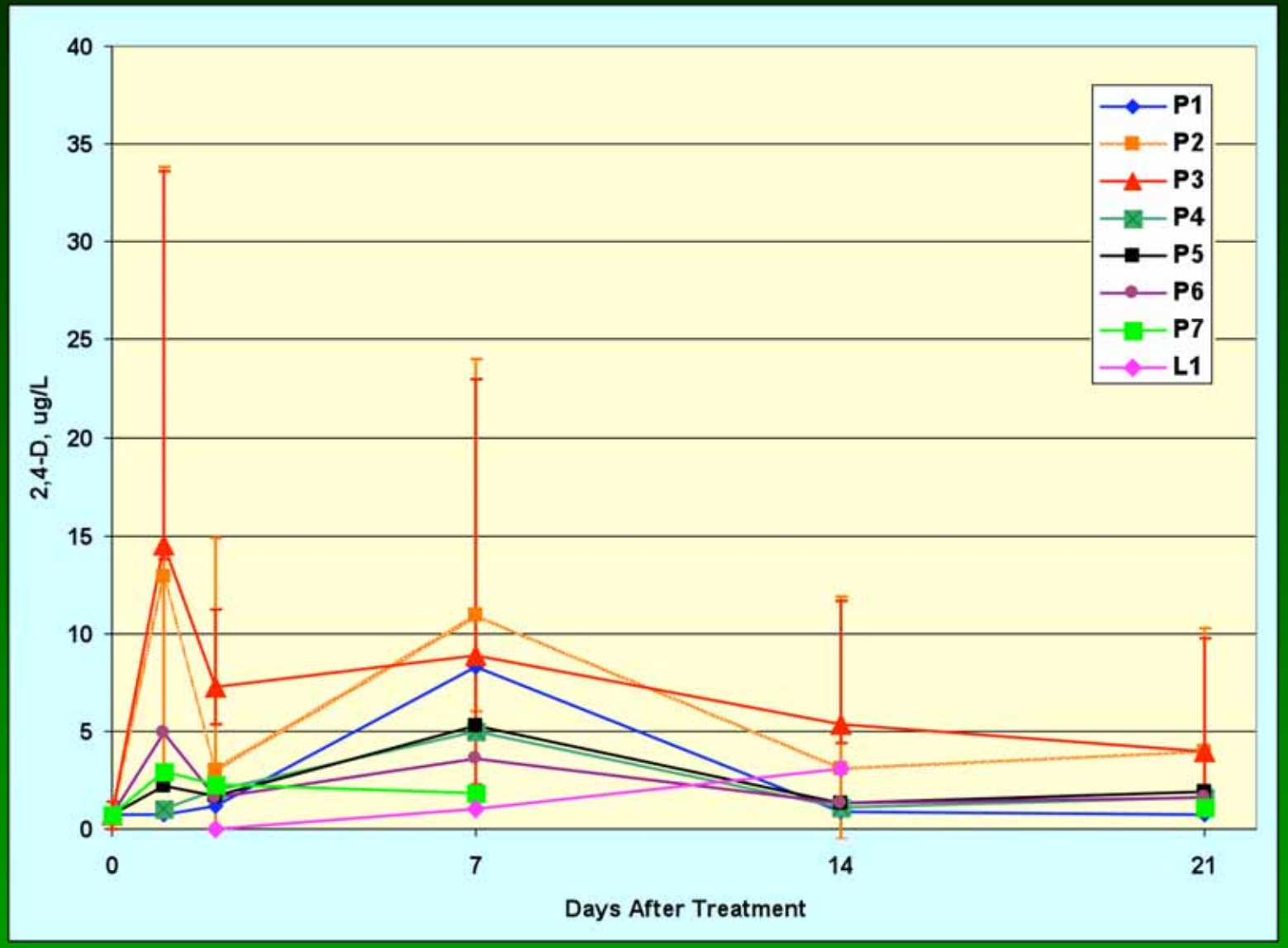
- 2, 5 acre plots (Plots P2 and P3)
- 2,4-D applied as granular Navigate 150 lbs /acre in depths > 5 ft
- 100 lbs/acre in depths < 5 ft
- Applied 23 April

Treatment Map



Water residue sample locations

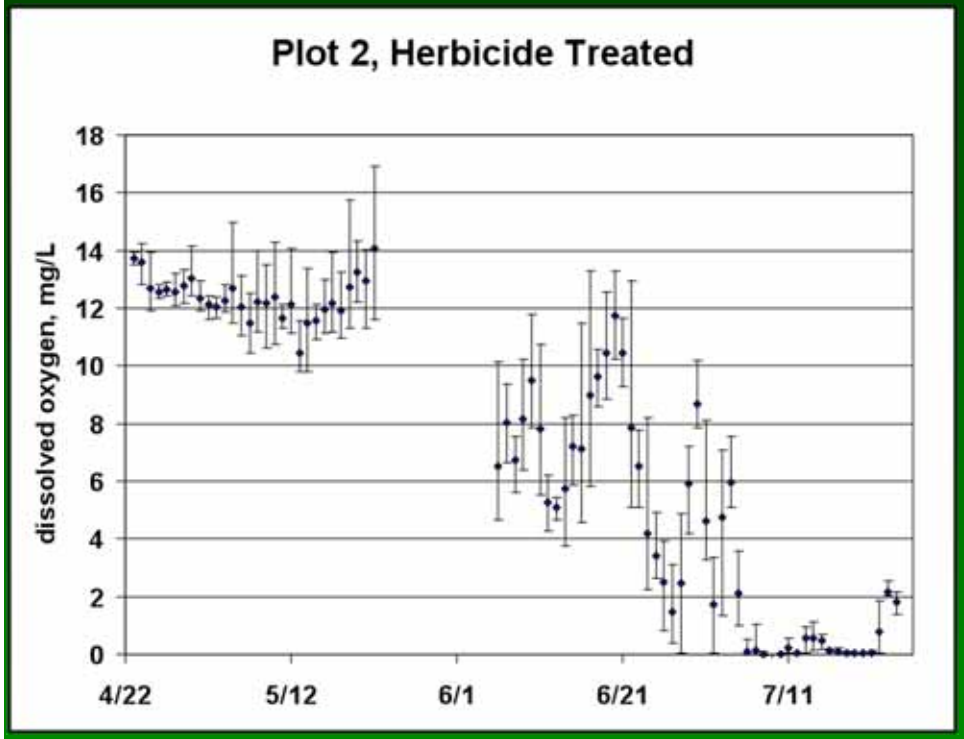
2,4-D Residue data

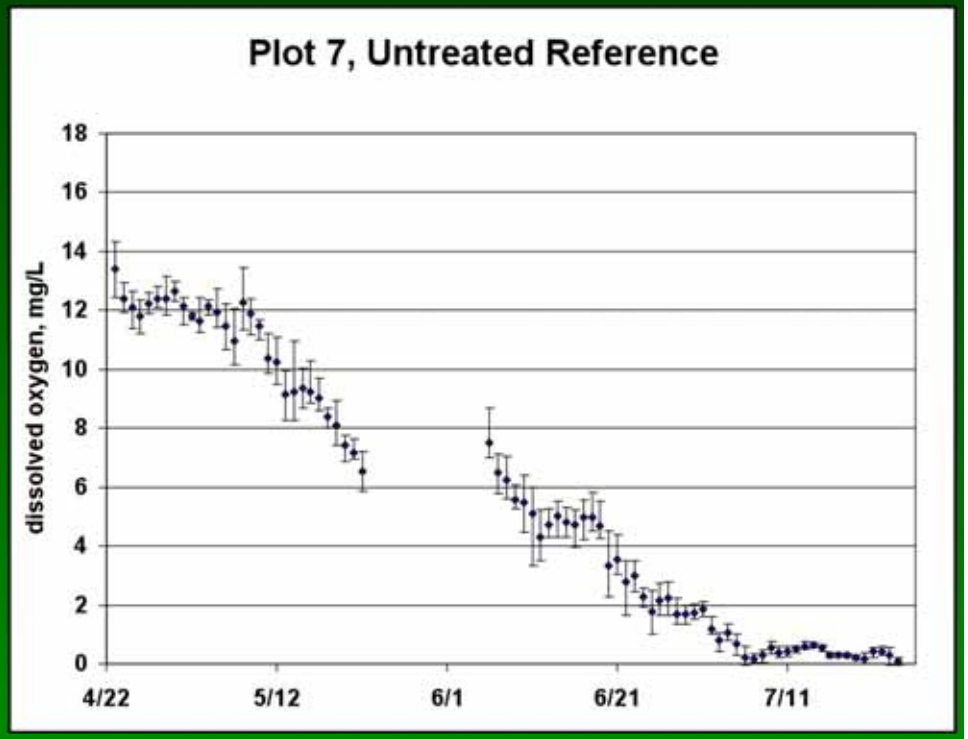


Plot P2
Eurasian watermilfoil
Nov 08

Plot P3
Eurasian watermilfoil
Nov 08

Dissolved Oxygen



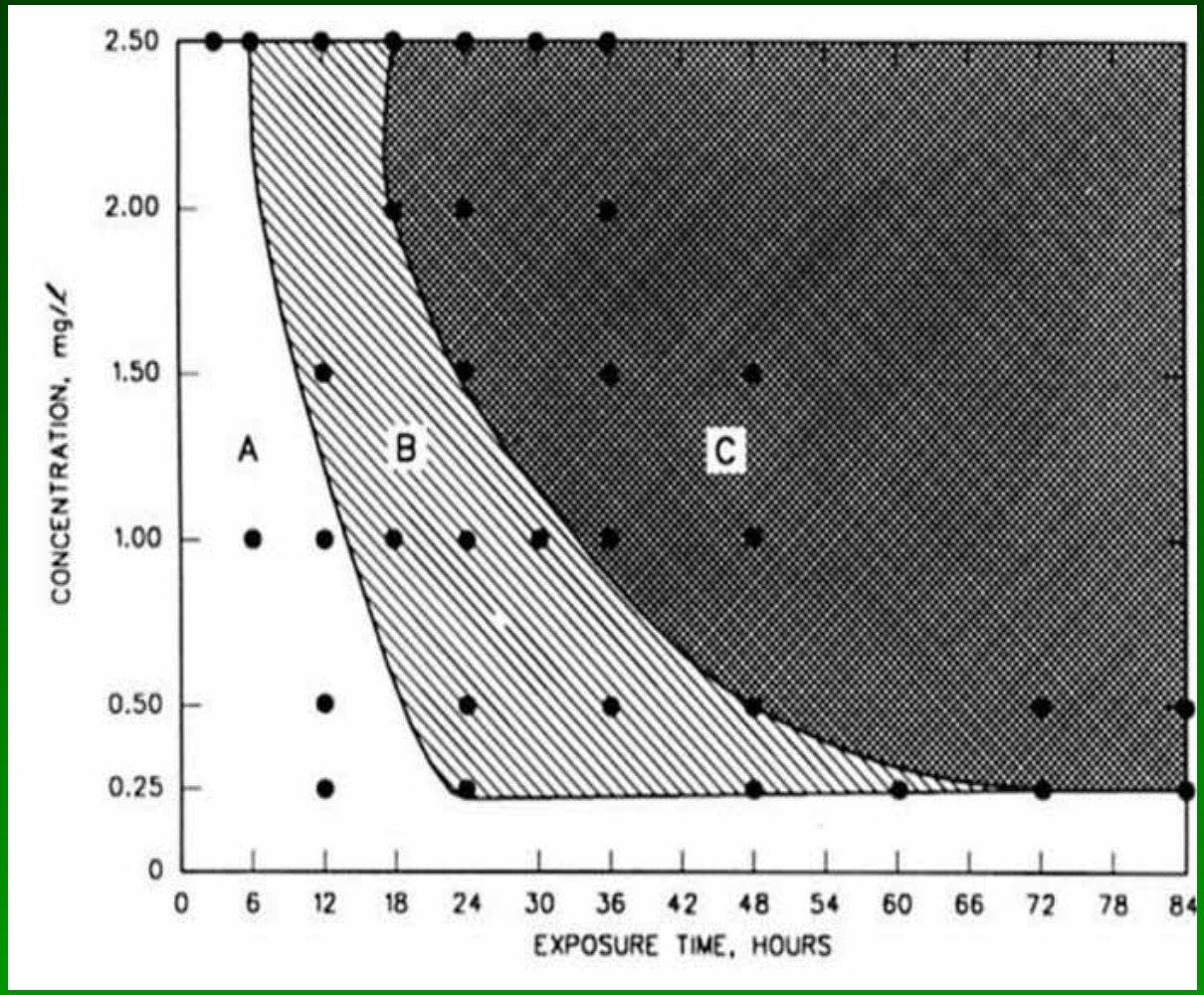


Additional Lake Projects

- Half Moon Lake, Eau Claire, WI, CLP & EWM
- Eagle Lake, Sturtevant, WI, CLP & EWM
- Lake Minnetonka, MN, CLP & EWM
- Vilas County, WI
- Kettle Moraine Lake, WI

Concentration/Exposure Time Relationship endothall (Aquathol K)

- Degradation vs dissipation
- Project scale



J. Aquat. Plant Manage 30: 1-5

Herbicide Selectivity

- Concentration, Exposure Time
- Species sensitivity