# Public Meeting to Discuss 2015 Herbicide Permit Application for Silver Lake, Kenosha County

Presented on March 26, 2015 by:

Mark Kordus, Project Manager

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# *Purpose of the Meeting*

- Provide of an overview of where we have been
- What the options are moving forward
- What we are proposing and why
- Permitting process and timelines
- Answer any questions

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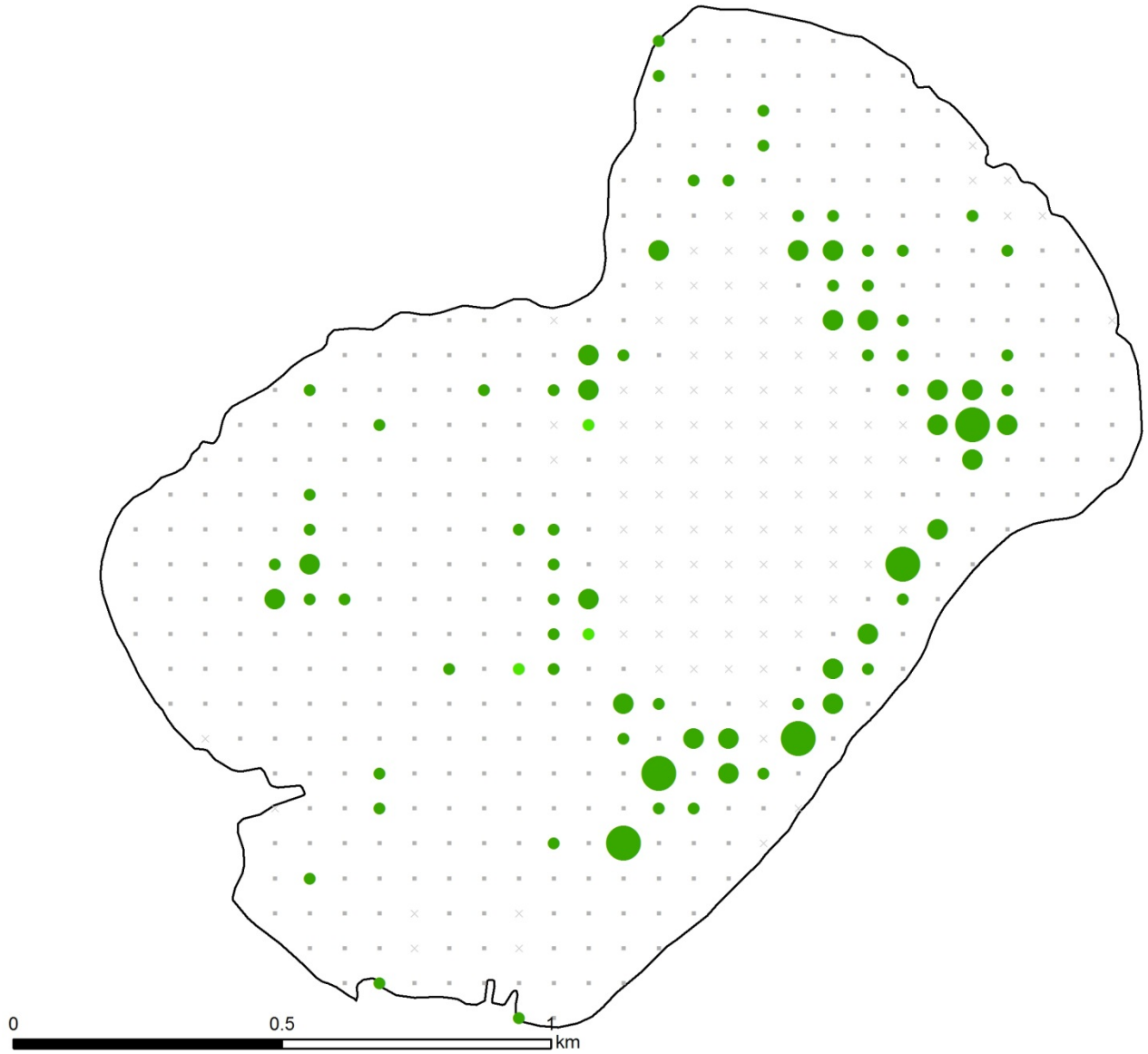
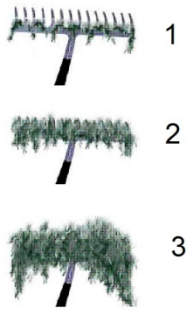
# Silver Lake, Kenosha Co.
## 6/7 - 6/8/2006 (WDNR Research)




**Eurasian (Hybrid) Watermilfoil**
Rake Fullness Rating

- No EWM
- 1
- 2
- 3
- Visual
- Not Sampled

Illustration of Rake Fullness Rating

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# Silver Lake, Kenosha Co.

## 9/11/2012 (Lake & Pond)


**Eurasian (Hybrid) Watermilfoil**

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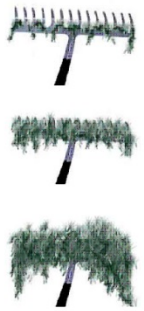
Illustration of Rake Fullness Rating

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Created: 09-26-2013

For questions or comments about the content of this map, please contact: DNRBaselineAquaticPlants@wisconsin.gov

# 2013 Whole Lake Treatment

- The invasive plants in the lake were confirmed as hybrid water milfoil, a cross between the invasive Eurasian water-milfoil and the native northern water-milfoil
- In May of 2013 a whole lake treatment using 2,4-D was completed, the first and only large scale treatment ever on Silver Lake
- The treatment was dosed at 350 PPB and calculated using the entire volume of water in the lake
- There was about 60% "control" of the target plant in year of treatment
- Most areas had regrowth by 2014

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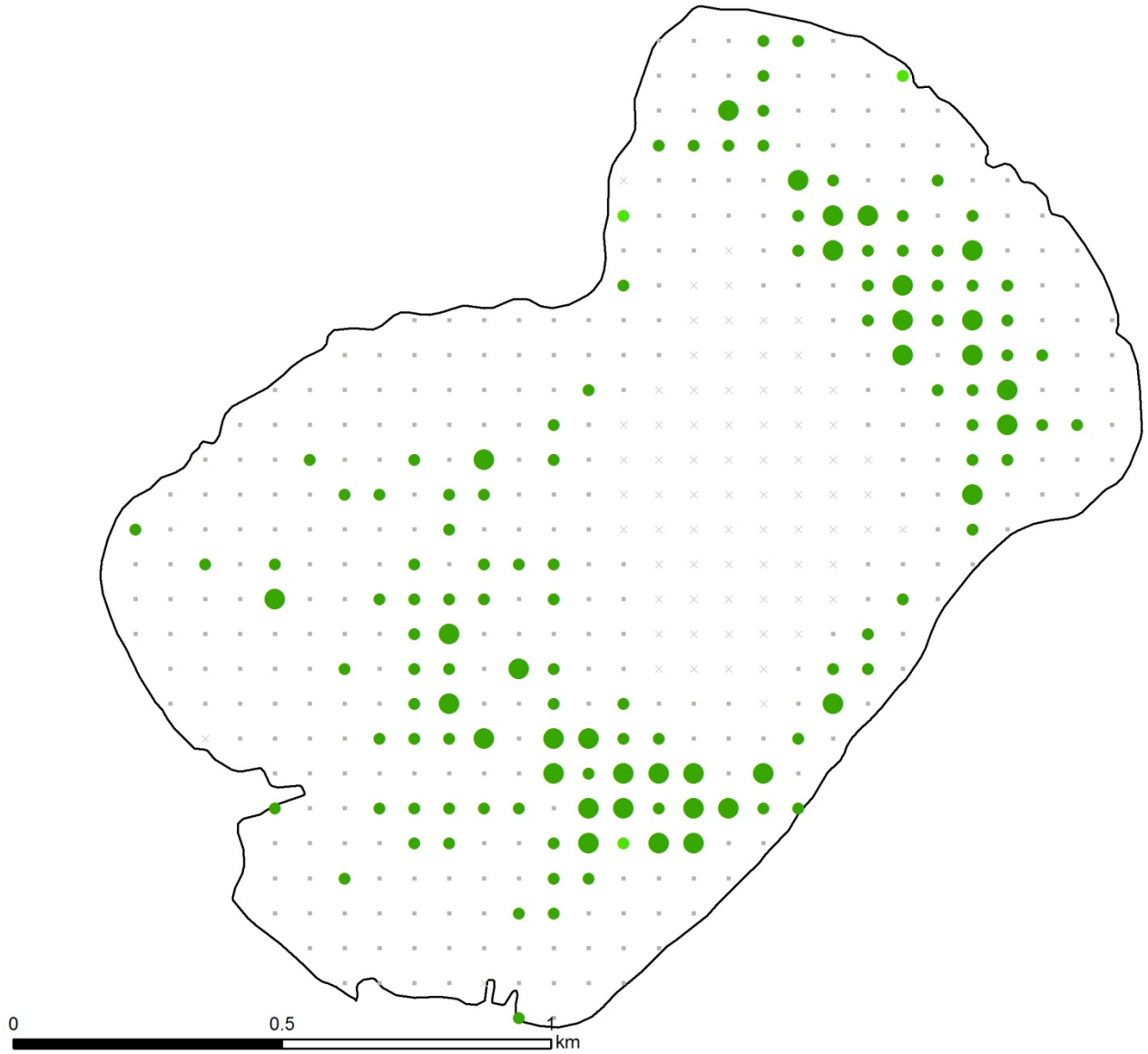
# Silver Lake, Kenosha Co.

## 9/3/2013 (WDNR Research)




**Eurasian (Hybrid) Watermilfoil**

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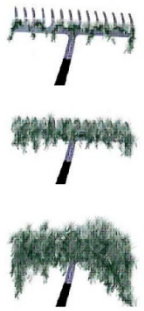
Illustration of Rake Fullness Rating

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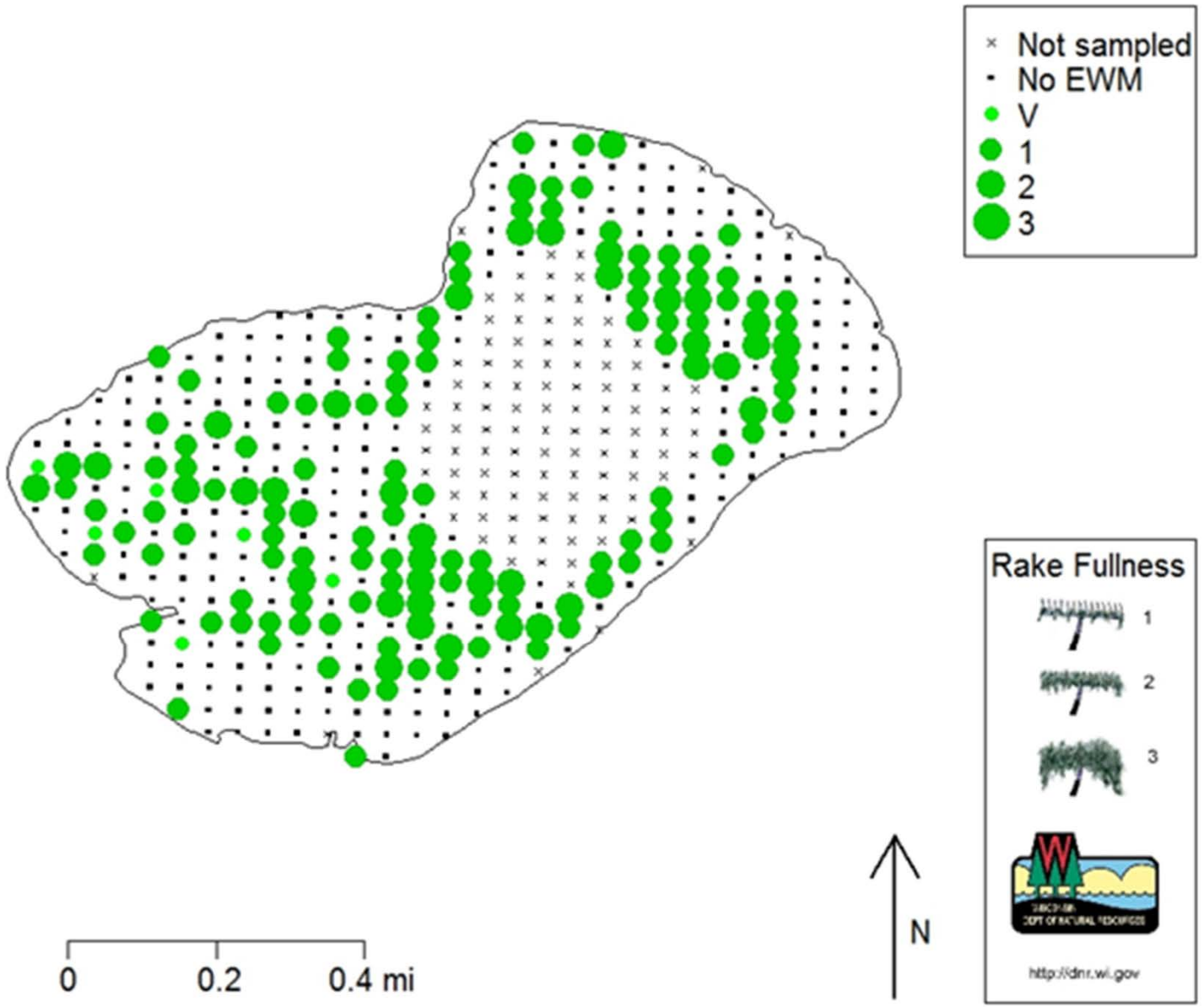
# Silver Lake, Kenosha Co., August 27, 2014



| Species | 2014 v 2006 | | | 2014 v 2012 | | | 2014 v 2013 | | |
|---|---|---|---|---|---|---|---|---|---|
| | P-value | Significance | + / - | P-value | Significance | + / - | P-value | Significance | + / - |
| Eurasian water-milfoil | 2.91605E-08 | *** | ↑ | 0.000188356 | *** | ↓ | 0.027083901 | * | ↑ |
| Curly-leaf pondweed | 0.049459398 | * | ↓ | --- | --- | --- | 0.340969524 | n.s. | ↓ |
| Filamentous algae | 2.12189E-15 | *** | ↓ | 0.320591634 | n.s. | ↑ | 0.818908373 | n.s. | ↓ |
| Watershield | 0.326878168 | n.s. | ↓ | --- | --- | --- | --- | --- | --- |
| Coontail | 9.38026E-08 | *** | ↑ | 0.003476289 | ** | ↑ | 0.619083636 | n.s. | ↑ |
| Muskgrass | 0.087155817 | n.s. | ↑ | 1.54093E-13 | *** | ↑ | 6.57896E-06 | *** | ↑ |
| Common waterweed | 0.076534282 | n.s. | ↑ | 0.211187471 | n.s. | ↑ | 0.575253465 | n.s. | ↑ |
| Water star-grass | 0.375920583 | n.s. | ↓ | 0.584337951 | n.s. | ↓ | 0.741466867 | n.s. | ↑ |
| Small duckweed | --- | --- | --- | 0.374769621 | n.s. | ↓ | --- | --- | --- |
| Purple loosestrife | --- | --- | --- | 0.011715855 | * | ↓ | --- | --- | --- |
| Northern water-milfoil | 4.44273E-08 | *** | ↓ | --- | --- | --- | --- | --- | --- |
| Whorled water-milfoil | --- | --- | --- | 0.374769621 | n.s. | ↓ | --- | --- | --- |
| Slender naiad | 0.000565207 | *** | ↓ | 0.001511544 | ** | ↓ | 0.001836643 | ** | ↓ |
| Southern naiad | 2.26428E-15 | *** | ↑ | 2.76481E-18 | *** | ↑ | 0.766381281 | n.s. | ↓ |
| Spiny naiad | 0.000775983 | *** | ↑ | 0.001770275 | ** | ↑ | 0.348103878 | n.s. | ↓ |
| Nitella | 0.001818742 | ** | ↓ | 0.011715855 | * | ↓ | --- | --- | --- |
| Spatterdock | 0.163919455 | n.s. | ↑ | 0.732855329 | n.s. | ↑ | 0.608798843 | n.s. | ↑ |
| White water lily | 0.138923262 | n.s. | ↑ | 0.078851835 | n.s. | ↓ | 0.638727249 | n.s. | ↑ |
| Common reed | --- | --- | --- | 0.12378175 | n.s. | ↓ | --- | --- | --- |
| Pickerelweed | 0.587022815 | n.s. | ↓ | 0.005057868 | ** | ↓ | 0.94404766 | n.s. | ↑ |
| Leafy pondweed | 0.165316341 | n.s. | ↓ | --- | --- | --- | --- | --- | --- |
| Frie's pondweed | 0.193453588 | n.s. | ↓ | 0.277567914 | n.s. | ↓ | 0.21635206 | n.s. | ↓ |
| Variable pondweed | 0.002873418 | ** | ↑ | 0.000168102 | *** | ↑ | 0.04333984 | * | ↑ |
| Illinois pondweed | 0.022132252 | * | ↓ | 9.52733E-18 | *** | ↑ | 1.97078E-10 | *** | ↑ |
| Floating-leaf pondweed | --- | --- | --- | 0.374769621 | n.s. | ↓ | 0.340969524 | n.s. | ↓ |
| Long-leaf pondweed | 0.163919455 | n.s. | ↑ | 0.171638633 | n.s. | ↓ | 0.22261958 | n.s. | ↓ |
| White-stem pondweed | 0.148396032 | n.s. | ↑ | 0.082149683 | n.s. | ↓ | 0.505957537 | n.s. | ↑ |
| Small pondweed | 0.049459398 | * | ↓ | --- | --- | --- | --- | --- | --- |
| Clasping-leaf pondweed | 0.813795846 | n.s. | ↓ | 0.011471259 | * | ↑ | 0.372035694 | n.s. | ↓ |
| Flat-stem pondweed | 0.148396032 | n.s. | ↑ | 0.110468261 | n.s. | ↑ | 0.505957537 | n.s. | ↑ |
| Common arrowhead | --- | --- | --- | 0.374769621 | n.s. | ↓ | --- | --- | --- |
| Hardstem bulrush | 0.307125467 | n.s. | ↑ | 0.25933707 | n.s. | ↑ | 0.293054625 | n.s. | ↑ |
| Three-square bulrush | --- | --- | --- | --- | --- | --- | 0.340969524 | n.s. | ↓ |
| Softstem bulrush | 0.326878168 | n.s. | ↓ | 0.003068436 | ** | ↓ | --- | --- | --- |
| Sago pondweed | 0.160994029 | n.s. | ↑ | 0.04573101 | * | ↑ | 0.877236974 | n.s. | ↓ |
| Narrow-leaved cattail | --- | --- | --- | 0.001973114 | ** | ↓ | --- | --- | --- |
| Small bladderwort | 0.326878168 | n.s. | ↓ | --- | --- | --- | --- | --- | --- |
| Small purple bladderwort | 0.277931416 | n.s. | ↓ | 0.110468261 | n.s. | ↑ | 0.920838358 | n.s. | ↑ |
| Common bladderwort | 0.163919455 | n.s. | ↑ | 0.26251395 | n.s. | ↑ | 0.608798843 | n.s. | ↑ |
| Common watermeal | --- | --- | --- | 0.209137281 | n.s. | ↓ | --- | --- | --- |
| Wild celery | 4.45015E-13 | *** | ↑ | 5.59743E-12 | *** | ↑ | 0.00286143 | ** | ↑ |
| Illinois pondweed hybrid | --- | --- | --- | 5.22049E-20 | *** | ↓ | 4.5084E-13 | *** | ↓ |

* - somewhat significant change, ** - moderatly significant change, *** - very significant change

# Herbicide Types

- Systemic or auxin growth regulator (2,4-D & triclopyr)absorbed by plant 2-3 weeks to see effects on their own not always effective on HWM
- Contact (diquat or endothall)as name suggests works quickly through direct contact, can be combined with an auxin herbicide for effective and selective control of HWM
- Chlorophyll pigment inhibitor (fluridone) requires long contact times 60-90+ days, absorbed through photosynthesis process and inhibits the product of chlorophyll killing the plant from the inside out, PlanTest herbicide resistance testing showed HWM in Silver Lake are susceptible

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# Toxicity LD-50

| Product | Oral $LD_{50}$(mg/kg) | Usage |
|---|---|---|
| Nicotine | 50 | Personal choice |
| Caffeine | 140 | Personal choice |
| Hot sauce (capsaicin) | 161 | Food seasoning |
| Bleach (sodium hypochlorite) | 192 | Household cleaner |
| Aspirin | 200 | Medication |
| **Endothall** | **233** | **Herbicide** |
| Naproxen sodium | 248 | Medication |
| Cinnamon | 275 | Food seasoning |
| Diphenhydramine HCl | 500 | Antihistamine |
| **Diquat** | **866** | **Herbicide** |
| Pink bismuth (bismuth subsalicylate) | 1,200 | Medication |
| Vitamin A | 1,510 | Vitamin |
| **Triclopyr** | **1847** | **Herbicide** |
| Acetaminophen | 1944 | Medication |
| Vitamin C | 2,000 | Vitamin |
| **Topramezone** | **>2,000** | **Herbicide** |
| Table Salt | 3,000 | Food seasoning |
| **2,4-D** | **3,129** | **Herbicide** |
| Vinegar (Acetic Acid) | 3,310 | Food seasoning, household cleaner |
| **Bispyribac-sodium** | **4,077** | **Herbicide** |
| **Carfentrazone** | **>5,000** | **Herbicide** |
| **Flumioxazin** | **>5,000** | **Herbicide** |
| **Fluridone** | **>5,000** | **Herbicide** |
| **Glyphosate** | **>5,000** | **Herbicide** |
| **Imazamox** | **>5,000** | **Herbicide** |
| **Imazapyr** | **>5,000** | **Herbicide** |
| Nail Polish Remover | >5,000 | Beauty product |
| **Penoxsulam** | **>5,000** | **Herbicide** |

David G. Petty (dpetty@ndrsite.com) is a research scientist and owner of NDR Research in Plainville, Indiana.

| Species | Expected Impact Year of Treatment | |
|---|---|---|
| | Fluridone @ 4 ppb for 90+ days | 2,4-D & endothall @ 0.3 / 0.7 ppm |
| Eurasian water-milfoil | significant decrease | significant decrease |
| Filamentous algae | none | none |
| Coontail | moderate decrease | moderate decrease |
| Muskgrass | slight increase | none |
| Common waterweed | significant decrease | moderate decrease |
| Water star-grass | None | none |
| Slender naiad | significant decrease | slight decrease |
| Southern naiad | significant decrease | slight decrease |
| Spiny naiad | significant decrease | slight decrease |
| Spatterdock | slight decrease | none |
| White water lily | slight decrease | none |
| Pickerelweed | none | none |
| Frie's pondweed | slight decrease | significant decrease |
| Variable pondweed | slight decrease | moderate decrease |
| Illinois pondweed | none | moderate decrease |
| Long-leaf pondweed | slight decrease | slight decrease |
| White-stem pondweed | slight decrease | none |
| Clasping-leaf pondweed | slight decrease | significant decrease |
| Flat-stem pondweed | Slight decrease | significant decrease |
| Hardstem bulrush | none | none |
| Sago pondweed | none | significant decrease |
| Small purple bladderwort | moderate decrease | slight decrease |
| Common bladderwort | moderate decrease | slight decrease |
| Wild celery | none | moderate decrease |
| Illinois pondweed hybrid | none | moderate decrease |

# Sonar Treatment Options for Invasive Milfoil Control

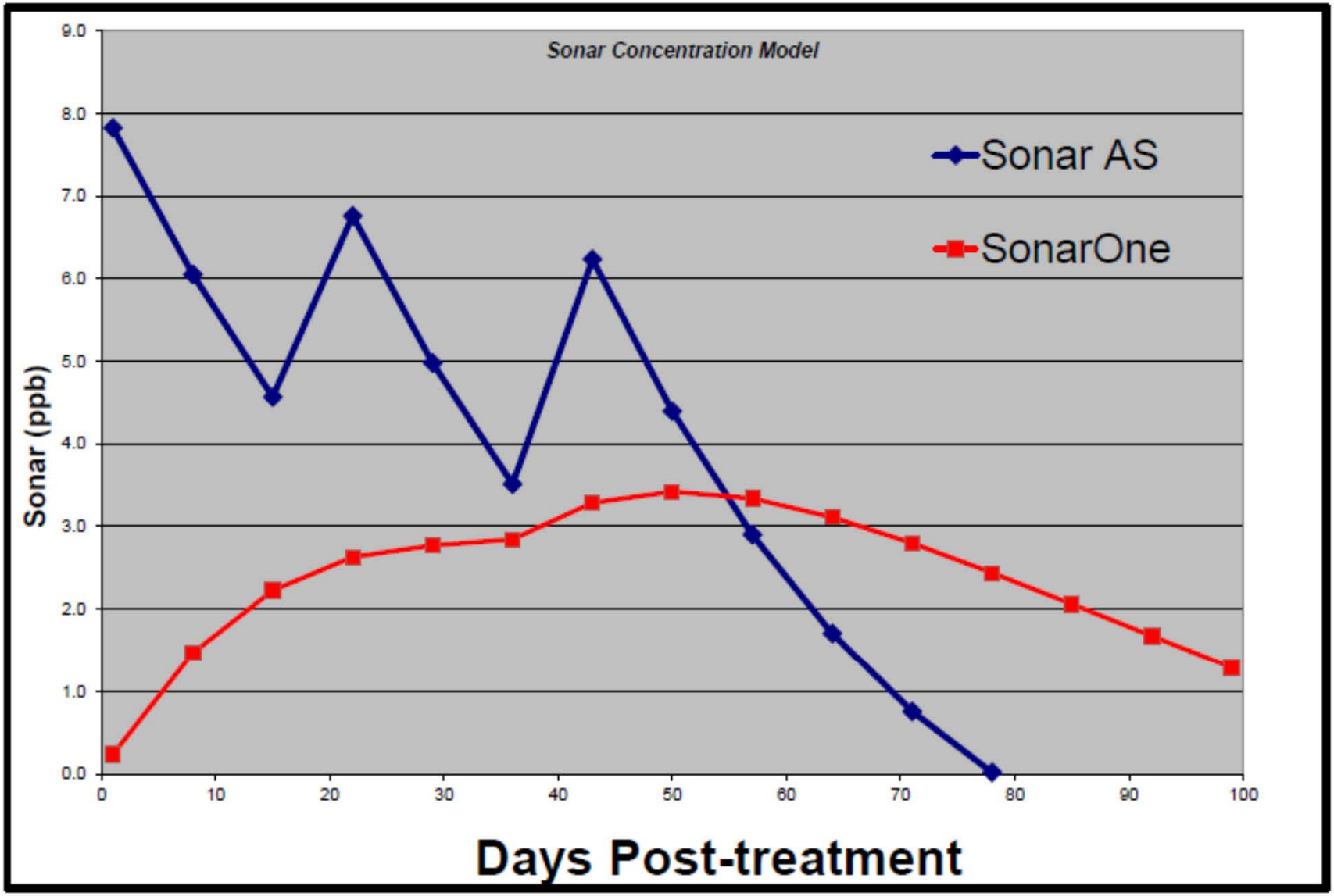
## Sonar liquid

- Application rates calculated on lakewide water volume or epilimnion in stratified waters
- Initial application rate, 6-8 ppb
- Sonar immediately available for plant uptake lakewide
- Multiple bump(s) of 2-4 ppb based on FasTEST lab results

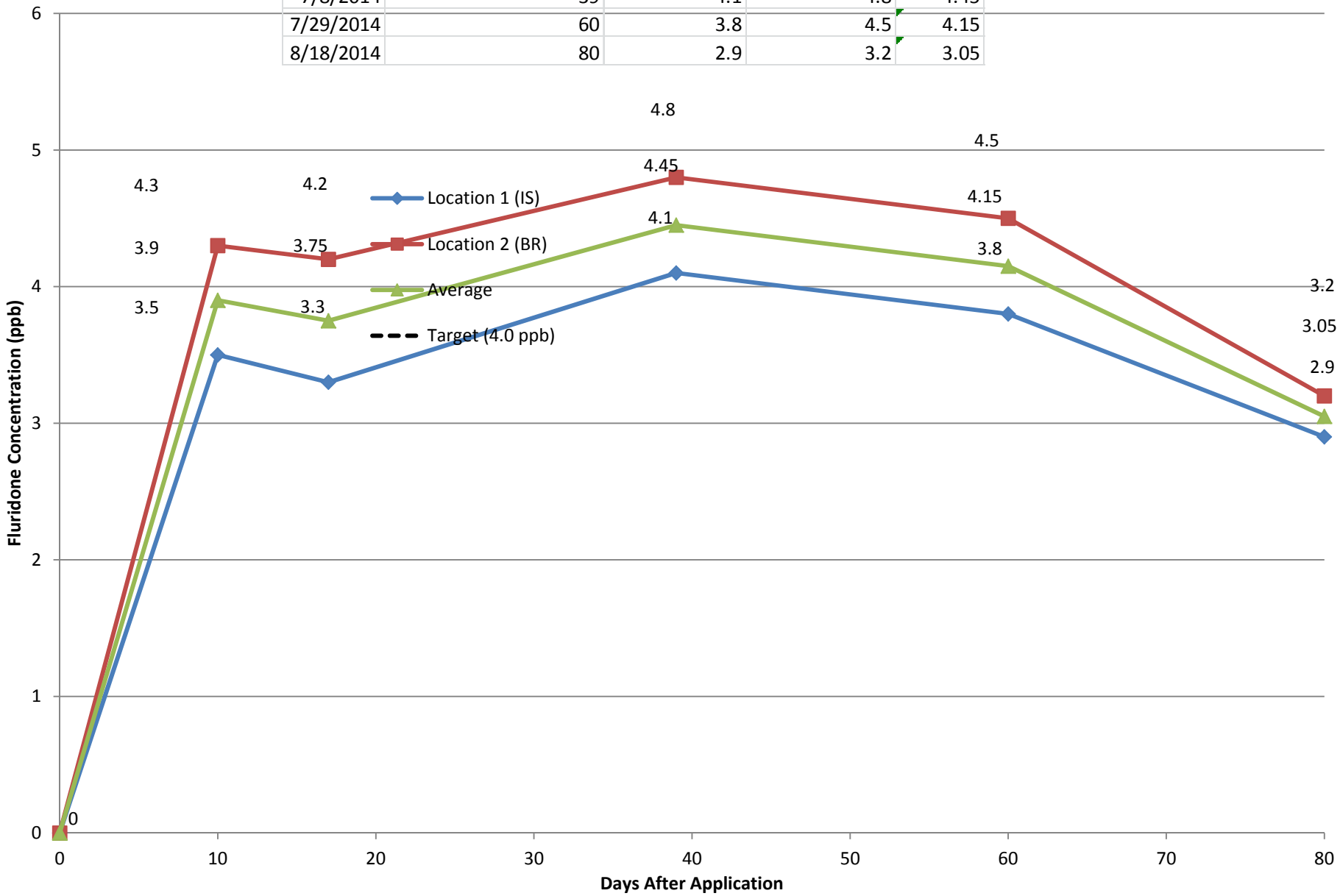
## Sonar pellets

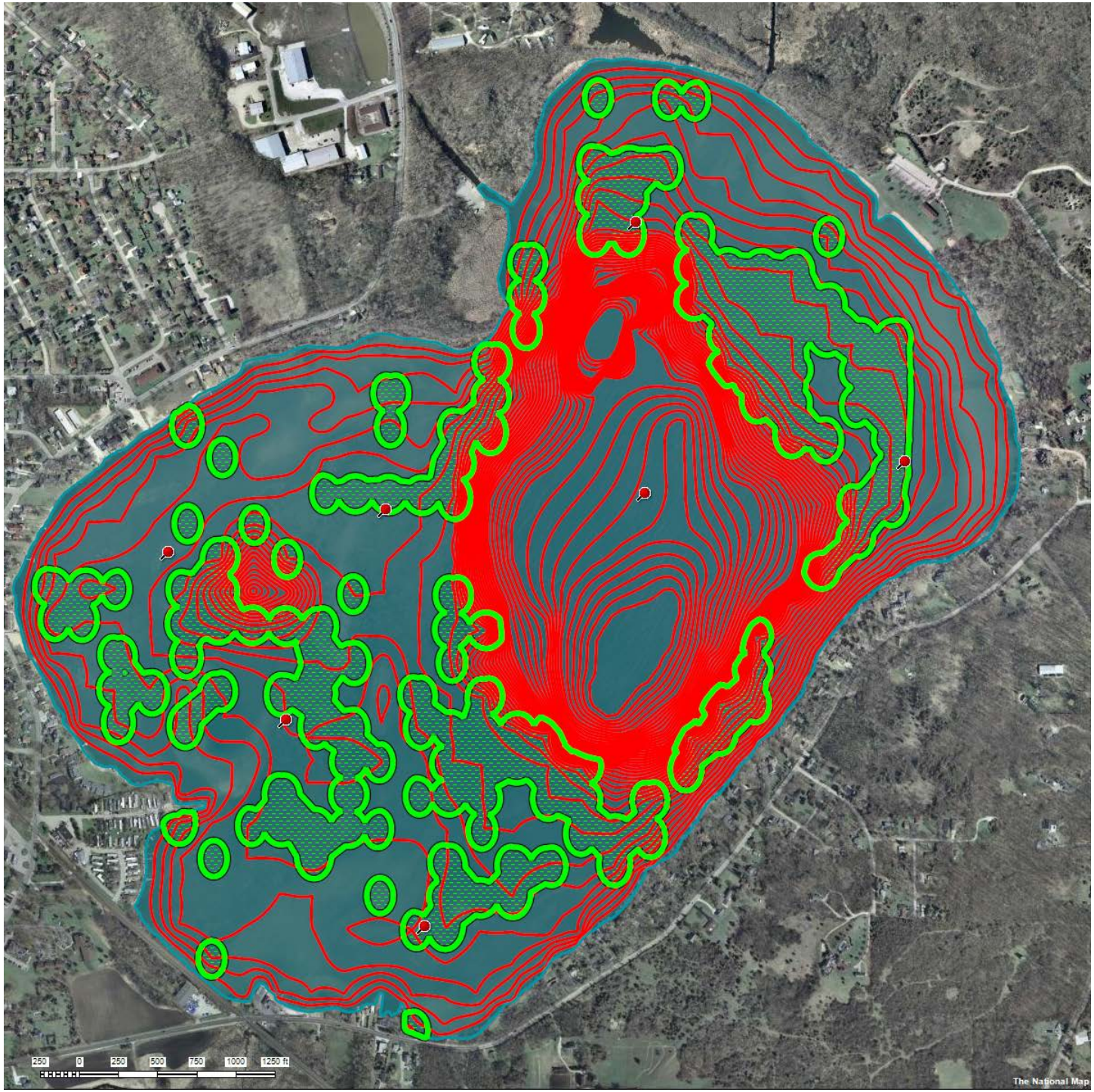
- Spatially targeted pellet application to littoral areas
- Initial calculated application rate, 20-40 ppb common in treated littoral area
- Sonar exposure from timed released pellets builds over time (see next slide)
- Target is typically 2 – 4 ppb in water column of the targeted littoral area
- Typically <2 ppb lakewide due to dilution in partial lake applications
- One or more bump(s) at 10-40 ppb based on FasTEST lab results

Notice difference in exposure (ppb) during first 10, 30 and 60 days. Pellets results in low ppb early and steady-sustained low but lethal ppb level throughout, with extended exposure to exhaust milfoil carbohydrate reserves.



| | | Residual (ppb) | | |
|---|---|---|---|---|
| Date | Days after Application | Location 1 (IS) | Location 2 (BR) | Average |
| 5/30/2014 | 0 | 0 | 0 | 0 |
| 6/9/2014 | 10 | 3.5 | 4.3 | 3.9 |
| 6/16/2014 | 17 | 3.3 | 4.2 | 3.75 |
| 7/8/2014 | 39 | 4.1 | 4.8 | 4.45 |
| 7/29/2014 | 60 | 3.8 | 4.5 | 4.15 |
| 8/18/2014 | 80 | 2.9 | 3.2 | 3.05 |




250
0
250
500
750
1000
1250 ft
The National Map

# *What and When?*

- Initial application of SonarOne (fluridone) pellets of 4 PPB applied around May 11, 55 – 60 water temps
- Second bump application about 5 weeks later June 15+/- of 4~ PPB
- Third bump application about 6 – 8 weeks later (early August) of 2 ~ PPB
- Continual residual monitoring
- Follow up aquatic plant surveys (2015/16)

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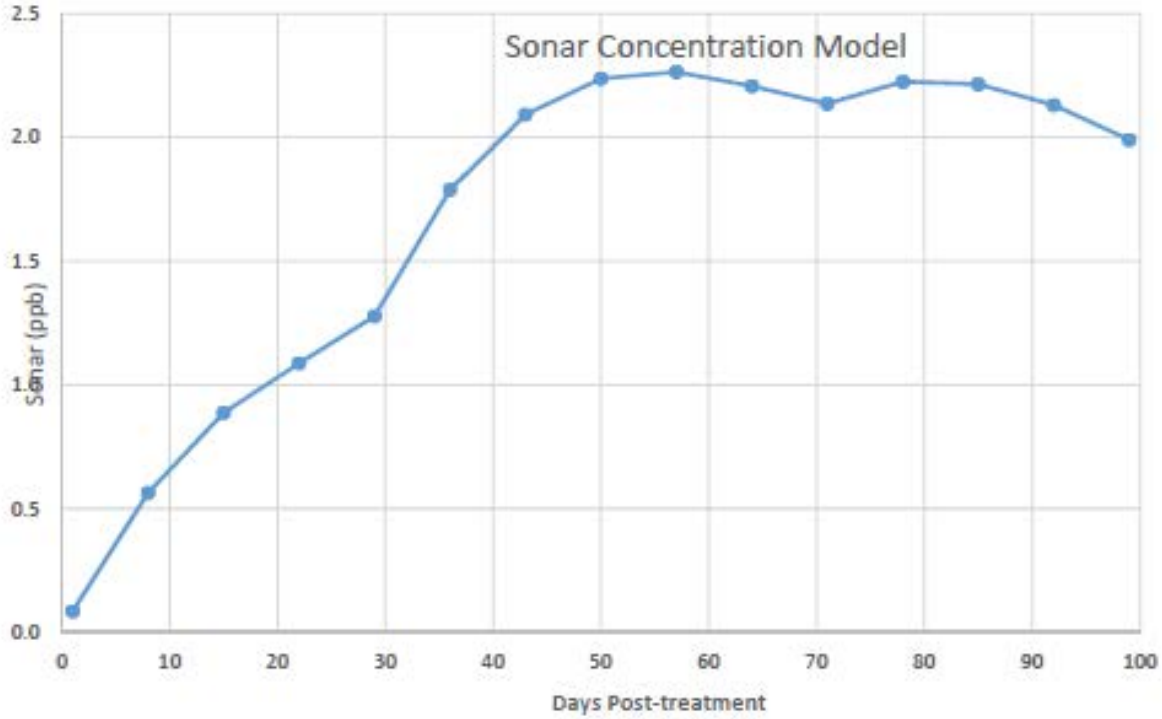
# Silver Lake – Kenosha County, WI

Updated 25MAR2015




Model of expected mean lake-wide Sonar concentration from prescribed treatment for Silver Lake.

Objective is to keep Sonar concentrations in the 2-4 ppb in the areas where pellets are applied.

# *Next Steps…*

- A permit for low dose granular SonarOne (fluridone) herbicide application was submitted by the Silver Lake Association to WDNR
- The permit is currently being reviewed by WDNR's statewide technical team and locally by Craig Helker
- A decision is expected within the next few weeks

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# *Project Contacts*

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