Christmas Lake Eurasian Watermilfoil

Communication Meeting

January 10, 2008

Agenda

- Welcome and Introductions
- Purpose of meeting
- EWM current status
- Treatment options – cost, benefits, risks
  - Harvesting
  - Herbicides
- CLHA member discussion
- Summary

Guests

- Chip Welling - EMW Coordinator, MN Department of Natural Resources
- Steve McComas - Scientist, Blue Water Science
- Dick Osgood - President and Certified Lake Manager, North American Lake Management Society (NALMS); Executive Director, Lake Minnetonka Association
- Tom Snook - Lake Restoration

Meeting Purpose

- Present and answer questions about the science and evidence available on milfoil problems and treatments
- Get a sense of the residents as to feedback on the treatment options
- Provide feedback:
  - To the Board considering 2008 milfoil control plan
  - To the DNR as part of permitting process

Lake Goals

1) Restore the lake condition as closely as possible to its natural chemical make-up, and promote a diverse native plant and animal community
2) Educate citizens about the lake's ecology and lake management techniques
3) Encourage a monitoring program to help evaluate the lake over time

Water Quality
Minnehaha Creek Watershed Dist.

Measure	North Central Hardwood Forests	Christmas Lake
Total Phosphorus	23 – 50 ppb	13 ppb
Chlorophyll	5 - 22 ppb	3.0 ppb
Secchi Disk	4.9 – 10.5 feet	17.7 feet

Water Quality
Metropolitan Council

2003 Water Quality

Best Ten and Worst Ten Lakes

for lakes larger than 50 acres

	Lake ID	Lake Name	City	Mean TP (ug/L)	Mean Chl-a (ug/L)	Mean SDT (ft)	Overall Grade
BEST TEN	27013700	Christmas Lake	Shorewood	11.8	3.2	16.1	A
	19044600	Lac Lavon Lake	Apple Valley	20.6	3.8	15.1	A
	82001400	Little Carnelian Lake	Stillwater Twp.	15.2	3.8	15.1	A
	82004600	Square Lake	May Twp.	11.2	3.0	19.7	A
	82008000	Sylvan Lake	Forest Lake Twp.	15.4	3.3	15.4	A
	27017002	Little Long Lake	Minnetrista	9.6	4.2	14.8	A
	82015300	Sunset Lake	Hugo	18.6	3.6	12.1	A
	10000900	Minnewashta Lake	Chanhassen	17.4	8.0	9.8	A
	82005200	Big Marine Lake	May Twp.	22.5	6.9	9.7	A
	82010300	Olson Lake	Lake Elmo	17.2	10.5	10.2	A
WORST TEN	70007600	Pike Lake	Prior Lake	225.6	120.3	2.6	F
	10002900	Miller Lake	Dahlgren Twp.	220.9	61.5	1.8	F
	82001500	Loon Lake	Stillwater Twp.	131.8	129.4	1.4	F
	10008900	Goose Lake	Waconia Twp.	170.2	88.3	1.4	F
	10009500	Swede Lake	Watertown Twp.	264.3	110.9	1.9	F
	19002300	Farquhar Lake	Apple Valley	347.1	87.2	1.8	F
	27011900	Cedar Island Lake	Maple Grove	248.6	103.6	1.5	F
	27012700	French Lake	Dayton	283.7	92.1	1.1	F
	10006900	Benton Lake	Benton Twp.	247.8	261.6	1.0	F
	10006600	Winkler Lake	Benton Twp.	460.0	120.0	1.3	F

TP - total phosphorus
Chl-a - chlorophyll-a

SDT - Secchi disk transparency

Current EWM Situation

- EWM harvesting
  - Twice per summer
  - ~$20,000 paid by CLHA
  - $12-15,000 paid by residents
- Unhappy and vocal residents
  - EWM still expanding
  - Cuttings appearing on lakeshore
  - 10 residents who refuse to pay dues
  - Asking for additional options for EWM control to be considered

Lake Health

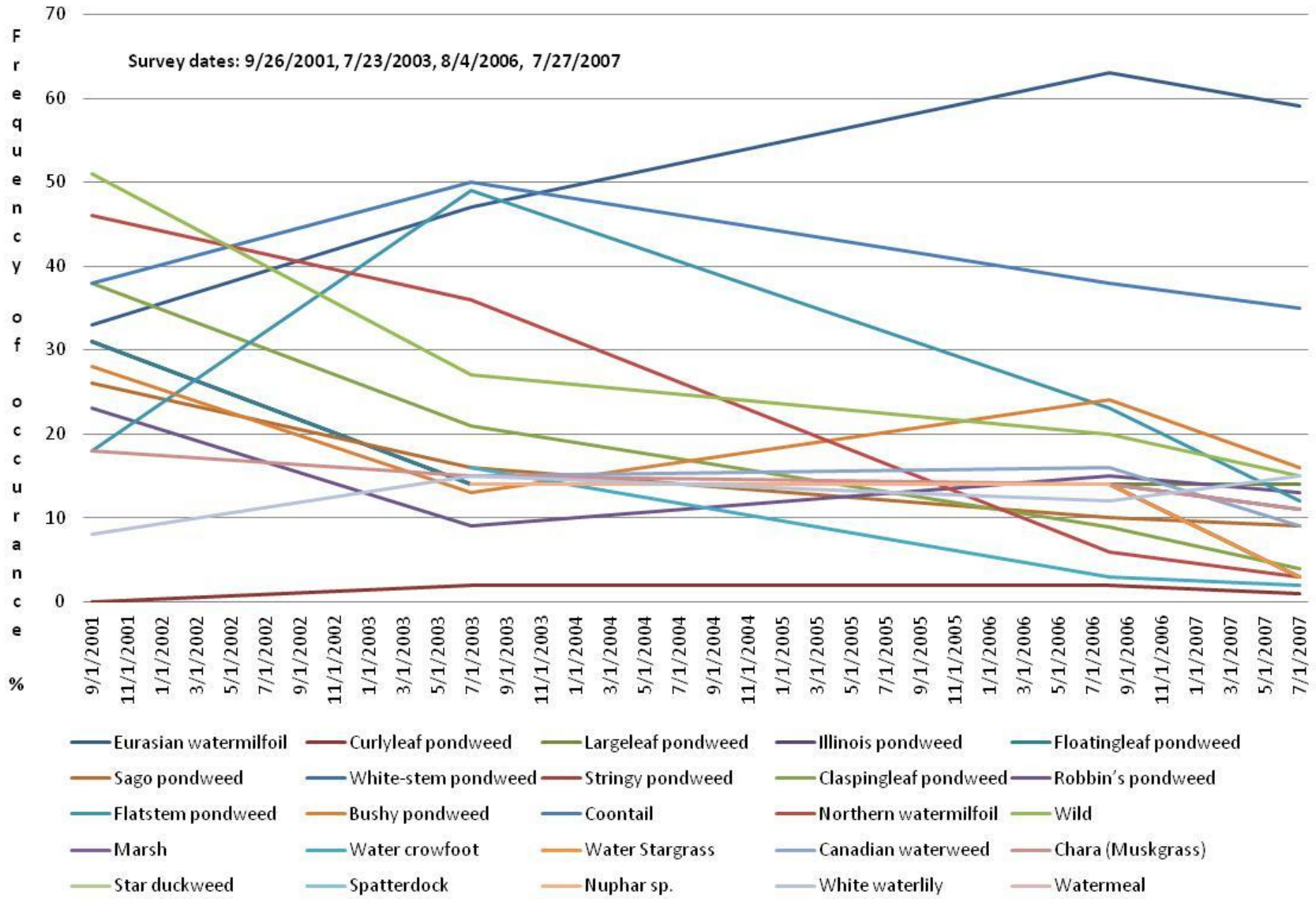
Aquatic plants in lakes and wetlands are beginning to be recognized as important ecosystem features in need of protection. As a result of this greater appreciation for aquatic plants in wetland and lake environments, aquatic plant surveys and assessments are becoming part of routine monitoring efforts conducted by consultants, citizen groups, and state and local agencies. Aquatic plant diversity and abundance are important indicators of lake or wetland health, but accurate maps and data are difficult to acquire. Because ground-based mapping requires much time and human resources, only a small fraction of this large resource has been mapped by natural resource agencies.

Source: University of Minnesota

Christmas Lake EWM Issues

- Eurasian milfoil (EWM)
  - Obstacle to boating, recreation (nuisance)
    - Controlled through twice annual harvesting
  - Ecological damage (crowding out native plants)
    - Getting worse as EWM crowds out native plants

Christmas Lake Vegetation Survey



Control Options - Do Nothing

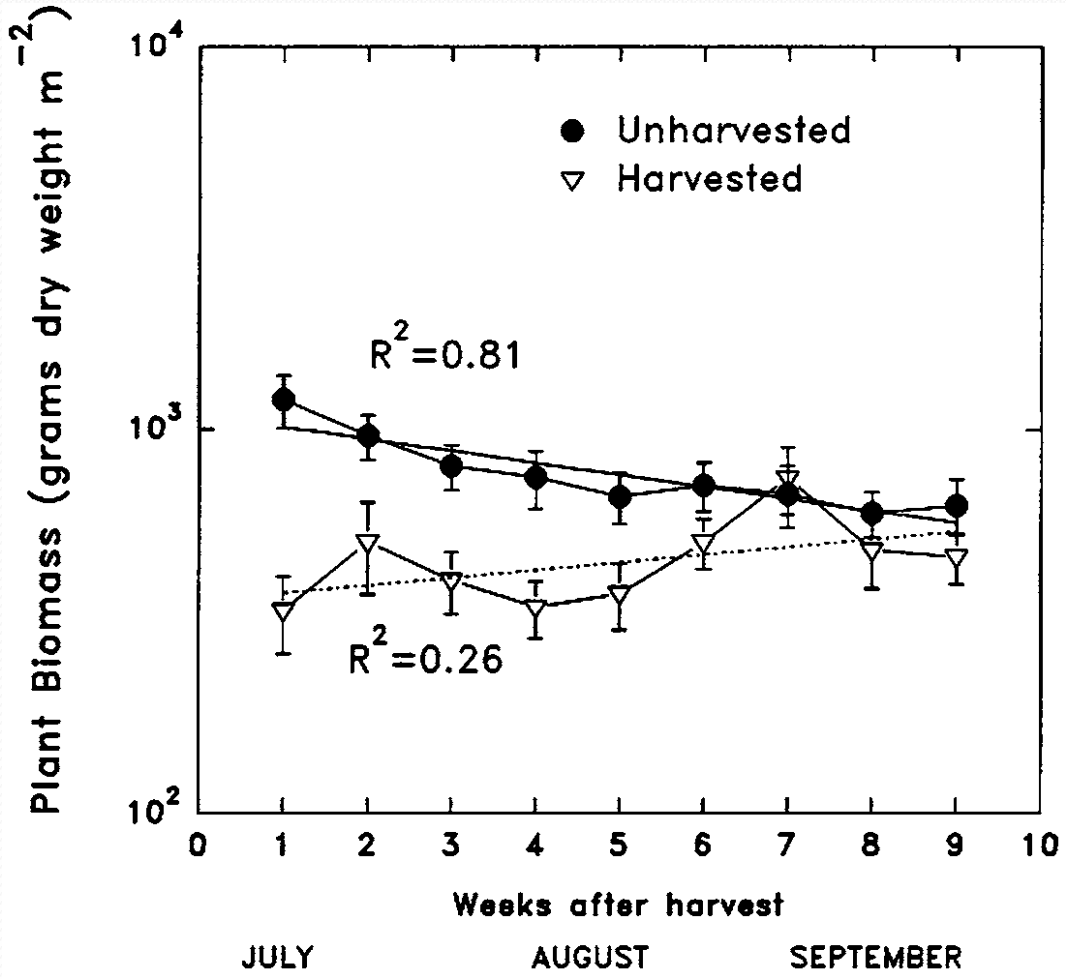
The ecological consequences of doing nothing may be high. According to John Madsen*, Eurasian watermilfoil, if unmanaged, "…can have severe negative effects on water quality, native plant distribution, and the abundance and diversity of aquatic insects and fish."

*Assistant Professor, Research and Extension, Mississippi State University and acknowledged milfoil authority, 2000

Control Options – Lake Wide Mechanical and Physical

Method	Benefits	Risks	Cost
Harvesting	• Large scale maintenance • Only depth of four feet	• Indiscriminate cutting • Needs to be repeated seasonally • EWM quickest to re-grow crowding out native plants • Fragmentation very likely spreading EWM to additional areas	$30-35,000/season

Effects of Harvesting on Lake Minnetonka (1990)



LVMP Status – March 2007

- Sections complete:
  - Description
  - Water quality
  - Aquatic vegetation
  - Public participation
  - Problems to be addressed
  - Goals for Management of Aquatic Plants
- Needs to be complete
  - Actions to achieve goals
  - Conditions of operations and permits
  - Responsibilities
  - Monitoring
  - Duration and review of LVMP
  - Preparation, approval, and distribution of the LVMP

Lake Management Goals (LVMP)

1) Reduce interference with recreational use of the lake caused by Eurasian watermilfoil
2) Increase abundance of native submersed aquatic plants by control of invasive, non-native submersed plants: Eurasian watermilfoil and curly-leaf pondweed, if it becomes significant
3) Protect high quality communities of native aquatic plants
4) Protect or restore water lilies

LVMP Conclusion

"Eurasian watermilfoil has reached the point in Christmas Lake where it interferes with some people's recreational use and enjoyment, and it has had a demonstrable negative impact on native submersed aquatic vegetation. As well, the frequency and abundance of water lilies appear to have been diminished."

CLHA Survey Results August 2006

- EWM poses a significant maintenance problem
- Protecting or restoring native plants is desirable
- Strong desire to manage/eradicate EWM tempered by strong desire to protect lake health and water quality
- Broad concern regarding use of herbicides
- Desire for more information regarding the safety, efficacy, cost and feasibility of all EWM control options and approaches

DNR-CLHA Letter Dated August 8, 2007

- "EWM, if unchecked, will likely continue damaging native aquatic plants, perhaps irreversibly"
- "Christmas Lake, being mesotrophic and retaining a good diversity of native plants, fits MN DNR's profile for a good candidate lake for a whole-lake fluridone treatment or a triclopyr large area treatment. MN DNR also considers social factors when reviewing candidate lakes for fluridone or triclopyr treatments and will require strong support from lakeshore owners before approving."
- "Both treatment options should be presented to CLHA members for their direction. MN DNR will support this as part of the LVMP process."

Treatment Options

Option	Benefits	Risks	Cost
Harvesting and individual herbicide applications within DNR rules (no LVMP needed).	• Nuisance control • "Safe"	• Non-selective • Adds to milfoil growth • Does not treat long term ecological damage	• $25-30,000/ year
Whole-lake herbicide application (fluridone) with annual maintenance – 5 year plan.	• Selective control of all milfoil • Second, third year treatments smaller	• Limited testing in Minnesota • May impact other water plants • Long term impacts unknown	• $24,450 first year
Large area herbicide application (triclopyr) with annual maintenance – 5 year plan	• Controlled areas • Risk limited	• Will impact other plants if applied incorrectly • Does not treat long term ecological damage	• $9,500/ 13 acre bays ($18,900 at 2.5ppm)

Triclopyr

- Benefits
  - Single bay treatments
- Risks
  - No skin irritation or human health risks
  - Not well absorbed through the skin
  - If ingested, rapidly excreted, unlikely to accumulate
  - Not considered cause of cancer, birth defects or genetic mutations
- Cost
  - Each year - $34,900 for (2) 13 acre bays @ 2.5 ppm or $15,900 @ 1 ppm

Fluridone – Benefits/Cost/Risks

- Benefits
  - Whole-lake treatment selective to EWM
  - Works by starving chlorophyll – not absorbed by humans
- Risks
  - No evidence of carcinogenity in rats or mice
  - Does not induce neurotoxicity
  - No estrogen, androgen and/or thyroid medicated toxicity
  - Applied at 5 ppb – drinking water approved for 150 ppb
- Cost
  - $24,450 – first year, should last 3 years

Fluridone Water Use Restrictions Following Application (Days)

Application Rate	Drinking	Fishing	Swimming	Livestock/ Pet consumption	Irrigation
Maximum Rate (150 ppb or less)	0	0	0	0	See irrigation instructions

Weaver Lake

- Trish Lugtu, President, Weaver Lake Conservation Association
- Goal: stunt growth of curly leaf pondweed
  - Treatment with fluridone in spring 2005
  - Water samples taken for 60 – 90 days
  - No harmful effects to other species
  - Water clarity improved from 3 ft to 14 ft

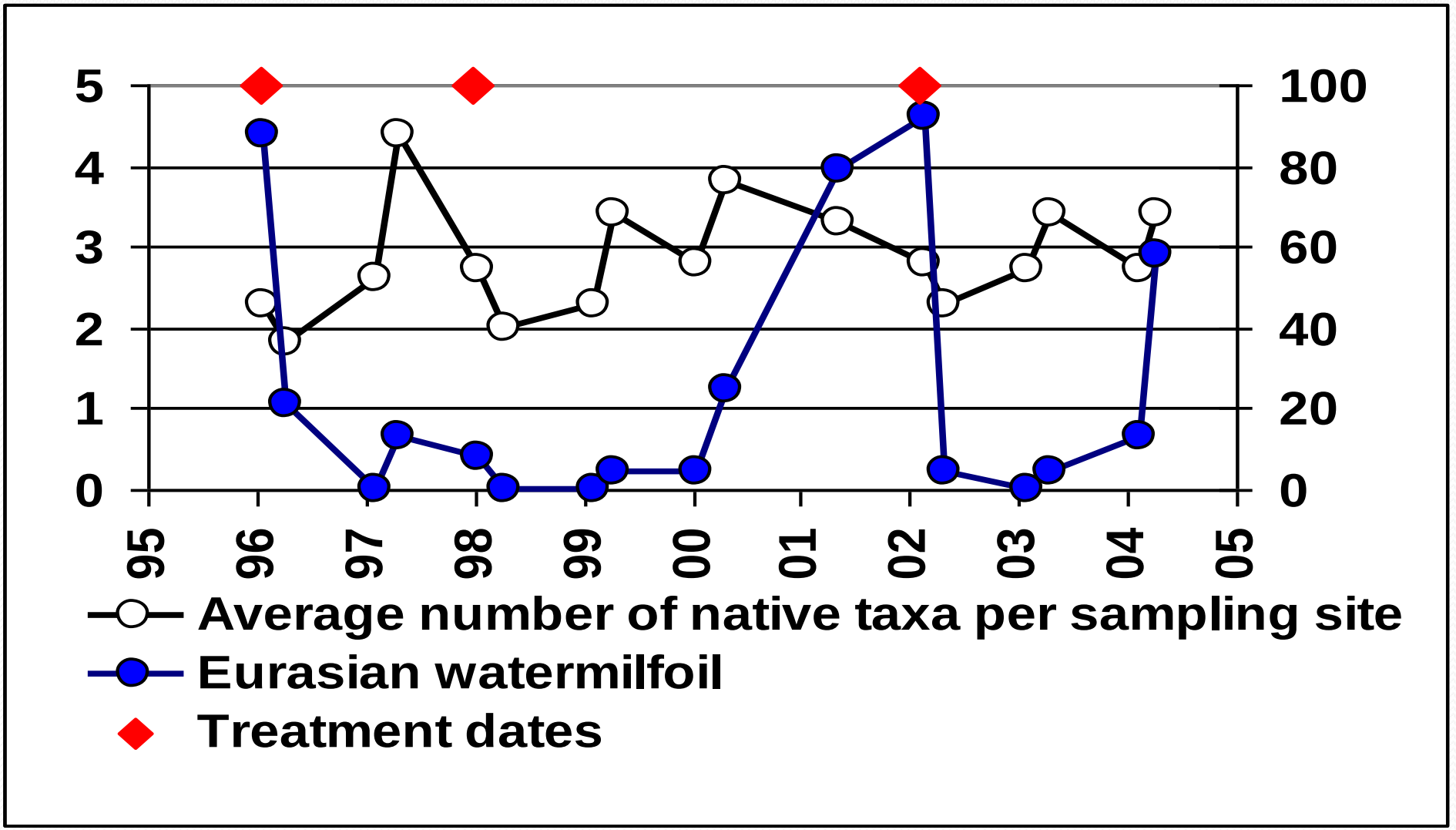
Weaver Lake 2006 Results

	Goal	Outcome
1	Reduced Turion production	Better than expected
2	Less CLPW washing up on beaches	Better than expected
3	Improved native plant growth	Better than expected
4	Improved water quality	Much better than expected

Lac Lavon

- Jeff Keher, Natural Resources Coordinator, Apple Valley
- Old gravel pit rapidly generating sediment
- Second clearest lake in Twin Cities
- Fluridone treatment for EWM in 1996, 1998, 2002
- Re-treatment in 2006 with 90-day follow-up
- Very little EWM seen in 2007
- Little to no damage to native plants

Lac Lavon: Average number of submersed native taxa per site, and Eurasian watermilfoil frequency



Lake Minnetonka EWM Herbicide Large Area Treatment (2006)

- Carman Bay – Endothall + 2,4-D
  - Little change in EWM density over summer
  - Elimination of CPW
  - No adverse effects on native plants
- Gray's Bay – 2,4-D
  - 79% reduction in occurrence, 99% reduction in density
  - No adverse effects on native plants
  - Native plant density increase after July
- Phelp's Bay - Triclopyr
  - 63% reduction in occurrence, 86% reduction in density
  - No adverse effects on native plants
  - Native plant density increased dramatically after treatment

Wisconsin Lakes

- Fluridone treated since 1997
  - Potter Lake
  - Random Lake
  - Bughs Lake
  - Clear Lake
- Applied 6 to 16 ppb, maintained 4 ppb for 90 days
- Plants eliminated by fluridone - coontail, native milfoils, elodea and naiads
- Plants not susceptible to fluridone increased including CLP
- Eutrophic lakes – not good candidates
- Fluridone applied at too high rate

Michigan Lakes

- Governor Engler Expert Panel – October 1999
  - Conclusion 1. A balanced, diverse aquatic plant community should be maintained in all water bodies for the maintenance of healthy fish and wildlife populations.
  - Conclusion 3. When Sonar® (fluridone) is used to control Eurasian watermilfoil, negative impacts on native aquatic plants should be minimal in the year of treatment and in subsequent years.
  - Conclusion 7. Sonar® does not have any direct negative impacts on fish or wildlife populations, or pose any human health concerns when used according to the product label.
- Over 300 lakes successfully treated
- CLHA Survey of 31 Michigan lakes
  - 100% satisfied with Sonar® treatment
  - 100% will treat again when needed

Discussion

Definitions

- Eutrophic lake - Shallow, murky bodies of water that have high concentrations of plant nutrients causing excessive algal production
- Mesotrophic lake - Characterized by moderate nutrient concentrations such as nitrogen and phosphorous and resulting significant productivity
- Oligotrophic lake - Relatively unproductive. It has few nutrients and relatively few plants and algae. It tends to be very clear