RANDOM LAKE
Aquatic Plant Survey
Whole Lake Demonstration Project/AIS Grant - 2008 and Final Report

INTRODUCTION
In 2003, the Village of Random Lake received an Aquatic Invasive Species Grant from the Wisconsin Department of Natural Resources (WDNR) to conduct a demonstration whole-lake chemical treatment on Random Lake. The Grant application included the project plan upon which the WDNR treatment permit will be based. That plan, and the subsequent grant, requires extensive monitoring to be conducted: the year prior to treatment, the year of treatment, and three years post treatment. The aquatic plant community and the water quality (Self-Help Volunteer Monitoring Program) are to be monitored.

A local volunteer collected the water quality samples throughout the summer of 2008. The results are included in this report.

In July of 2008, Aron & Associates conducted the aquatic plant survey on Random Lake. This survey is part of an ongoing demonstration project to document changes in the aquatic plant community of Random Lake. This information can be compared with past studies and may be used by future investigators to determine if the aquatic plant population is changing. The impact of various management techniques may be evaluated based on their respective impacts on the aquatic plants. This information should be used to guide future lake management decisions on Random Lake.

Random Lake is located in the Village of Random Lake, Sheboygan County, in Southeast Wisconsin. Hydrographic and morphometric data are presented in Table 2. A map of Random Lake showing depth contours is presented in Map 3.

METHODOLOGY
General Survey
A preliminary survey of the lake was made by boat. An attempt was made to locate all plant communities on the lake by region. Nomenclature follows Crow & Hellquist (2000). No plants samples were collected and preserved since all species found had been collected during previous surveys. The maximum rooting depth on Random Lake in 2008 was determined to be 13 feet, that is, no plants were found growing in water deeper than 11 feet. This is an improvement from the 11 feet maximum rooting depth in 2007.

Point Intercept Survey

The methodology for the point intercept survey was developed by the WDNR Bureau of Research for the state's Whole Lake Treatment Protocol. A grid and global positioning satellite (GPS) coordinates for sampling, were developed by WDNR and provided to Aron & Associates for use in the Demonstration Whole Lake Treatment Project surveys on Random Lake.

The initial grid established 146 sample points. Of those, 13 were on land and were eliminated from the list, resulting in 133 sample points. In 2008, because of the high water levels, one sample point was inundated and had aquatic plants present.
Samples points were located using a 2004 Garmin GPS LMS330 with an LGC-2000 Receiver. Four rake tows were conducted at each sample point. Each plant species retrieved was recorded and given a density rating in accordance with the current WDNR criteria, between 1 and 3. The dominant species at each sample point was also identified. The data collected were then used to the mean density and percent of frequency for each species. Lake depth at each sample point was determined by using the Garmin after calibration in the field.

The abundance of each species was determined using four estimates:

1) The frequency is the rating of how often a species occurs in the sample points.
2) The average density rating, or the average density of a species in the sample point where it occurred.
3) The relative density rating, or the average density of a species averaged over all sample points whether or not any species were present.
4) The relative density rating averaged over all sample points in which any species occurred.

EARLIER STUDIES

In October 1999, a whole-lake chemical treatment was conducted on Random Lake using Sonar™ (SePRO Corporation). Eurasian watermilfoil (*Myriophyllum spicatum*) was the primary target species. The goal of the project was to eliminate Eurasian watermilfoil, enhancing conditions for native species. A condition of the WDNR permit for the project required that aquatic plants in the lake be monitored. Pre-treatment monitoring was conducted in 1999 and continued through 2002. The results of that monitoring are provided in Table 1. The monitoring in 1999 through 2002 was conducted using the line-intercept method for the establishment of sample points.

As Eurasian watermilfoil re-infested Random Lake, the Village used harvesting and 2-4,D chemical spot treatments to slow the return of Eurasian watermilfoil. Curly-leaf pondweed (*Potamogeton crispus*) increased significantly between 1999 and 2002. Long-term historical data on the aquatic plant community is not available. A second whole-lake treatment of Random Lake was conducted in 2005 using Sonar (active ingredient, fluridone). This survey is the third post-treatment survey following treatment.
The 2005 treatment was conducted in spring 2005 while the 1999 treatment was conducted in fall. It is not yet known if this will influence the results of the treatment.

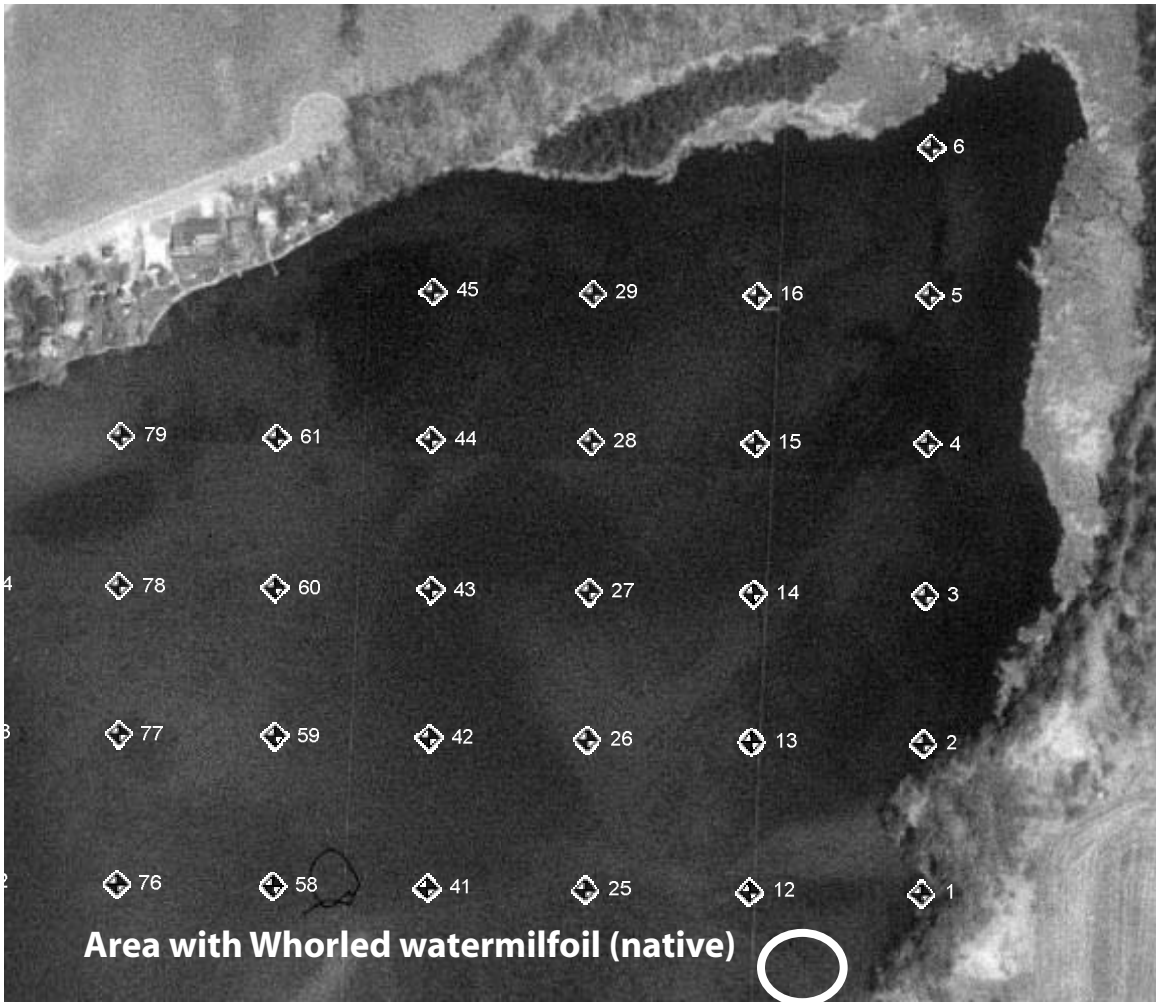
RESULTS OF THE 2008 SURVEY

A total of 12 aquatic macrophytes were found during the survey in 2008, similar to that seen in 2006 and 2007 (Table 2). Eleven of the plants were found during the grid survey and one was found during the general survey. Wetland fringe species are not included in the list of species. It should be noted that large stands of bulrush are present in Random Lake. In 2008, the bulrushes were abundant and healthy.

The plants found in the lake in 2008 are listed in Table 2. Chara (*Chara* sp.), sago pondweed (*Stuckenia pectinata*), and spiny naiad (*Najas marina*) dominated the plant community, throughout the depths. Water lilies (*Nuphar* and *Nymphaea* sp.) were common in the shallow areas. Curly-leaf pondweed (*P. crispus*), an exotic species, was not found in 2008. Eurasian watermilfoil (*Myriophyllum spicatum*) was found throughout the lake in 2008 (Map 1). It should be expected that because of its distribution in the lake, Eurasian watermilfoil will continue its spread throughout the lake unless aggressive control measures are undertaken. A native milfoil, whorled watermilfoil (*Myriophyllum verticillatum*) was found in one area, on the Northeast side of the lake near the bulrushes (Map 2).

2008 was a very unusual year, with record rains in June and high water levels through July. High water levels and runoff that contributed to more suspended sediment, may have influenced the plant growth of various species throughout the region, including that on Random Lake.

Map 1 - Location of Re-Infestation of Eurasian Watermilfoil, July 2008



Map 2 - Location of Whorled Watermilfoil, 2008

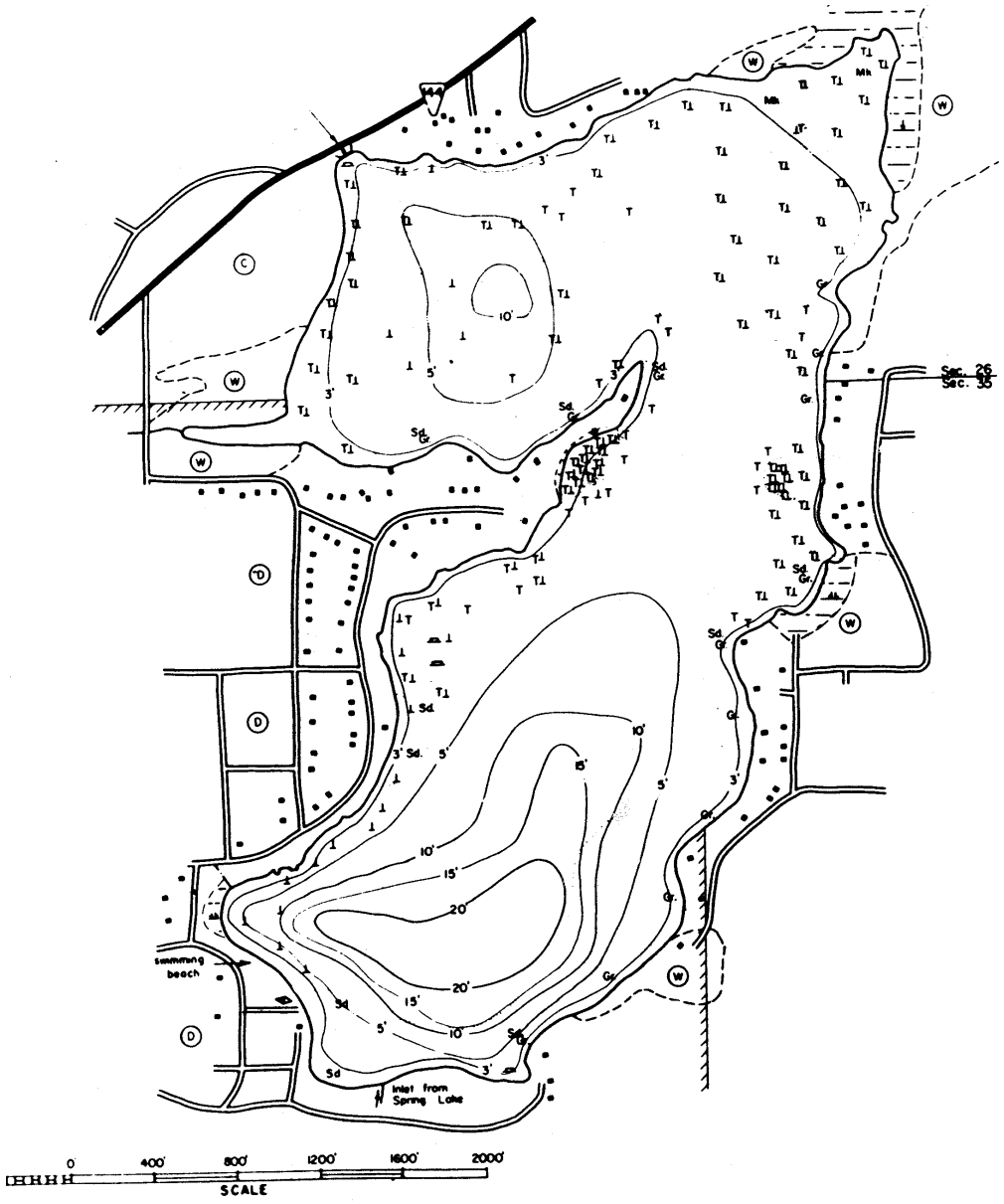
The results of the survey data for the July 2008 survey for all species at each sample depth are included at the end of this report.

The maximum rooting depth in 2008 was 13 feet. Sediments in Random Lake range from sand and gravel to muck. At 1.5 feet the substrate is primarily sand and gravel. At 15 feet the substrate is muck.

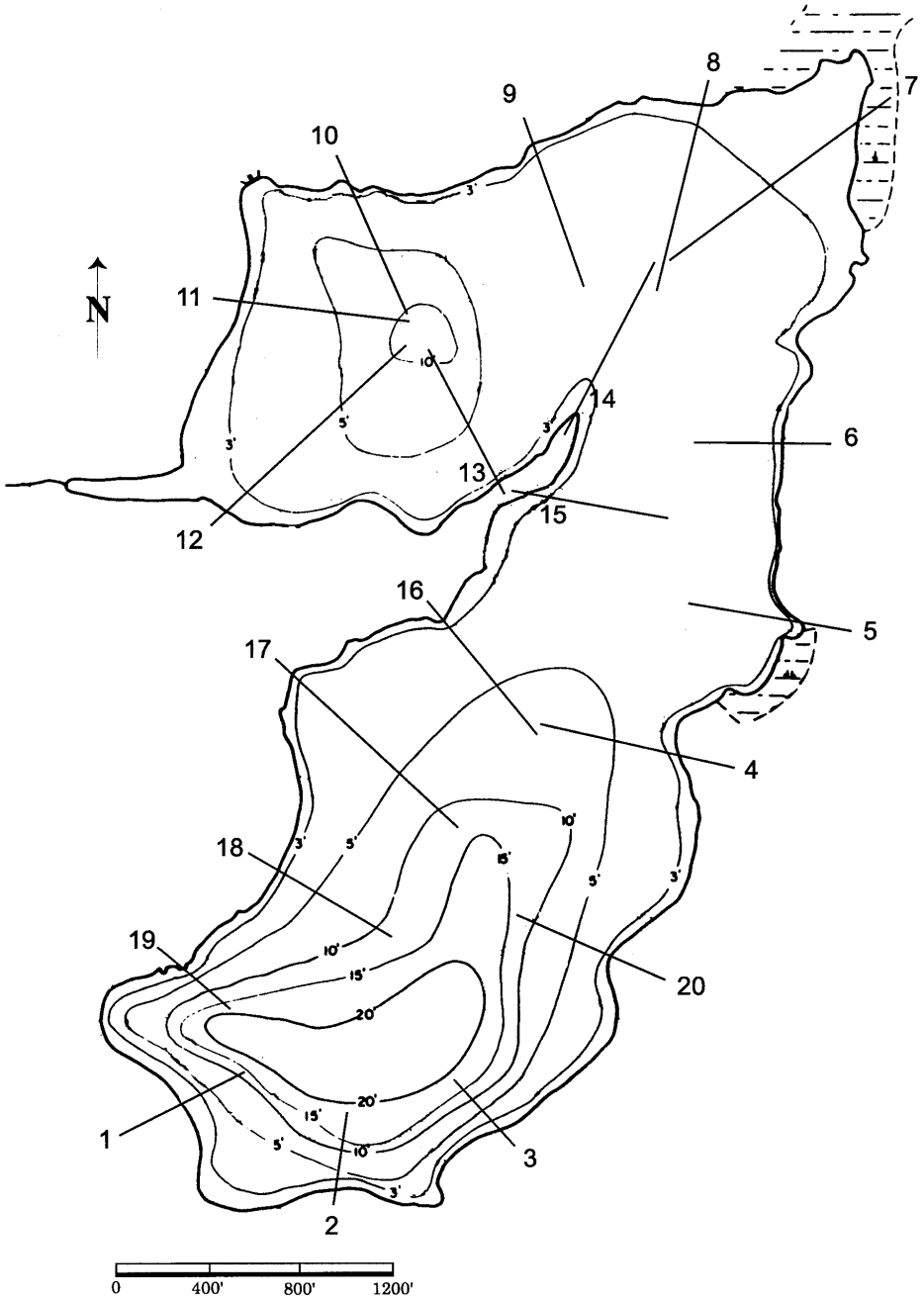
Table 1. Hydrographic and Morphometric Data Random Lake

Size of Lake	209 acres
Lake Volume	1279 acre feet
Length of Shoreline	3.6 miles
Maximum Depth	21 feet
Mean Depth	6 feet
Percent of area less than 3 feet deep	14%
Percent of area greater than 20 feet deep	4%

Source: WDNR

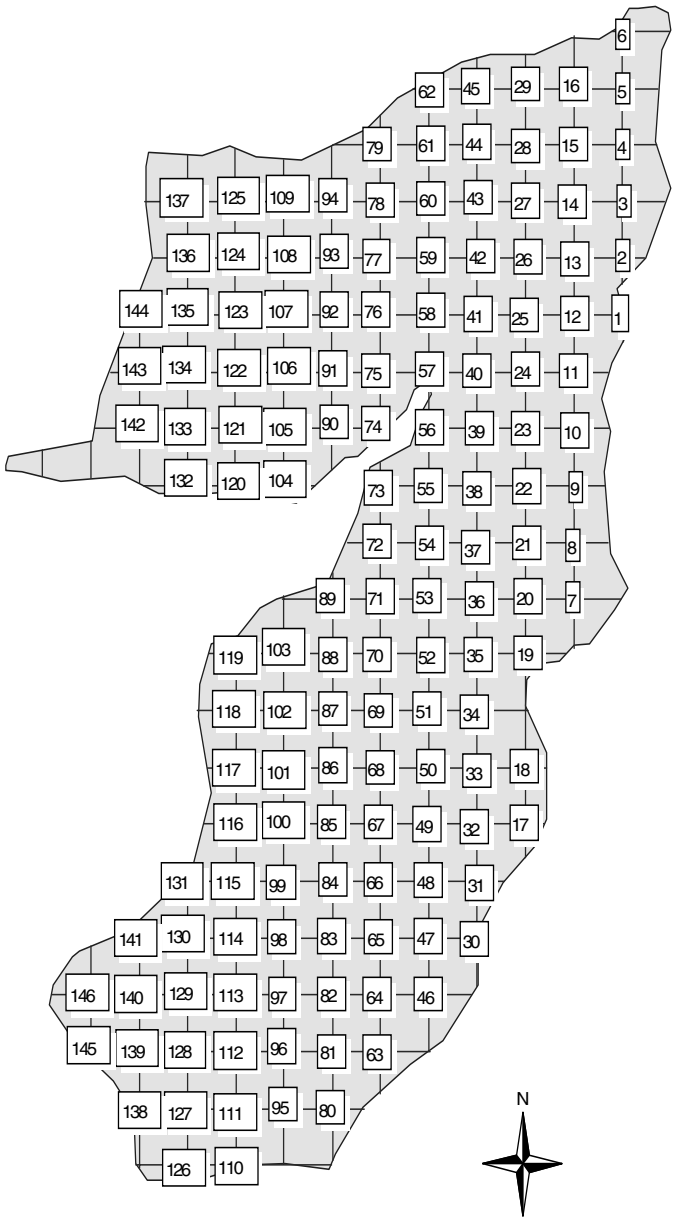


Map 3 - Bathymetric Map, Random Lake, Wisconsin.



Aron&Associates, 1999

Map 4 - Line Transect Survey Locations, Random Lake, Wisconsin, 1999.



Map 5 - Point Intercept Survey Sample Points on Random Lake, 2005-2008.

Table 2. Random Lake Aquatic Plant Species - 1999 to 2008

	% Frequency								
Species	**1999[b]**	**2000**	**2001**	**2002**	**2004**	**2005[c]**	**2006**	**2007**	**2008**
Chara sp.	34	57	43	49	50	64	50	56	53
Elodea canadensis				3	1				
Lemna minor						1[a]	X	X	
Myriophyllum spicatum	60	1[a]	9	69	8			X	5
Myriophyllum verticillatum							X	X	X
Najas flexilis	1		X	2	10		2	2	2
Najas marina	10			X	13		6	11	20
Nitella sp.						10			
Nuphar advena	5	5	6	7	4	3	1	X	2
Nymphaea sp.	5	5	0	4	2	10	5	1	1
Potamogeton crispus	1	4	19	25	1		7	6	
P. amplifolius			1	3	6		X	3	1
P. Illinoensis	14	18	17	34	8		X	1	9
P. foliosus				X	1				
P. natans	1	5	5	7	6	5	2	1	1
P. zosterformis	X		10	7	X				
Stuckenia pectinata	33	57	48	56	37	12	40	32	27
Utricularia vulgaris	1		2	3	9		1	4	8
Vallisneria americana				X	X				
Total Species	12	8	11	16	16	7	13	14	12

Notes:
[a] Found in only one sample point.
[b] Fall 1999 whole lake treatment.
[c] Spring 2005 whole lake treatment.
X Found only in the general survey.

WATER QUALITY 2008

The water quality on Random Lake was monitored under the Self-Help Volunteer Monitoring Program. The volunteer, Wayne Stroessner, collected the samples following the Self-Help protocol. Complete results are provided in the appendix and are available on the WDNR website, http://dnr.wi.gov.

Random Lake is considered eutrophic, with decreased clarity, warm-water fisheries, oxygen-depleted bottom waters during summer, dense plant growth.

Table 3. Random Lake Water Quality Data Summary for 2008*

Sampling Date	Secchi (ft)	Total Phosphorus (mg/l)	DO at surface (mg/l)	Temp at surface (^{o}F)	Chlorophyll A (ug/l)
5/09/08	4.25		6.8	60	
5/28/08	3.5		6.76	63	
6/18/08	3.25	33			5.43
7/21/08		17			.98
8/05/08	4		11.46	79	
8/13/08	3.75	22	12	74	9.55
8/21/08	4.25		11.06	74	
8/29/08	3.75		11.95	76	
9/06/08	4.25		9.29	70	
9/15/08	4.5		9.88	65	
9/22/08	5		11.6	70	
9/30/08	5.5				
10/11/08	6.25				

*Complete 2008 report is provided in the Appendix or are available at www.dnr.state.wi.us.

Table 4. Comparison of 2004 through 2008 Water Quality Data on Random Lake

Sampling Date	Average Secchi (ft)	Average Total Phosphorus (mg/l)	Average Chlorophyll A (ug/l)
2004	5.2	26.8	5.2
2005	4.9	21.6	7.3
2006	4.0	20.4	8.4
2007	3.89	24.5	9.5
2008	3.9	24	5.32

SUMMARY

The Village of Random Lake has conducted significant aquatic plant management activities over the years to keep Random Lake open to recreational use. As Eurasian watermilfoil expanded its range, the management efforts have not always been able to keep pace with the growth of the exotic plant. A demonstration chemical treatment was conducted using Sonar in October 1999. Since 2002, the Village has used a combination of harvesting and chemical treatment (using 2,4-D products) to control Eurasian watermilfoil. A second Sonar treatment was conducted in spring 2005.

An analysis of 2008 plant data from the 1999 through 2007 project shows a number of differences:

— The 2004 through 2008 surveys were done using point-intercept while earlier surveys were done using the line-transect method.

— Significant differences in frequency over the years are present. The reasons for the disparity are unclear. It could be simply the difference in sampling protocols used, or other factors could come into play, such as weather, treatments, etc. Actual reasons are most likely a combination of factors.

— There is significant difference in the lake's response following the 2005 Sonar treatment to that following the 1999 Sonar treatment. The fall 1999 treatment, conducted at a higher rate, produced significant impact on native species immediately after treatment, but showed little impact long term as plants species increased 4 years post-traetment.

— The Eurasian watermilfoil treatment in 1999 was not 100% successful, but the spring 2005 treatment appeared to be.

— The spring 2005 treatment was done at a much lower rate yet the impact on natives, the season of treatment was significant.

— The number of plant species has returned to the pre-1999 treatment levels, but not the pre-2005 treatment level. Whether that will result in long term impacts is unknown. The timing of the treatment may have been a factor in this difference. The native plants may already have started their seasonal growth when the May 5, 2005 treatment was conducted.
— Fewer native plant species were found in 2008 than were found in 2005 survey following the whole-lake treatment.
— Water clarity continues to be poor with a low of 3.25 feet and a high of 6.25 feet in 2008.
— Random Lake stratifies during the summer months, with the bottom waters, usually those below 14-15 feet, being anoxic (devoid of oxygen).
— Eurasian watermilfoil has re-entered the lake even though spot treatments were conducted in 2007 and 2008. Fragments were found throughout the lake during the survey, and were reported frequently by the volunteer monitor.
— After the fall 1999 treatment, there was a significant amount of Eurasian watermilfoil back in the lake in 2002, while after the spring 2005 treatment Eurasian watermilfoil was just beginning to spread throughout the lake in 2008.
— The Village should aggressively locate and chemically treat Eurasian watermilfoil early in the season, as early as May 1 to May 15. This would allow control while the plant biomass is low and before susceptible native species such as bladderwort begin to grow. The treatment should be done as soon as the plants are showing signs of active growth. The treatment should cover the areas identified in 2008 and any other areas where Eurasian watermilfoil was found by the end of 2008. The North end of the lake and the public boat launch and beach should be thoroughly checked and treated.

DEFINITION OF A PROJECT'S SUCCESS

How one perceives whether or not a project is successful depends upon one's perspective. A skier or swimmer may not like aquatic plants to the surface and will deem an eradication successful. An angler may consider any plant beneficial and will deem a Eurasian watermilfoil eradication of Eurasian watermilfoil a failure.

On Potters Lake, an early whole-lake treatment for Eurasian watemilfoil was considered by WDNR to be unsuccessful because the number of plant species failed to increase post-treatment. What was unknown going in to the project was whether there was ever much diversity in the lake that might rebound. The community considered the treatment a huge success because recreational opportunities improved, plant debris declined and the community saved ten's of thousands of dollars in plant management funds which they used to fund wetland acquisitions.

Going into this multi-year project on Random Lake, much discussion took place on how to better define success. WDNR set forth the following criteria to use to evaluate the suc-

cess. These criteria are all based on the lake resource, and not on the communities quality-of-life considerations.

WDNR Criteria for Success

1 *There shall be a reduction in the Eurasian watermilfoil frequency and/or density from pretreatment survey conditions until August 2007.*

2 *There shall be no net reductions (+/-20%) in the frequency and or density of the native plant community, with the exception of Elodea sp. and Najas sp.*

3 *There shall be no documented overall negative impacts to the fish population or other aquatic organisms either directly or indirectly related to the use of herbicides in the lake.*

4 *There shall be no reductions (+/-20%) in water quality trends throughout the study.*

Evaluation of the criteria

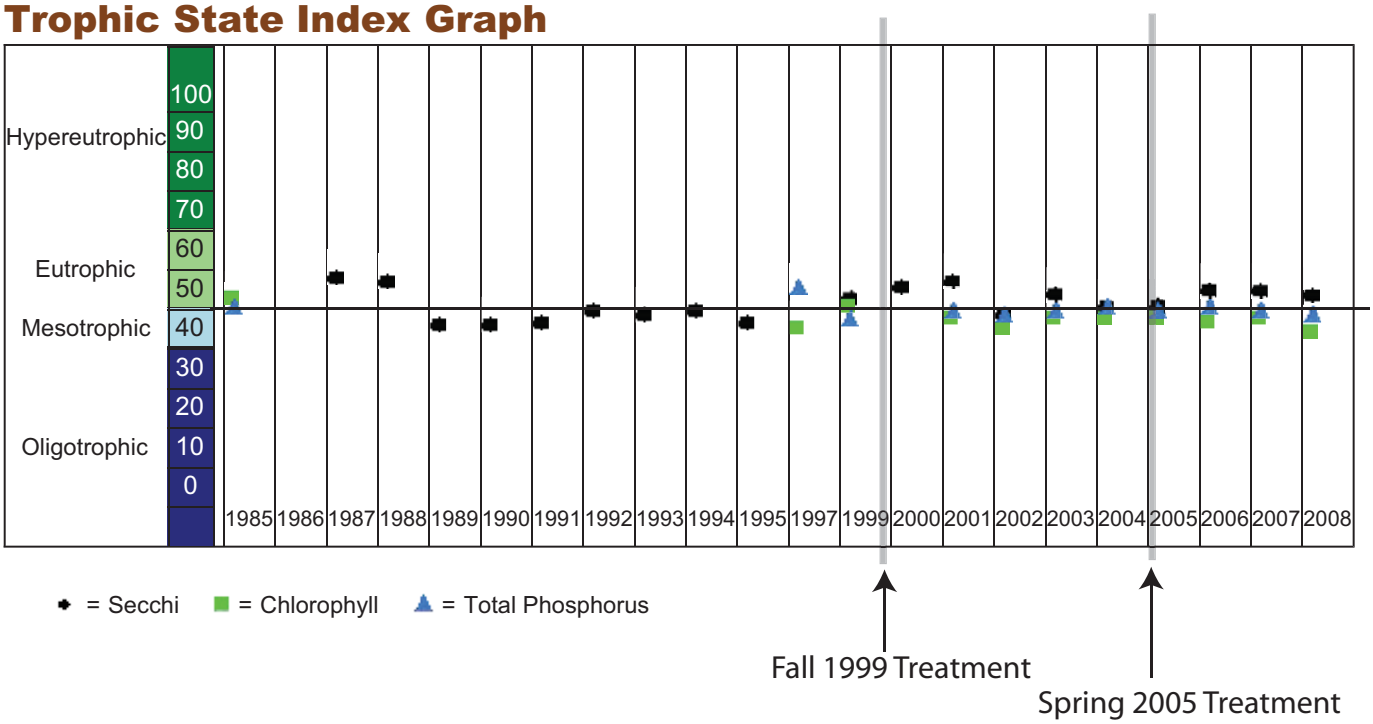
1. Eurasian watermilfoil has dropped post treatment regardless of which year starting point is used (Table 2).
2. Using number of native species (16), minus Elodea and Najas (2), in 2004 as a starting point (14), means up to a shift of +/-2.8 species is allowable. In 2006, and 2007 there were 13 and 14 species respectively. In 2008, there were 12 species, for a drop of 15%.
3. There were no documented overall negative impacts to the fish or other aquatic organisms reported.
4. Two of the water quality parameters, total phosphorus and Chlorophyll A improved or remained the same post treatment. Water clarity, measured by a Secchi disk, dropped from 5.2 to 3.9 feet, approximately 25% reduction. Graph 1 shows the Trophic State Index for Random Lake from 1985 through 2008

Determination

Based on all four criteria, the project met or exceeded the expectations in all but a single portion of one criteria, the secchi disk measurements. This project has been successful in reducing the significant problems caused by Eurasian watermilfoil in Random Lake.

The DNR permit (which includes the evaluation criteria), the aquatic plant data, and the water quality report for 2008, are included in the Appendix.

Trophic State Index Graph



Graph 1 - Trophic State Index, Random Lake, 1985 through 2008.

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State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary
Gloria L. McCutcheon, Regional Director

Plymouth Service Center
1155 Pilgrim Road
Plymouth, WI 53073
Telephone 920-892-8756
FAX 920-892-6638

April 28, 2005

Bob McDermott – Village President
Village of Random Lake
96 Russell Drive
Random Lake, WI 53075

Subject: 2005 Random Lake Whole-Lake Treatment Amendment

Dear Mr. McDermott:

Per your request, here is the permit amendment for chemical aquatic plant control on 209 acres in Random Lake in the Town of Sherman, Sheboygan County. The permit has been approved with a few conditions. This permit is valid from April 28, 2005 to December 31, 2008.

The permit conditions that you requested an amendment for were conditions 2, 5, 6, 7, 8, and 9. The Department has amended permit conditions 6, 7, and 8.

Condition 2 references our authority through Wis. Admin. Code NR 107 and remains the same. Condition 5 and 9 also remain the same because these are included in the overall goals of the project. Condition 6 has been changed to remove any responsibility by the Village for restocking of aquatic native plants negatively impacted by the treatment and states that there shall be no net reductions in the frequency and/or density of the native plant community (+/- 20%), with the exception of *Najas* sp. and *Elodea* sp. because of the documented impacts to these two species at the proposed treatment dosage. The original condition 7 has been omitted and the original permit condition 8 has been changed to state there shall be no documented overall negative impacts to fish and other aquatic organisms.

Due to the deletion of permit condition 7 from the original permit, original permit conditions 8 through 14 have been changed to permit conditions 7 through 13.

During the optional written comment period to request a public information meeting, the Department did not receive any letters or phone calls concerning the proposed treatment.

Attached is a copy of your permit amendment, which lists the conditions that must be followed. In addition, I have included a copy of our findings of fact, conclusions of law and your rights to appeal our action. A copy of the permit amendment must be kept and be present on site during the application. Please read your permit conditions carefully so that you are fully aware of what is expected of you.

Your next step will be to notify me of the date on which you plan to perform the application; NR 107.07(1) states that the permit holder shall notify the Department four working days in advance of the anticipated treatment.

It is not necessary to mail this amended version of the permit to Village residents because overall changes were relatively minor. If you have any questions about your permit, please call me at (920) 892-8756.

Sincerely,

John Masterson
Water Quality Biologist

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

The Village of Random Lake is hereby granted under Section 281.17(2) Wisconsin Statutes and Administrative Code NR107, a permit to conduct an herbicide application in Random Lake, Town of Sherman, Sheboygan County, Section 26 and 35, Township 13 North, Range 21 East, subject to the following conditions:

PERMIT CONDITIONS

1. The Village must follow all aspects of the department approved plan for the project and the grant agreement for Lake Protection Grant #ALPT-003-04.

2. DNR oversight and approval will be required for any herbicide treatments through the year 2008.

3. Conditions of this permit are stated in Wisconsin Administrative Code NR 107.08. These conditions must be followed.

4. You must notify Water Quality Biologist, John Masterson, 1155 Pilgrim Road, Plymouth, WI 57073, Phone (920) 892-8756, 4 working days prior to anticipated treatment date to schedule supervision.

5. There shall be a reduction in the Eurasian Water Milfoil (EWM) frequency and/or density from pretreatment survey conditions until August 2007.

6. There shall be no net reductions (+/- 20%) in the frequency and/or density of the native plant community, with the exception of *Elodea* sp. and *Najas* sp. These two species may be susceptible to Fluridone at a treatment dosage of six (6) parts per billion.

7. There shall be no documented overall negative impacts to the fish population or other aquatic organisms either directly or indirectly related to the use of herbicides in the lake.

8. There shall be no reductions (+/- 20 %) in water quality trends throughout the study.

9. Posting signs shall be provided at the public boat launch, which will include a map of the treatment area. Posting requirements listed in NR 107 must also be followed.

10. A copy of this decision and the enclosed permit must be provided to riparian property owners in the treatment area before the treatment may occur. The Department also requires the District to have several copies of the decision and enclosed permit available for public inspection.

11. This permit includes the authorization to treat with the selective herbicides Fluridone (Trade name: Sonar A.S.) and 2,4-D (Trade names: Weedar 64 and/or Navigate). The initial 6 ppb whole-lake treatment with Fluridone to reduce EWM may follow with a second whole-lake treatment to bump the concentration back up to 6 ppb to accomplish the required concentration time for Fluridone effectiveness. The second "bump" treatment concentration and timing will be based on the FasTEST results, which will be taken 3, 15, 30, 45, 60, and 75 days post-treatment. 2,4-D spot treatments are authorized during 2006, 2007, and 2008 to maintain a reduction in EWM.

12. All herbicide treatments shall be performed in a manner consistent with the product label; Wis. Admin. Code NR 107; the department approved project plan; and this permit.

13. All aspects of the year-end reports and the overall project final report are the sole responsibility of the Village of Random Lake.

FINDINGS OF FACT (Facts which were considered in making this decision.)

1. The Village of Random Lake has filed an application for a permit to conduct an herbicide application in the Town of Sherman, Sheboygan County, in Sections 26 and 35, Township 13 North, Range 21 East. This permit application specifically addresses the herbicide applications to 209 acres on Random Lake.

2. The proposed chemical to be used, Fluridone (Sonar A.S.) and 2,4-D (Weedar 64 and Navigate) are registered for aquatic use by the United States Environmental Protection Agency and both labeled and registered by a firm licensed as a pesticide manufacturer and labeler with the Wisconsin Department of Agriculture, Trade and Consumer Protection.

3. The chemicals Fluridone and 2,4-D does have current Department aquatic chemical fact sheets.

4. The Department has determined the proposed treatment will provide selective relief of Eurasian Water Milfoil and will not place unreasonable restrictions on existing water uses.

5. The Department relies on the Environmental Protection Agency and the Department of Agriculture Trade and Consumer Protection to register these chemical products for aquatic use. The Environmental Protection Agency (EPA) has determined that "no unreasonable adverse effects" will occur as a result of using Fluridone and 2,4-D according to label instructions. "Unreasonable" in the EPA definition means the risk of using a pesticide exceeds the benefits. The selectivity of Fluridone and 2,4-D to control Eurasian Water Milfoil and not harm native aquatic plants is considered to be important to the Department. Diverse native aquatic plant habitats are preferred to mono-typical stands of Eurasian Water Milfoil. Native stands of aquatic plants tend not to grow to nuisance levels and provide better more diverse habitats for a number of aquatic species including fish, invertebrates, waterfowl, and amphibians.

6. The Department has determined that there will be no significant adverse effects resulting from the treatment of Random Lake.

7. The Department chooses to waive the restriction on treating 150 feet from shore. This code requirement is being waived due to the objective of this project, which is to selectively control Eurasian Water Milfoil on a whole lake scale. An aquatic plant species shift from EWM to one dominated by native aquatic plants is considered beneficial for the Random Lakes ecosystem.

8. The Department has determined that there will be no significant injuries to fish, fish eggs, fish larvae, essential fish food organisms or wildlife, either directly or through habitat destruction in the proposed treatment area. The Eurasian Water Milfoil now present in Random Lake is considered poor habitat for most fish when in a canopy growth condition. Canopy growth can create conditions, which are unfavorable for fish predation and respiration.

9. The Department has determined that there are no known populations of endangered or threatened species that will be affected by the Fluridone and 2,4-D applications in Random Lake.

10. The Department has determined that the Fluridone application will occur in a designated sensitive area. The sensitive area designations on Random Lake include a provision in the management plan for chemical treatment when targeting Eurasian Water Milfoil.

CONCLUSIONS OF LAW (These are the legal reasons why the Department can make these decisions)

1. The Department has authority under the above indicated Statutes and Administrative Codes, to issue a permit for the use of aquatic herbicides in this area.

NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that Wisconsin Statutes and Wisconsin Administrative Code establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to ss. 227.52 and 227.53, Wis Stats., you have 30 days after the decision is mailed or otherwise served by the Department, to serve a petition within the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

To request a contested case hearing pursuant to Section 227.42, Wisconsin Statutes, you have 30 days after the decision is mailed or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review. This notice is provided pursuant to Section 227.48(2), Wisconsin Statutes.

Dated at Plymouth, Wisconsin on April 28, 2005

STATE OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES
For the Secretary

By John Masterson
John Masterson
Water Quality Biologist

cc: Vic Pappas – Sheboygan Basin Water Team Leader
John Nelson – Senior Fish Biologist
Warden Mike Clutter
Random Lake Association
Marine Biochemists
Aron & Associates

State of Wisconsin
Department of Natural Resources
Aquatic Plant Manager

PERMIT APPLICATION FOR CHEMICAL AQUATIC PLANT CONTROL

Form 3200-4 Rev. 3-99

DNR USE ONLY
ID Number
County Code
Waterbody Number

NOTE: Use of this form is required by the Department for any application filed pursuant to s. 281.17(2), Wis. Stats., and Chapter NR 107, Wis. Adm. Code. The Department will not consider your application unless you complete and submit this application form. Personally identifiable information requested on this form is not likely to be used for purposes other than that for which it is originally being collected.

SECTION I, APPLICANT DATA

Name of Permit Applicant. (Also indicate names and addresses of all individuals, associations, communities or town sanitary districts sponsoring treatment. Attach additional sheets if necessary.)

HOME ADDRESS

Name: Village of Random Lake
Street or Route: PO Box 344 — Fire Number:
City, State, Zip Code: Random Lake WI 53075
Telephone Number (include area code) Home: 920 Business: 994-4852

LAKE ADDRESS

Name: Same
Street or Route — Fire Number:
City, State, Zip Code:
Telephone Number (include area code) Home: Business:

SECTION II, LOCATION OF AQUATIC PLANT CONTROL

Waterbody To Be Treated (waterbody where treatment area is located): Random Lake

Lake Surface Area: 209 acres

Estimated Surface Area That Is 10 Feet or Less in Depth: ~150 acres

County: SHEBOYGAN

Town 13 Range 21E Section 26

Names of Adjacent Riparian Property Owners (use additional sheet if necessary)
1. SEE ATTACHED
2.
3.

Name of Applicator or Firm: Marine Biochem

Street or Route: 6316 W. Eastwood Ct

City, State, Zip Code: Mequon WI 53092

Telephone Number (include area code) Home: 262 238 Business: 0406

Name of Lake Property Owners' Association Representative or Lake District Representative (if none, please indicate): Bob McDermott

Applicator Certification Number for Category 5, Aquatic Pesticide Application: 001517

Business Location License Number (if applicable): 93-001282-001282

Restricted Use Pesticide License Number (if applicable):

DNR USE ONLY

Date Verified w/DATCP	
Certification Expiration	
Date Verified w/DATCP	
Expiration Date	
Date Verified w/DATCP	
Expiration Date	

Area(s) Proposed for Control (Note details in permit cover letter for final permitted sizes of treatment areas.)

Whole Lake

A. Shoreline Length _____ ft. X Distance From Shore _____ ft. + 43,560 ft. = _____ Estimated Acreage. Average Depth ____ ft.

B. Shoreline Length _____ ft. X Distance From Shore _____ ft. + 43,560 ft. = _____ Estimated Acreage. Average Depth ____ ft.

C. Shoreline Length _____ ft. X Distance From Shore _____ ft. + 43,560 ft. = _____ Estimated Acreage. Average Depth ____ ft.

D. Shoreline Length _____ ft. X Distance From Shore _____ ft. + 43,560 ft. = _____ Estimated Acreage. Average Depth ____ ft.

E. Shoreline Length _____ ft. X Distance From Shore _____ ft. + 43,560 ft. = _____ Estimated Acreage. Average Depth ____ ft.

Total Estimated Acreage 209

the estimated acreage is greater than 10 acres, or is greater than 10 percent of the estimated area 10 feet or less in depth in Section please complete and attach Form 3200-4A, Large-Scale Treatment Worksheet. Private pond treatments are exempted from this quirement.

this area within or adjacent to a sensitive area designated by the Department of Natural Resources?

☒ Yes ☐ No

SECTION IV, REASONS FOR AQUATIC PLANT CONTROL

Purpose of Aquatic Plant Control

- [x] 1. Reduce nuisance algae accumulation — filamentous
- [ ] 2. Maintain navigational channel for common use
- [ ] 3. Maintain private access for boating
- [ ] 4. Maintain private access for fishing
- [ ] 5. Improve swimming
- [ ] 6. Control of purple loosestrife
- [x] 7. Other: Eliminate EWM Reduce Curly-Leaf

Nuisance Caused By

- [x] 1. Algae
- [ ] 2. Emergent water plants (majority of leaves and stems growing above water surface, e.g. cattails, bulrushes)
- [ ] 3. Floating water plants (majority of leaves floating on water surface, e.g., waterlilies, duckweed)
- [x] 4. Submerged water plants (leaves and stems below water surface, flowering parts may be exposed, e.g., milfoil, coontail)
- [ ] 5. Other: _____

Name of Plants, if known

Filamentous Algae
Eurasian Watermilfoil

NOTE: Different plants require different chemicals for effective treatment. Do not purchase chemical before identifying plants.

SECTION V, CHEMICAL CONTROL – See Project Plan Attached

Alternatives to Chemical Control	Feasible?	If No, Why Not?
Mechanical harvesting	☐ Yes ☐ No	
Hand pulling	☐ Yes ☒ No	too widespread
Hand raking	☐ Yes ☒ No	" " "
Hand cutting	☐ Yes ☒ No	not appropriate Control
Sediment screens/covers	☐ Yes ☒ No	too widespread
Dredging	☐ Yes ☒ No	not appropriate
Lake drawdown	☐ Yes ☒ No	" "
Nutrient controls in watershed	☐ Yes ☒ No	not effective
Other:	☐ Yes ☐ No	

NOTE: If proposed treatment involves multiple properties, please consider feasibility of EACH alternative for EACH property owner. If you checked yes to any of the alternatives listed above, please explain your decision to use chemical controls:

Trade Name of Proposed Chemical(s)	Method of Application
(1) Sonar AS (2) Weedar 64 (3) Navigate (4) Cutrine Plus (5) Clearigate	(1) Sub surface injection (2)(3) Sprayer (4)(5) Sprayer

Which Chemicals or Other Control Options Have Been Tried Before On The Proposed Site, and What Were the Results?

Sonar – effective – see treatment plan & 2004 Report

NOTE: Chemical fact sheets for aquatic pesticides used in Wisconsin are available from the Department of Natural Resources upon request.

SECTION III, FEES

1. s. NR 107.11(1), Wis. Adm. Code, lists the conditions under which the permit fee is limited to the $20 minimum charge.
2. s. NR 107.11(4), Wis. Adm. Code, lists the uses that are exempt from permit requirements.
3. s. NR 107.04(2), Wis. Adm. Code, provides for a refund of acreage fees if the permit is denied or if no treatment occurs.
4. Fee calculations:

Basic Permit Fee (non-refundable)	$ 20.00
If proposed treatment is over 0.25 acre, calculate acreage fee: (round up to nearest whole acre, to maximum of 50 acres.)	
209 acres X $25 per acre = $ 1250	
If proposed treatment is ≤ 0.25 acre, acreage fee is $0.	
Enter Acreage Fee (from above)	1250
Total Fee Enclosed	$ 1270

Please include a sketch and/or a printed map of lake indicating area and dimensions of each individual area where plant control is desired. Also show location of property owners riparian to and adjacent to the treatment area. You may use the space below to sketch a map. Attach a separate list of owners and corresponding treatment dimensions coded to the lake map, if necessary.

See attached

SECTION VI, APPLICANT'S RESPONSIBILITIES

1. The applicant has prepared a detailed map which shows the length, width and average depth of each area proposed for the control of rooted vegetation and the surface area in acres or square feet for each proposed algae treatment.

2. The applicant understands that the Department of Natural Resources may require supervision of any aquatic plant management project involving chemicals. Under s. NR 107.07, Wis. Adm. Code, supervision may include inspection of the proposed treatment area, chemicals and application equipment before, during or after treatment. The applicant is required to notify the regional office 4 working days in advance of each anticipated treatment with the date, time, location and size of treatment unless the Department waives this requirement. Do you request the Department to waive the advance notification requirement? ☐ Yes ☒ No

3. The applicant agrees to comply with all terms or conditions of this permit, if issued, as well as all provisions of Chapter NR 107, Wis. Adm. Code. The required application fee is attached.

4. The applicant has provided a copy of the current application to any affected property owners' association, inland lake district and, in the case of chemical applications for rooted aquatic plants, to all owners of property riparian or adjacent to the treatment area. The applicant has also provided a copy of the current chemical fact sheet for the chemicals proposed for use to any affected property owner's association or inland lake district.

I hereby certify that the above information is true and correct and that copies of this application have been provided to the appropriate parties named in Section II and that the conditions of the permit and pesticide use will be adhered to.

Robert J McDermott — Applicant's Signature

12-11-05 — Date Signed

All portions of this permit, map and accompanying cover letter must be in possession of the chemical applicator at time of treatment. During treatment all provisions of Chapter NR 107, specifically ss. NR 107.07 and NR 107.08, Wis. Adm. Code, must be complied with, as well as the specific conditions contained in the permit cover letter.

SECTION VII, PERMIT TO CARRY OUT CHEMICAL TREATMENT (LEAVE BLANK-DNR USE ONLY)

The foregoing application is approved. Permission is hereby granted to the applicant to chemically treat the waters described in the application during the season of 2005.

Application fee received?
☒ Yes ☐ No

Advance notification of treatment required?
☒ Yes ☐ No

State of Wisconsin
Department of Natural Resources
For the Secretary

By John Masterson
Regional Director or Designee

4/4/05 — Date Signed

4/4/05 — Date Mailed

Please NOTE:

If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to ss. 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is mailed or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

To request a contested case hearing pursuant to s. 227.42, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review.

This notice is provided pursuant to s. 227.48(2), Wis. Stats.

County of Sheboygan
STATE OF WISCONSIN } ss.

Gary J. Feider, being duly sworn on oath deposes and says that he is the general manager of The Sounder, a weekly newspaper published in the Village of Random Lake, Sheboygan County, Wisconsin, and that a notice, of which the annexed is a printed copy, taken from said paper, has been published in said newspaper on the following dates:

March 10, 2005

Gary J. Feider

Subscribed and sworn to before me this 10th

day of March, 2005

Notary Public, Sheboygan County, Wis.
My commission expires February 22, 2009.

NOTICE OF APPLICATION FOR AQUATIC PLANT MANAGEMENT PERMIT

The Village of Random Lake intends to apply for a permit from the WDNR to treat up to 209 acres (entire lake) on Random Lake with aquatic pesticides. The treatment(s) will take place between April 1, 2005 and October 15, 2005.

The Village will conduct a public informational meeting on the proposed treatment if five or more individuals, organizations, units of government request one. The meeting will give citizens a chance to learn more about the proposed treatment.

Any request for a public meeting on this proposed treatment must be made within five days of this published notice. The request must specify the topics to be discussed, including problems and alternatives, and must be sent in writing to the Village of Random Lake, P.O. Box 344, Random Lake, WI 53075, and copied to John Masterson, DNR, P.O. Box 408, Plymouth, WI 53073.

This notice is required by NR 107, Wisc. Admin. Code.

(Published March 10, 2005)

RANDOM LAKE AQUATIC PLANT SURVEY - 2008

Transect #	Depth	Plants CHARA	NITELA	MYRSP	STUPE	POTFO	NAJFL	NAJMA	NUPHAR	NYMPH	POTIL	POTAM	POTGR	POTNA	UTRIVU	POTCR	LEMNA	ELOCA	MYRVE
1	1	3			1			v	v			v							
2	ON LAND																		
3	3.5			v															
4	3	1		v	2			1			1				1				
5	1.5			v															
6	ON LAND																		
7	2.75	1			1		v	1				1							
8	3	3			v						1								
9	3	3									1								
10	2.75	3			1				v	v									
11	2.75				2						v				v				
12	4	2			v						1				v				v
13	3.5	3			v						1								
14	4.5	3		v	v					v					1				
15	4	2		v	2			1		v	1				1				
16	4	3			v														
17	ON LAND																		
18	2.5																		
19	2	1									2								
20	5																		
21	5	2						1							1				
22	4.75	3		v															
23	5	3													1				
24	4.75	3																	
25	5	2																	
26	5.5			v				1											
27	5														1				
28	5	1							2										
29	4	3			v				v	v					1				
30	ON LAND																		
31	4	3																	
32	6.5																		
33	6.5	3			1														
34	6	3																	
35	5	1																	
36	6	3																	
37	6	3			v														
38	5.25	3			v														
39	5	3																	
40	5.25	2			1										1				
41	5.5	3																	
42	7			v															
43	6				2			1											
44	5	1		2	1														
45	3	2		1				1							v				
46	7			2							1								

Transect #	Depth	CHARA	NITELA	MYRSP	STUPE	POTFO	NAJFL	NAJMA	NUPHAR	NYMPH	POTIL	POTAM	POTGR	POTNA	UTRIVU	POTCR	LEMNA	ELOCA	MYRVE
47	9.5	2			1														
48	6.5	3																	
49	8.25	2		1															
50	10.75																		
51	9.25																		
52	8				1														
53	7	3			1														
54	5	3			v														
55	5	1					1				2								
56	ON LAND																		
57	ON LAND																		
58	6	3																	
59	6	3			1														
60	6	2						1			v								
61	5			v	1		1												
62	3.5	1			1														
63	8.5								1			v							
64	19.25										1								
65	18.25																		
66	16.25																		
67	15.75																		
68	13.5																		
69	8.75																		
70	5	1						1											
71	5.25	3																	
72	4	3			v														
73	1.5	3			1				1										
74	ON LAND																		
75	5.25	3																	
76	5.5	1			1														
77	5	1			2														
78	5.5	1																	
79	4																		
80	5.5	1			1			1			1								
81	19.25																		
82	20.5																		
83	17.75																		
84	14.75							1											
85	13.25																		
86	11																		
87	9	1																	
88	6.25	1			1														
89	4	2			1			1			1								
90	5.5																		
91	14.75																		
92	14.25																		
93	7																		
94	4										1								
95	12.5																		
96	20.25																		

Transect #	Depth	CHARA	NITELA	MYRSP	STUPE	POTFO	NAJFL	NAJMA	NUPHAR	NYMPH	POTIL	POTAM	POTGR	POTNA	UTRIVU	POTCR	LEMNA	ELOCA	MYRVE
97	19.5																		
98	13.25																		
99	10.25																		
100	11.25																		
101	11																		
102	8.75	2																	
103	5							1											
104	ON LAND																		
105	5.5							1											
106	13.25																		
107	17.75																		
108	11.5																		
109	6.5				1														
110	ON LAND																		
111	9.25	1																	
112	20																		
113	19.75																		
114	13																		
115	9	1			v														
116	6	3																	
117	5.75	v			1			1	v										
118	5	3			2			1											
119	3.75				1				v						1				
120	ON LAND																		
121	5.25				1			2											
122	7.5			3				1											
123	8				2			2											
124	8				2			2							1				
125	6	3		v															
126	6			1					v										
127	9			v	1						1								
128	19.25																		
129	19.5																		
130	12.25	1																	
131	4.5	1					1												
132	ON LAND																		
133	4	3								1				v					
134	4.5	1						1											
135	5	1			1			1											
136	5	2			1			1		v	v								
137	3	1			v			1	v	v									
138	3.25																		
139	9.5																		
140	19																		
141	6.5	2			1			1		v	v								
142	3.5	3		v	1				v	v				2					
143	3.25	1			1														
144	1.5	3						1				v							
145	ON LAND																		
146	9				1														

Transect #	Depth	CHARA	NITELA	MYRSP	STUPE	POTFO	NAJFL	NAJMA	NUPHAR	NYMPH	POTIL	POTAM	POTGR	POTNA	UTRIVU	POTCR	LEMNA	ELOCA	MYRVE

Total Sample Sites (146 - 12 on land) = 134 Note: because of high water, sample point 1 was accessible with plants.
Sample Sites w/ No Plants 38

	CHARA	NITELA	MYRSP	STUPE	POTFO	NAJFL	NAJMA	NUPHAR	NYMPH	POTIL	POTAM	POTGR	POTNA	UTRIVU	POTCR	LEMNA	ELOCA	MYRVE
Sites found(Frequency)	70	0	6	36	0	3	26	2	1	12	1	0	1	10	0	0	0	0
% Frequency	52.63	0.00	4.51	27.07	0.00	2.26	19.55	1.50	0.75	9.02	0.75	0.00	0.75	7.52	0.00	0.00	0.00	0.00
Density (Max = 3) at sites found	2.11	#DIV/0!	1.67	1.19	#DIV/0!	1.00	1.12	1.50	1.00	1.17	1.00	#DIV/0!	2.00	1.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Relative Density (Max = 3) /hole Lake	1.11	0.00	0.08	0.32	0.00	0.02	0.22	0.02	0.01	0.11	0.01	0.00	0.02	0.08	0.00	0.00	0.00	0.00
Found visually in vicinty			12	12		1	1	7	8	4	2		2	3				1

Lake Water Quality 2008 Annual Report

Random Lake
Sheboygan County
Waterbody ID Number: 30300

Lake Type: DRAINAGE
DNR Region: SE
GEO Region: SW

Site Name	Station ID
Random Lake - Deep Hole	603312

Date	SD (feet)	SD (meters)	Hit Bottom?	CHL	TP	TSI (SD)	TSI (Chl)	TSI (TP)	Lake Level	Staff Gauge	Clarity	Color	Perception
05/09/2008	4.25	1.3	NO			56			HIGH	0.27	MURKY	GREEN	2-Very minor aesthetic problems
05/28/2008	3.5	1.1	NO			59			HIGH	0.17	MURKY	GREEN	2-Very minor aesthetic problems
06/18/2008				5.43	33		48	55					
07/21/2008				.98	17		35	50					
08/05/2008	4	1.2	NO			57			HIGH	.44	MURKY	BROWN	2-Very minor aesthetic problems
08/13/2008	3.75	1.1	NO	9.55	22	58	52	52	NORMAL	.15	MURKY	GREEN	2-Very minor aesthetic problems
08/21/2008	4.25	1.3	NO			56			NORMAL	.1	MURKY	GREEN	2-Very minor aesthetic problems
08/29/2008	3.75	1.1	NO			58			NORMAL	.1	MURKY	GREEN	2-Very minor aesthetic problems
09/06/2008	4.25	1.3	NO			56			HIGH	.16	MURKY	BROWN	2-Very minor aesthetic problems
09/15/2008	4.5	1.4	NO			55			HIGH	0.23	CLEAR	GREEN	2-Very minor aesthetic

SD = Secchi depth measured in feet converted to meters; Chl = Chlorophyll a in micrograms per liter (ug/l); TP = Total phosphorus in ug/l, surface sample only; TSI(SD),TSI(CHL),TSI(TP) = Trophic state index based on SD, CHL, TP respectively; Depth measured in feet; Temp = Temperature in degrees Fahrenheit; D.O. = Dissolved Oxygen in parts per million.

Date	SD (feet)	SD (meters)	Hit Bottom?	CHL	TP	TSI (SD)	TSI (Chl)	TSI (TP)	Lake Level	Staff Gauge	Clarity	Color	Perception
09/22/2008	5	1.5	NO			54			HIGH	0.17	CLEAR	GREEN	problems 2-Very minor aesthetic problems
09/30/2008	5.5	1.7	NO			53			NORMAL	0.1	CLEAR	BROWN	2-Very minor aesthetic problems
10/11/2008	6.25	1.9	NO			51			HIGH	0.17	CLEAR	BROWN	2-Very minor aesthetic problems

05/09/2008		
Depth FEET	Temp. DEGREES C	D.O. MG/L
0	15.6	6.8
2	15.5	6.84
4	15.3	6.83
6	15	6.81
8	14.7	6.79
10	14.4	6.68
12	13.8	6.49
14	12.9	6.1
16	12.1	5.78
18	11.7	5.49
20	11.4	4.9
22	11.1	2.94
22.3	11	2.77

05/28/2008		
Depth FEET	Temp. DEGREES C	D.O. MG/L
0	17.2	6.76
2	17.1	6.79
4	16.5	6.81
6	15.8	6.8
8	15.6	6.8
10	15.3	6.61
12	15.1	6.5
14	15.1	6.42
16	15	6.25
18	14.9	6.12
20	14.7	6.06
22	14.6	5.57
22.2	14.6	3.18

08/05/2008		
Depth FEET	Temp. DEGREES C	D.O. MG/L
0	25.9	11.46
2	25.9	11.46
4	25.8	11.53
6	25.6	11.28
8	25.5	10.35
10	25.3	10.01
12	25	9.3
14	24.6	5.79
16	23.9	1.83
18	22.3	.89
20	21	.84
22	20	.85
22.3	19.5	.92

08/13/2008		
Depth	Temp.	D.O.
0	23.4	12
2	23.4	11.94
4	23.4	11.9
6	23.4	11.8
8	23.3	11.32
10	23.2	11.45
12	23.1	10.72

08/21/2008		
Depth	Temp.	D.O.
0	23.5	11.06
2	23.5	11.04
4	23.5	10.98
6	23.4	11.04
8	23.4	11.04
10	23.2	10.78
12	23.1	9.93

08/29/2008		
Depth	Temp.	D.O.
0	24.6	11.95
2	24.4	12.1
4	24.3	12.35
6	24	12.54
8	23.5	12.21
10	23.2	11.41
12	23	11.14

SD = Secchi depth measured in feet converted to meters; Chl = Chlorophyll a in micrograms per liter (ug/l); TP = Total phosphorus in ug/l, surface sample only; TSI(SD),TSI(CHL),TSI(TP) = Trophic state index based on SD, CHL, TP respectively; Depth measured in feet; Temp = Temperature in degrees Fahrenheit; D.O. = Dissolved Oxygen in parts per million.

08/13/2008		
Depth	Temp.	D.O.
14	22.8	8.5
16	22.6	7.97
18	22.1	6.59
20	21.2	.68
22	20	.62
22.2	19.8	.64

08/21/2008		
Depth	Temp.	D.O.
14	22.9	8.95
16	22.3	3.85
18	21.8	.58
20	21.1	.49
22	20.3	.48
22.2	20	.51

08/29/2008		
Depth	Temp.	D.O.
14	22.8	9.37
16	22.4	5.36
18	21.9	.45
20	21.2	.36
22	20.4	.35
22.2	20.3	.35

09/06/2008		
Depth	Temp.	D.O.
0	21.2	9.29
2	21.2	9.35
4	21.2	9.49
6	21.2	9.55
8	21.2	9.57
10	21.1	9.41
12	21	9.3
14	21	8.86
16	20.9	8.17
18	20.6	8.35
20	20.5	8.17
22	20.4	.71
22.3	20.3	.51

09/15/2008		
Depth	Temp.	D.O.
0	18.5	9.88
2	18.6	9.96
4	18.7	10.05
6	18.7	10.1
8	18.7	10.09
10	18.7	10.06
12	18.7	10.01
14	18.7	9.89
16	18.6	9.6
18	18.5	9.6
20	18.4	9.44
22	18.3	6.79
22.4	18.3	.93

09/22/2008		
Depth	Temp.	D.O.
0	21	11.6
2	20.9	11.77
4	20.8	12.03
6	20.6	12.22
8	20.1	12.2
10	19.8	12.04
12	19.3	9.89
14	18.9	8.49
16	18.5	7.76
18	18.2	4.97
20	18.1	1.43
22	18	0
22.3	18	0

Date	Fieldwork Comment
05/09/2008	Fish between 13' to 19'; No ducks; 1 pr. geese w/5 babies; 2 more pr. geese - no offspring; No new plants visible from surface for reeds- cattails- lily pads- pondweeds except EWM (Eurasian Water Milfoil) and bladderworts; cloudy day; air temp = 55#F;
05/28/2008	pH = 7.2; Fish from 10' - 18'; 2 families of geese w/12 goslings; lily pads- reeds + cattails getting green; EWM more abundant near fish refuge and Neitzki home; Very windy yesterday; 80#F two days ago then cooler (64#F today) and dry.
06/10/2008	Landsat; pH = 7.0; Fish from 9'-19-; Rained heavily Sat + Sun - Lake Delton collapse;Reeds + Cattails are green + healthy; Lily pads blossoming; Eurasian Water Milfoil abundant w/sprigs floating in many areas; Air temp @ 65#F. Landsat; pH = 7.0; Fish from 9'-19-; Rained heavily Sat + Sun - Lake Delton collapse;Reeds + Cattails are green + healthy; Lily pads blossoming; Eurasian Water Milfoil abundant w/sprigs floating in many areas; Air temp @ 65#F.
06/18/2008	Landsat; pH=6.9; Fish between 9'-20'; water level @ 15" above normal on June 13-14-15 - highest since July 12- 2004 @ +17.75"; "No wake" traffic on lake; Phosphate + Chlorophyll samples sent in.
06/26/2008	Landsat; pH = 7.1; Fish between 11'-19'; 16 geese (8 adults- 8 younger); EWM increasing- numerous pondweeds esp. Sago- curly leaf- bladderwort; more algae than usual; Warm- dry weather.
07/04/2008	Landsat; pH = 7.2; Fish between 6'-19'; Sago Pondweed floaters; Much debris 2mm + less; EWM

SD = Secchi depth measured in feet converted to meters; Chl = Chlorophyll a in micrograms per liter (ug/l); TP = Total phosphorus in ug/l, surface sample only; TSI(SD),TSI(CHL),TSI(TP) = Trophic state index based on SD, CHL, TP respectively; Depth measured in feet; Temp = Temperature in degrees Fahrenheit; D.O. = Dissolved Oxygen in parts per million.

Date	Fieldwork Comment
	spreading near swim area + boat launch east; Milfoil sprayed 3 days prior by DNR; Dry weather w/cool nights.
07/12/2008	Landsat; pH = 7.0; Fish between 10'-19'; Many 1mm particulates; EWM treated 12 days prior; White Lily pads flowering; Reeds turning brown; Some green EWM at swimming area and Conger's property; No geese observed; Rainy and warm. Landsat; pH = 7.0; Fish between 10'-19'; Many 1mm particulates; EWM treated 12 days prior; White Lily pads flowering; Reeds turning brown; Some green EWM at swimming area and Conger's property; No geese observed; Rainy and warm.
07/21/2008	One day after Landsat; pH = 7.1; Fish between 9'-19'; Much debris 1-2mm in diameter; Some EWM is dying but new plants @ N.W. swimming area- DeLuca- Meekins- N. of Public Pier- NW end in North Basin; Much Sago- Bladderwort. One day after Landsat; pH = 7.1; Fish between 9'-19'; Much debris 1-2mm in diameter; Some EWM is dying but new plants @ N.W. swimming area- DeLuca- Meekins- N. of Public Pier- NW end in North Basin; Much Sago- Bladderwort.
07/28/2008	Landsat; pH = 7.2; Fish between 9'-19'; Yellow Lily pads blossoming; EWM appears dead at NE portion but alive at swimming area and Conger property; Pleasant weather.
08/05/2008	Landsat; pH = 7.1; Fish between 9'-19'; Many EWM sprigs floating; 16 geese flew in; 9 crows chasing hawk at SE side; Yellow + White lily pads flowering; EWM same prior locations; Warm + rainy weather. Landsat; pH=7.1; fish 9'->19' deep; many EWM sprigs floating; 16 geese flew in; 9 crows chasing hawk; yellow + white lily pad blossoms; EWM in same locations as prior report; weather warm + rainy; 70% Cumulo-Nimbus cloud cover; WNW winds at 5-10 MPH; light traffic on lake
08/13/2008	Landsat; pH = 6.9; Fish between 10'-15'; EWM still spreading: north of public pier- DeLucas- N+S Zimmermans- Meekins- Congers- Harden east- NW in N. Basin; Yellow lily pad flowers; warm + rainy. Landsat; pH = 6.9; Fish between 10'-15'; EWM still spreading: north of public pier- DeLucas- N+S Zimmermans- Meekins- Congers- Harden east- NW in N. Basin; Yellow lily pad flowers; warm + rainy. Landsat; pH = 6.9; Phosphate + Chlorophyll samples sent in; Fish between 10'-15'; EWM slowly spreading more: north of public pier - similar to last monitoring; Yellow lily pad flowers; Reeds turning brown; Light rain in AM. Landsat; pH = 6.9; Phosphate + Chlorophyll samples sent in; Fish between 10'-15'; EWM slowly spreading more: north of public pier - similar to last monitoring; Yellow lily pad flowers; Reeds turning brown; Light rain in AM.
08/13/2008	Landsat; pH=6.9; Fish 10'->15'; EWM still spreading - North of public pier- Delucas N+S- Zimmermans- Meakins- Congers- Hardens - E- NW Basin; yellow lily pads blossoming; rain in AM; 80% cumulo-nimbus cloud cover w/WNW winds at 5MPH; traffic = 1 fisherman; Phosphate and Chlorophyll sample sent in.
08/21/2008	Landsat; pH=7.3; weather warm + dry; 10% cirrus cloud cover w/SE winds @ 5MPH; traffic = 3 quiet fishing boats; fish 9'->19'; 1 mm suspended particulate matter scattered throughout; healthiest EWM @ DeLucas property - others less green; no geese.
08/29/2008	Landsat; pH=7.1; 20% cumulus cloud cover w/NW winds at 5+MPH; warm dry weather; several watercraft + tubers; fish 10'->18'; EWM growing @ DeLucas and swimming area + still present at prior sites; no geese or ducks observed.
09/06/2008	Landsat; pH=7.0; 50% cirrus cloud cover w/SSW wind @ 5MPH; rainy + cool weather; traffic = several fishing boats; fish 9'->19'; EWM - same as last week; one large EWM plant floated by at sampling site.
09/15/2008	One day after Landsat; pH=6.9; 100% cumulo-nimbus but some clearing earlier; NNE wind @ 5-10 MPH; recent weather was rain + cloudy; traffic = 1 canoe; fish 9'-19'; surveyed for EWM with Village President and certified weed applicator - found in prior locations plus more in shallow part of refuge; large flock of geese flew over; some lilies still blooming.
09/22/2008	Landsat; pH=7.1; 10% cirrus cloud cover plus very hazy; ESE winds at 5 MPH; warm + dry weather; 2 fishing boats; fish 9'->20' w/biggest fish at 11'; deciduous leaves beginning to fall; no ducks or geese seen.
09/30/2008	Landsat; pH=7.1; 50% cirrus + cumulus cloud cover w/WNW winds from 15-20 MPH; seasonal weather

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Date	Fieldwork Comment
	with some light rain; no traffic except monitor; air temperature @ 54#F; fish 9'->19' (mostly 10' -> 15'); inconsistent readings because wind shifted boat even with three anchors; EWM still prevalent; reeds and cattails turning brown; maples turning red/orange.
10/11/2008	No Landsat today; pH=7.1; 1% cirrus cloud cover w/ E wind from 0-5 MPH; seasonal weather; six fishing boats other boater- but no jet skis; air temp 60#F; fish 10'->16'(mostly 12'-14'); many gulls; dozens of geese in refuge; EWM in same areas but gray in color; lily pads NOT flowering; a busy kindfisher catching food at lake surface.

Date	Data Collectors	Project
05/09/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
05/28/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
06/10/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
06/18/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
06/26/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
07/04/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
07/12/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
07/21/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
07/28/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
08/05/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
08/13/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
08/21/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
08/29/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
09/06/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
09/15/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
09/22/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
09/30/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole
10/11/2008	Wayne Stroessner	Citizen Lake Monitoring - Water Quality - Random Lake; Deep Hole

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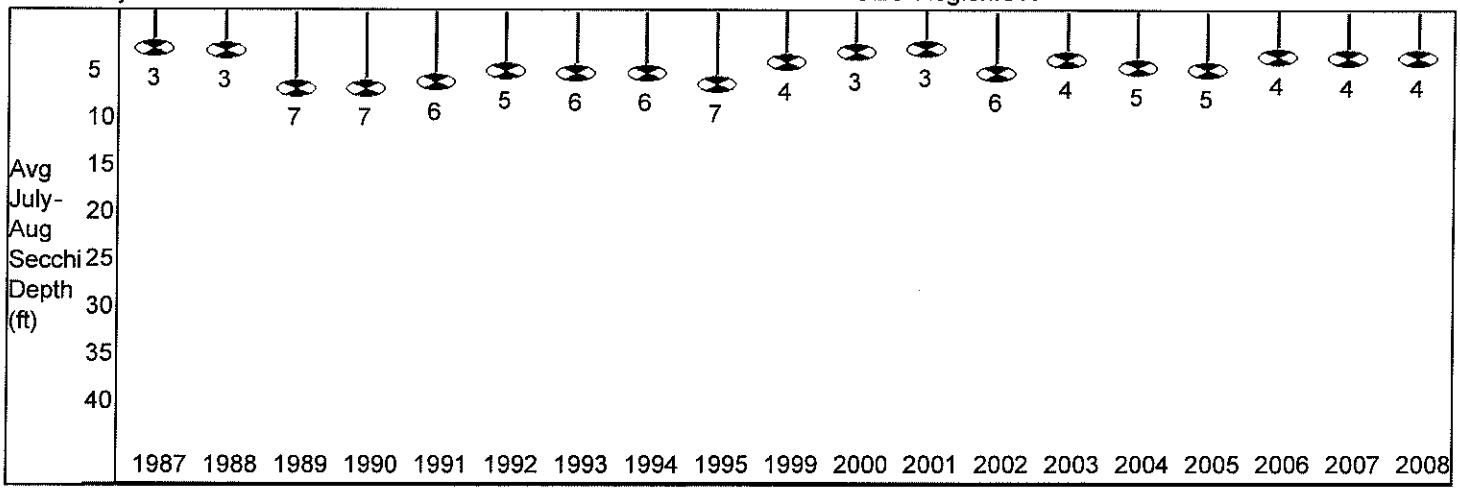
Random Lake
Sheboygan County
Waterbody Number: 30300

Lake Type: DRAINAGE
DNR Region: SE
GEO Region:SW

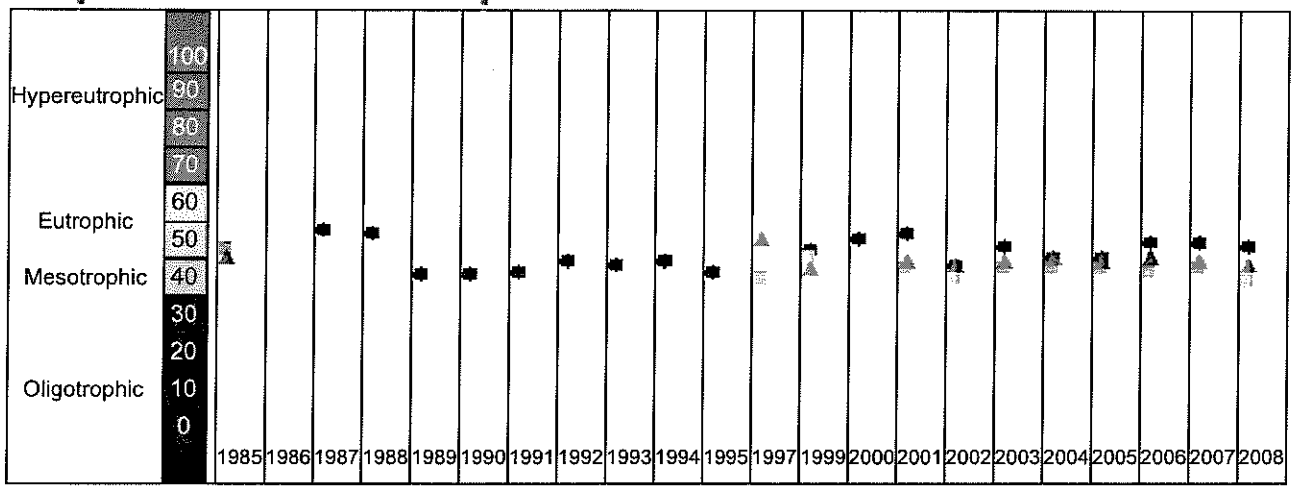


Past secchi averages in feet (July and August only).

Year	Secchi Mean	Secchi Min	Secchi Max	Secchi Count
1987	2.9	2.25	3.25	3
1988	3.1	2.5	3.5	6
1989	7.1	5.25	8	4
1990	7.1	5.5	10	6
1991	6.5	5	8	6
1992	5.4	4.25	6	4
1993	5.6	3.75	7.75	6
1994	5.5	5.5	5.5	1
1995	6.8	6.75	6.75	1
1999	4.4	4	5	11
2000	3.4	3.25	3.75	4
2001	3	2.4	4	12
2002	5.6	5	6.25	10
2003	4.1	2.75	5.25	5
2004	4.9	4.592	5.5	6
2005	5.1	4.5	5.75	4
2006	3.8	3.5	4.75	6
2007	3.9	3.25	4.5	7
2008	3.9	3.75	4.25	4

Report Generated: 04/01/2009

Trophic State Index Graph



Monitoring Station: Random Lake - Deep Hole, Sheboygan County

Past Summer (July-August) Trophic State Index (TSI) averages.

◆ = Secchi ■ = Chlorophyll ▲ = Total Phosphorus

TSI(Chl) = TSI(TP) = TSI(Sec)	It is likely that algae dominate light attenuation.
TSI(Chl) > TSI(Sec)	Large particulates, such as Aphanizomenon flakes dominate
TSI(TP) = TSI(Sec) > TSI(Chl)	Non-algal particulate or color dominate light attenuation
TSI(Sec) = TSI(Chl) >= TSI(TP)	The algae biomass in your lake is limited by phosphorus
TSI(TP) > TSI(Chl) = TSI(Sec)	Zooplankton grazing, nitrogen, or some factor other than phosphorus is limiting algae biomass

TSI	TSI Description
TSI < 30	Classical oligotrophy: clear water, many algal species, oxygen throughout the year in bottom water, cold water, oxygen-sensitive fish species in deep lakes. Excellent water quality.
TSI 30-40	Deeper lakes still oligotrophic, but bottom water of some shallower lakes will become oxygen-depleted during the summer.
TSI 40-50	Water moderately clear, but increasing chance of low dissolved oxygen in deep water during the summer.
TSI 50-60	Lakes becoming eutrophic: decreased clarity, fewer algal species, oxygen-depleted bottom waters during the summer, plant overgrowth evident, warm-water fisheries (pike, perch, bass, etc.) only.
TSI 60-70	Blue-green algae become dominant and algal scums are possible, extensive plant overgrowth problems possible.
TSI 70-80	Becoming very eutrophic. Heavy algal blooms possible throughout summer, dense plant beds, but extent limited by light penetration (blue-green algae block sunlight).
TSI > 80	Algal scums, summer fishkills, few plants, rough fish dominant. Very poor water quality.

Trophic state index (TSI) is determined using a mathematical formula (Wisconsin has its own version). The TSI is a score from 0 to 110, with lakes that are less fertile having a low TSI. We base the overall TSI on the Chlorophyll TSI when we have Chlorophyll data. If we don't have chemistry data, we use TSI Secchi. We do this rather than averaging, because the TSI is used to predict biomass. This makes chlorophyll the best indicator. Visit Bob Carlson's website, dipin.kent.edu/tsi.htm, for more info.