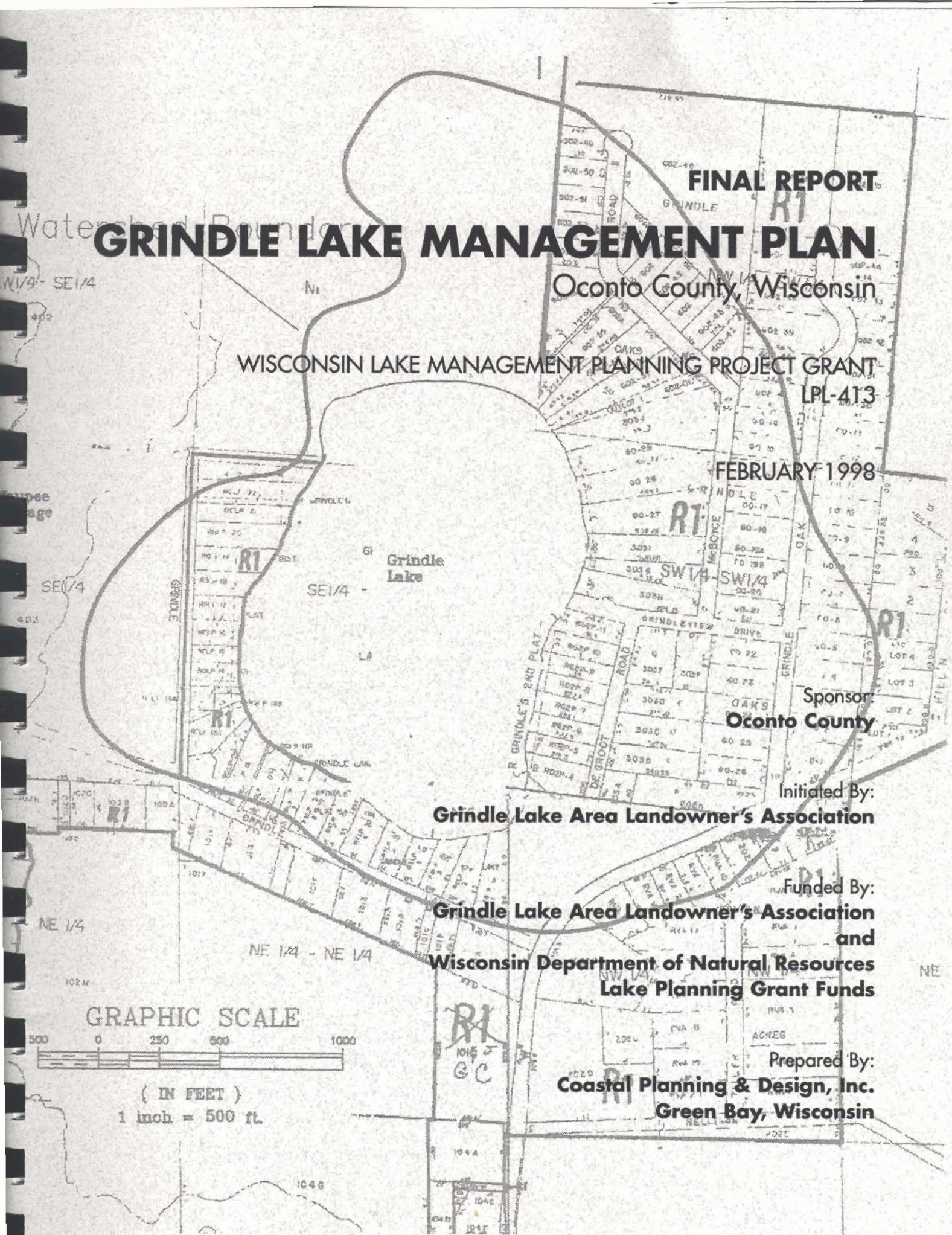

FINAL REPORT

GRINDLE LAKE MANAGEMENT PLAN

Oconto County, Wisconsin

WISCONSIN LAKE MANAGEMENT PLANNING PROJECT GRANT
LPL-413

FEBRUARY 1998

Sponsor:
Oconto County

Initiated By:
Grindle Lake Area Landowner's Association

Funded By:
Grindle Lake Area Landowner's Association
and
Wisconsin Department of Natural Resources
Lake Planning Grant Funds

Prepared By:
Coastal Planning & Design, Inc.
Green Bay, Wisconsin

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Acknowledgements

Grindle Lake Area Landowner's Association

Jerry Yaedtke
Keith Cauwenbergh

Wisconsin Department of Natural Resources

Tim Rasman

Wisconsin Adopt-A Lake Program
University of Wisconsin-Stevens Point

Libby McCann

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Summary

Grindle Lake is located in northeastern Oconto County, 18 miles west of Crivitz, Wisconsin, and about 6 miles northeast of Mountain, Wisconsin, on C.T.H. "W". It is a 42 acre seepage lake.

Over the past several years residents of Grindle Lake discussed the apparent decline in lake water clarity. Recently such concerns increased as unidentified decomposing matter was noticed on the lake's surface, in addition to the apparent decline in water clarity. This concern prompted the Grindle Lake Area Landowner's Association to initiate a study of the lake and surrounding watershed to determine if such concerns are valid. Oconto County sponsored the study through the Wisconsin Lake Management Planning Project Grant. Funding was provided by the landowner's association and Wisconsin Department of Natural Resources (DNR) Lake Planning Grant funds. Coastal Planning & Design, Inc. was retained as the consultant to do the study. Sampling and observations occurred from March to August 1997. A lake association meeting was held at the lake during the Labor Day 1997 weekend to review and discuss the results of the study.

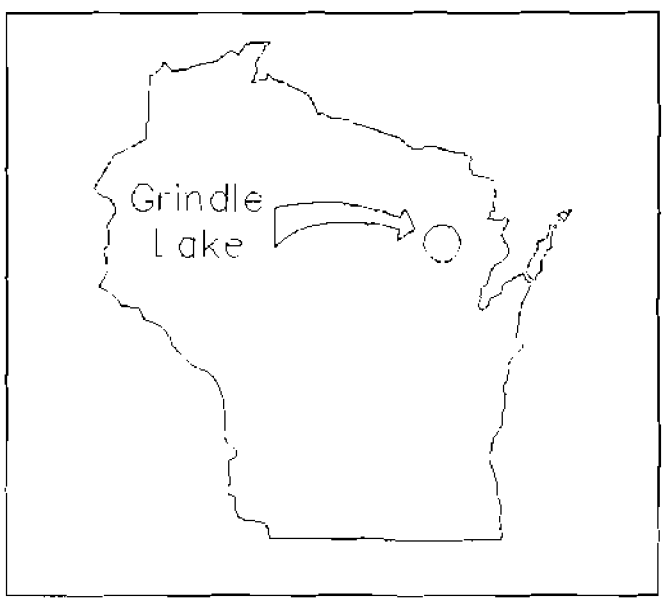
The results of the study are as follows:

- The lake is in good health. Water clarity, trophic condition and lake vegetation all indicate a healthy lake system. No exotic aquatic plants were found.
- No failing septic systems were evident. No suspicious decomposing matter was found. Most soil types around the lake however are not suited for septic tank absorption fields, or do not adequately filter septic tank effluent. Therefore it is critical to properly maintain existing septic systems and replace failed systems.
- Existing development and use of the shoreline is reasonable. In most instances riparian landowners have minimized human disturbance of the shoreline and nearshore areas to the vicinity of private docks and small swim areas.
- About 80% of the 120 acre watershed is subdivided for residential development. This is a significant portion of the watershed and about 25 lots remain undeveloped. Wisconsin construction site "best management practices" should be required and installed for all new lot construction, remodeling and other land disturbing activities.
- Residents and landowners around and near the lake seem to have a genuine interest in maintaining a healthy lake. The Wisconsin Self Help Lake Monitoring Program and Adopt-A-Lake Program are two excellent programs to maintain and foster a further understanding of the lake for residents of every age.

Grindle Lake Study

1. Introduction

Grindle Lake is a 42 acre lake located in northeastern Oconto County, Wisconsin. It is classified as a seepage lake because it receives nearly all of its water from precipitation, limited runoff, and groundwater flow. Based on USGS topographic maps, the lake watershed covers about 120 acres. There are no streams or rivers flowing into the lake. There is a small earthen overflow outlet to the Waupee Flowage in the northwest corner of the lake. It appears the lake may have been divided from the flowage along the northwest side of the lake by a modest earth berm that was either man-made, possibly during the logging era, or naturally made from winter ice shoves on the lake or other natural processes. During the 1997 open water monitoring work, there was barely any noticeable movement of water through the outlet. Residents indicated water does flow both into and out of the lake through the outlet, but most often it functions as an outlet.



The 1997 lake study was prompted by concern that lake clarity was decreasing and the observation of unidentified decomposing matter on the lake's surface. In September 1995 a DNR water quality biologist conducted a survey of the lake in response to concerns about failing septic systems. A nearshore inspection revealed no direct pipes leading to the water. No evidence of dumping or floating waste was found. The biologist also inspected a sample of material gathered by a resident but was not able to identify the nature of its contents. A letter from the DNR biologist is presented in Appendix 1.

The objective of the 1997 study was to determine what the state of the lake really is, and what measures may be needed to protect and improve the lake. Water sampling parameters and schedule were determined by the DNR with analysis by the State Lab of Hygiene. Coastal Planning & Design, Inc. gathered the samples.

2. Methods

Aerial Watershed Analysis

Coastal Planning & Design, Inc conducted an aerial reconnaissance survey of the lake and watershed on April 25, 1997. Photographs are included in Appendix 2. The photographs aided in documenting the existing land uses, topography, vegetation and development in the watershed.

Lake Monitoring

Water samples were collected and analyzed in accordance with criteria set forth by the DNR. The criteria is included in Appendix 3 along with the project grant application and award letter. Actual samples were collected using a Van Doren sampler which is lowered to the desired depth and retrieves a sample at that location Preservatives were added as necessary and then the samples were packed on ice and mailed to the State Lab of Hygiene in Madison for analysis. Lake sampling was conducted five times during 1997. The specific dates were March 16, May 13, June 18, July 16 and August 11. An underwater dive inspection, shoreline assessment, and aquatic plant survey were also done on July 16.

The following parameters were analyzed:

- Chlorophyll a
- Dissolved Oxygen
- Conductivity
- Nitrate plus Nitrite
- Total Kjeldahl Nitrogen (TKN)
- Total Phosphorus (TP)
- Ammonia
- Dissolved Reactive Phosphorus

Temperature and dissolved oxygen were recorded using a YSI Model 85 handheld meter. Recordings and samples were taken at one meter beneath the surface and one meter above the bottom in the deepest area of the lake which was approximately six meters or about 19 feet. Results of the sampling are included in Appendix 4. Also included in the appendix are three pages of results from a March 19, 1985 survey and sampling.

Aquatic Plants

Tim Rasman, DNR limnologist, and David Wentland, Coastal Planning & Design, Inc. coastal engineer, did an aquatic plant inspection on July 16, 1997 using snorkel and SCUBA gear. Specimens were collected for identification and underwater photographs taken. Shoreline vegetation was also noted and the upland, shoreline and nearshore areas were inspected from the lake for visible evidence of failing septic systems. A follow-up letter from Tim Rasman summarizing the inspection, and photographs taken on July 16, are included in Appendix 5.

3. Results

Inlake Water Quality Monitoring (1997)

	March 16	May 13	June 18	July 16	August 11
Secchi Depth (feet)	NA	12.0	12.5	12.5	11.5
Chlorophyll a (µg/l)	NA	4.37	2.57	2.13	3.52
Dissolved Oxygen (mg/l)	4.5 1.3	10.3 10.5	7.8 10.9	7.8 9.1	7.7 7.5
Total Phosphorus (µg/l)	ND ND	7 8	7 2	16 14	ND 7

4.5 ← reading at 1 meter below surface

1.3 ← reading at 1 meter above bottom

NA = Not Available

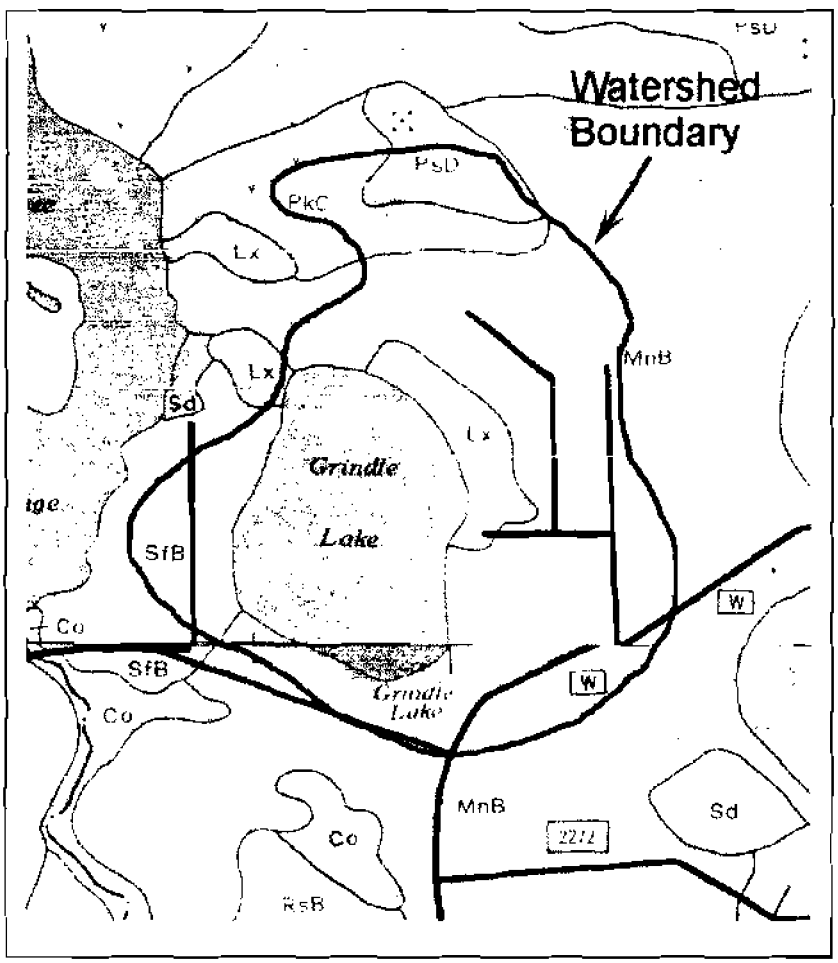
ND = Not Detected (quantity was below lowest quantitative limit)

Parameter	North Central Hardwood Forests	Western Corn Belt Plains	Northern Glaciated Plains	Northern Lakes & Forests	Grindle Lake average
Total phosphorus (ug/l)	23-50	65-150	130-250	14-27	7.60
Chlorophyll a mean maximum	 5-22 7-37	 30-80 60-140	 30-55 40-90	 <10 <15	 2.74 3.52
Secchi disc (feet)	4.9-10.5	1.6-3.3	1.0-3.3	8-15	12.2
Total Kjeldahl Nitrogen (mg/l)	< 60-1.2	1.3-2.7	1.8-2.3	<.75	.8
Nitrite & Nitrate N(mg/l)	<.01	.01-.02	.01-.1	<.75	.043
pH	8.2-9.0	8.3-8.6	8.7	8.6-8.8	6.6
TKN.TP Ratio	25:1-35:1	17:1-27.1	7:1-18:1	25:1-35:1	>15:1

Soil Survey

The U.S. Department of Agriculture Soil Conservation Service 1988 publication, *Soil Survey of Oconto County, Wisconsin*, lists five different soils types within the Grindle Lake watershed. Their general locations in the watershed are shown on the soils map. Abbreviated descriptions of the soil characteristics are as follows:

MnB-Menahga sand, 0 to 6 percent slopes. This nearly level and gently sloping, deep, excessively drained soil is often located on flats and convex side slopes. Typically, the surface layer is black sand about three inches thick. The subsurface layer is very dark grayish brown sand about two inches thick. The subsoil is strong brown and dark yellowish brown, consisting of very friable and loose sand about 20 inches thick.



Permeability is rapid in the Menahga soil. The available water capacity is low. Surface runoff is slow in cultivated areas. Organic matter content is low in the surface layer.

A cover of pasture plants or hay is effective in controlling soil blowing. This soil is suited to trees. Seedling survival can be improved by careful planting of vigorous nursery stock. Area selection or clear-cut harvest methods can minimize windthrow. Loose sand can interfere with the traction of wheeled equipment.

This soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. (Emphasis added) This soil is suited to dwellings and to local roads and streets.

Lx-Loxley mucky peat, 0 to 1 percent slopes. This nearly level, deep, very poorly drained soil is on low-lying flats in depressions and drainageways. It is subject to

ponding. Typically, the organic material is at least 60 inches thick. It is dark reddish brown mucky peat in the upper part, dark reddish brown muck in the next part, and black and very dark brown muck in the lower part.

Permeability is moderately rapid in the Loxley soil. The available water capacity is very high. The water table is above or near the surface throughout the year. It hinders root growth. The organic matter content is very high in the surface layer. If the soil is drained, the organic matter decomposes and subsidence occurs.

The undrained areas provide wildlife habitat. Because of the high water table, the periodic ponding and a low fertility level, undrained areas are unsuitable for most forage species. Reed canarygrass can be grown in these areas. Because of the highly acidic conditions and the high water table, most trees cannot grow in this soil. A few scattered black spruce, jack pine, quaking aspen, and tamarack grow on the soil.

The soil is generally unsuited to septic tank absorption fields because of the ponding (Emphasis added), to dwellings because of the ponding and low strength, and to roadways because of ponding and high potential for frost action.

Sd Seelyeville and Markey mucks, 0 to 1 percent slopes. These nearly level, deep, very poorly drained soils are in upland depressions and drainageways. They are subject to ponding. Typically, the Seelyeville soil is muck to a depth of more than 60 inches. It is very dark gray in the upper part and black and very dark brown in the lower part. In some areas more than 10 inches of mucky peat is below the surface layer.

Permeability is moderately rapid in the Seelyeville and Markey soils. Available water capacity is very high. Surface runoff is very slow or ponded. Unless drained, these soils have a water table above or near the surface throughout the year. Organic matter content is very high in the surface layer.

Most areas are undrained and wooded. A few small areas are drained and used for crops. These soils generally are unsuited to cultivated crops because the growing season is limited by frost late in spring and early in fall. Because of the high water table and the periodic ponding, undrained areas are unsuitable for most forage species. Reed canarygrass can be grown in these areas. These soils are suited to trees. The high water table during the planting season limits reforestation to natural regeneration. Harvesting with heavy equipment is limited to periods when the soil is frozen. Harvesting by clear-cut or area-selection methods helps to prevent windthrow of the remaining trees. Suitable herbicides or mechanical removal can control competing vegetation, which interferes with natural regeneration following harvest.

These soils are generally unsuited to septic tank absorption fields because of the ponding. (Emphasis added) They are unsuited to dwellings because of the ponding and low strength, and to local roads and streets because of the ponding.

SfB-Shawano fine sand, 2 to 6 percent slopes. This gently sloping, deep, excessively drained soil is on convex side slopes. Typically, the surface layer is very dark brown fine sand about four inches thick. The subsoil is brown and strong brown, very friable fine sands about 25 inches thick. The substratum to a depth of about 50 inches is strong brown, loose fine sand. In some small areas the soil is eroded.

Permeability is rapid in the Shawano soil. The available water capacity is low. Surface runoff is slow in cultivated areas. Organic matter content is low or very low in the surface layer. This layer is very friable and can be easily tilled.

A cover of pasture plants or hay is effective in controlling soil blowing. Overgrazing, however, reduces the extent of the protective cover and thus increases the susceptibility to erosion and soil blowing. Yields generally are low unless fertilizer and irrigation water are applied. The best planting time is early in spring, before the surface layer dries out. A later planting time is likely to result in a poor survival rate unless this soil is irrigated. The soil is suited to trees. The seedling survival rate can be improved by careful planting of vigorous nursery stock. Suitable herbicides or mechanical removal can control competing vegetation, which interferes with natural regeneration following harvest.

The soil adequately absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. (Emphasis added) The soil is suited to dwellings and to local roads and streets.

Co-Cormant loamy fine sand, 0 to 1 percent slopes. This nearly level, deep, poorly drained and very poorly drained soil is on low-lying flats and in depressions and drainageways. It is subject to ponding. Typically, the surface layer is very dark gray loamy fine sand about nine inches thick. The substratum to a depth of about 60 inches is mottled, loose fine sand. It is dark grayish brown in the upper part and grayish brown in the lower part. In some places the surface layer is mucky loamy fine sand, loamy sand, or sand.

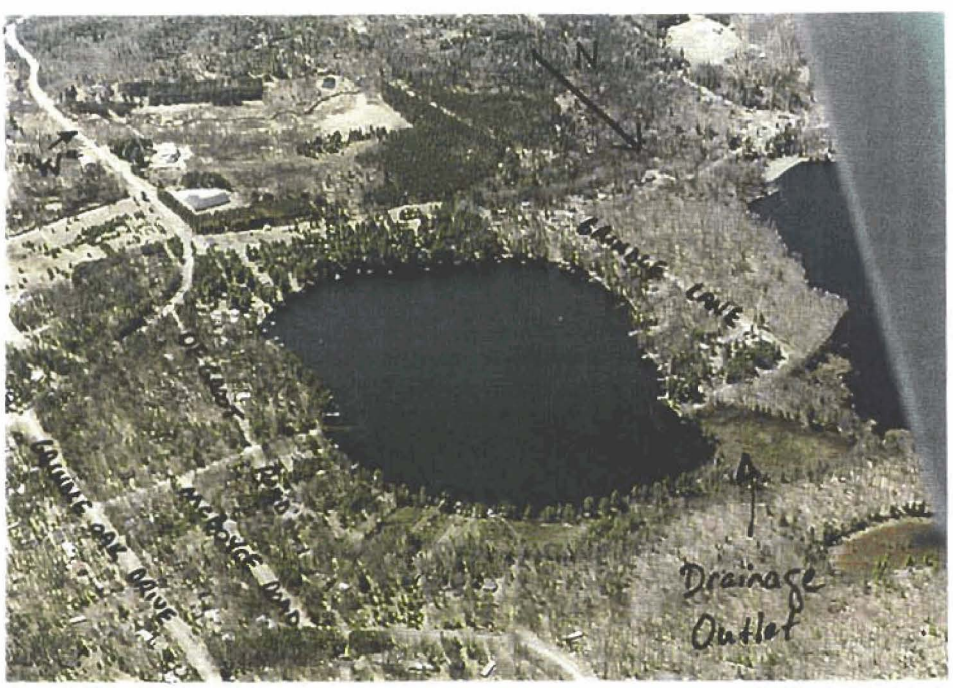
Permeability is rapid in the Cormant soil. The available water capacity is low. Surface runoff is very slow or ponded. Unless the soil is drained, the water table is above or near the surface throughout the year. It hinders root growth. Organic matter content is high or very high in the surface layer.

This soil is generally unsuited to septic tank absorption fields because of the ponding and the rapid permeability and to swellings because of the ponding. Overcoming these limitations is difficult, and a more suitable site should be selected. (Emphasis added) The soil is poorly suited to local roads and streets because of the ponding. Culverts and ditches can remove surface water, and fill material can raise the roads and streets above the ponding level.

4. Discussion

To help understand the results of the Grindle Lake water quality data gathered in 1997, it is important to understand the general processes that occur in a lake. A good resource publication is *Understanding Lake Data* by Shaw, Mechenich and Klessig. One copy of the publication is included with the final report to the lake association. Additional copies are available from the local Wisconsin county Extension office or from Extension Publications, Rm. 245, 30 N. Murray St., Madison, 53715, (608) 262-3346.

During most years, Grindle Lake receives the majority of its water from groundwater flow, with the remainder coming from surface flow during precipitation events. Lake residents at the Labor Day weekend meeting mentioned that the adjacent Waupee flowage does flow occasionally into Grindle Lake through the drainage outlet in the northwest corner of the lake (see picture). The fact that Grindle Lake receives most of its water from groundwater flow means landowners in the watershed should be particularly mindful of what they apply to their yards in terms of fertilizers, pesticides, and other products that will drain through the soils and to the lake. Residents should also try to recognize the particular soil characteristics of their property and understand the possible limitations of such soils. Many of the soils around the lake are not well suited to absorb and filter wastewater effluent, fertilizers, and other pollutants.



The following discussion addresses several of the parameters used in compiling the Trophic State Index (TSI). The TSI is commonly used to measure the health of a lake. It rates a lake's productivity, which corresponds directly to the level of nutrient concentrations. It also rates lake clarity, oxygen levels, and other factors such as fish

species found in the lake. Highly productive lakes are called eutrophic. Lakes with low productivity are called oligotrophic. A mesotrophic lake is the midrange description in productivity. Grindle Lake ranks as oligotrophic to almost mesotrophic. Two of the key nutrients tested for in lakes are nitrogen and phosphorus. These two nutrients are usually the limiting factors in determining plant productivity.

a) Clarity

Clarity is a measure of water quality related to chemical and physical properties. It can be separated into two components: suspended materials and dissolved materials. The algae population is part of the suspended component and it is usually the most variable parameter. Although algae are found naturally in lakes, too large a concentration can cause severe problems.

A secchi depth of 10 feet is generally regarded as good water clarity. The secchi depth for Grindle Lake was consistently between 11.5 to 12.5 feet, and averaged about 12.2 feet in 1997. The rule of thumb is that sunlight can penetrate 1.7 times the secchi depth. For Grindle Lake, this means that photosynthesis can occur to a depth of about 20.7 feet, very near the maximum depth found in the lake. This seems to correlate well with the observations of the July 16 dive which found plants on nearly the entire lake bottom. There was only a small area less than 100 feet in diameter in the deepest area of the lake with just a few plants.

b) Dissolved Oxygen

The dissolved oxygen (DO) in Grindle Lake ranged between 4.5 milligrams per litter (mg/l) in March and 10.9 mg/l in mid-June. One mg/l is equal to one part per million (PPM). The lowest DO during the year usually occurs in the spring during ice out. A reading of 4.5 mg/l in March (the normally lowest concentration time of the year) suggests there is an adequate oxygen concentration to sustain fish populations in the lake. There was 10 inches of snow cover on a 17 inch ice sheet on March 16.

c) Chlorophyll

The chlorophyll-a ranged from 2.13 microgram per liter (µg/l) to 3.52 µg/l. One µg/l is equal to one part per billion. This is an indicator of the amount of algae in a lake. Levels found in Grindle Lake indicate an oligotrophic condition, which is a desirable nutrient-poor or fairly nonproductive lake condition. A level of 6.5 µg/l to 10 µg/l indicates a mesotrophic lake while a level of 11 µg/l or greater would indicate a eutrophic (highly productive) lake. (Shaw et al.)

d) Nutrients

Of all nutrients needed by plants, phosphorus is the key nutrient affecting the amount of algae and weed growth. Phosphorus originates from a variety of sources, many of which are related to human activities. Major sources include human and animal wastes, soil erosion, detergents, septic systems and runoff from farmland or lawns. High nitrogen and phosphorus levels in lakes increases the plant productivity, which often

occurs as algae blooms. These blooms often block out sunlight, which causes rooted plants to be shaded out.

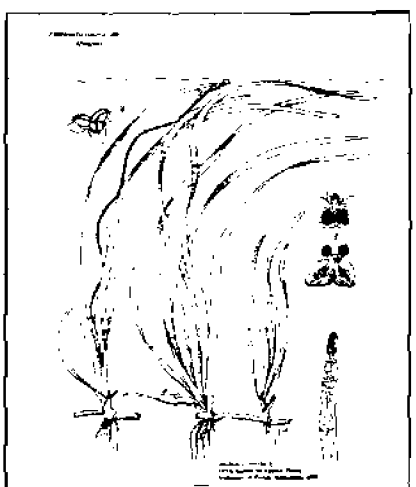
Aquatic plants need about 15 times as much nitrogen as phosphorus during photosynthesis. This assumes that phosphorus is the limiting nutrient based on Total Kjeldahl Nitrogen (TKN) to Total Phosphorus (TP) ratios greater than 15:1. The total phosphorus levels found in Grindle Lake ranged from 2 and 16 mg/l, which are indicative of a healthy lake. In the surface water of Grindle Lake, phosphorus concentrations ranged from 7 µg/l to 16 µg/l. Phosphorus concentrations near the bottom of Grindle Lake ranged from 2 µg/l and 14 µg/l. Phosphorus levels for an oligotrophic lake range from 3 µg/l to 10 µg/l and for an mesotrophic lake range from 18 µg/l to 27 µg/l.

A lake with a soluble reactive phosphorus concentration of 10 µg/l or less at spring turnover usually will not have summer algae blooms. Grindle Lake had a concentration of 2 µg/l at spring turnover.

e) Aquatic Plants

Plant species were collected and identified during the July 16 dive by Tim Rasman, DNR limnologist, and David Wentland, Coastal Planning & Design Inc. coastal engineer. Aquatic specimens were taken back to the Lake Michigan DNR office in Green Bay for identification. Existing plants can serve as an indicator of lake health. Plant species that were found included:

1) Potamogeton foliosus (leafy pondweed) Frequently in creeks, ditches, and lakes. Few authorities warrant it much taxonomic significance.
2) Potamogeton pusillus (small pondweed) Frequently in calcareous waters.
3) Eriocaulon septangulare (pipewort) Usually in calcareous soil, very rare on lake borders.
4) Isoetes sp. (quillwort family) No preference of substrate. Not much known about it.
5) Potamogeton ampifolius (large-leaf pondweed) Common in lakes.
6) Vallisnerai americana (wild celery, eel grass) Found in shallow water of lakes and streams.
7) Najas flexilis (slender naiad) Often found in calcareous streams and ponds.
8) Nitella sp. (algae) This algae is found infrequently on a variety of substrates.
9) Brasenia schreberi (watershield) Common emergent plant with no preference for a hard or soft substrate.



Vallisnerai americana

According to Tim Rasman there was only one plant that could be considered dominant in Grindle Lake. The particular plant was a member of the genus of algae known as Nitella sp. Tim Rasman noted that not much additional information was available on the plant besides the fact that it is found infrequently on a variety of substrates. An encouraging note was that all plants taken from Grindle Lake the day of the survey are native to Northern Wisconsin. There was no evidence of any of the exotic species, such as Eurasian water milfoil, which is becoming a serious concern elsewhere in Wisconsin.

Tim Rasman noted the aquatic plant commonly known as watershield was found in Grindle Lake. According to Tim, it provides good cover for fish and other aquatic life and its seeds are a source of food for waterfowl. If it becomes overly abundant, cutting and raking are the best methods for controlling it.

The species Isoetes sp. or quillwort was also found in Grindle Lake. According to Nichols and Vennie 1991, it is a submergent plant found mostly in soft waters. The root crown is small therefore making it vulnerable to being uprooted. Gases from decomposing plant and sediments uproot it and bring it to the surface where it is subject to wind and wave action. It can be used as compost or mulch if removed from dock and swim areas.

Rooted plants were found on nearly the entire lake bottom except for a small area considered to be the deepest part of the lake at about a depth of 21 feet. This area was about 100 feet across and would be less than 1% of the lake bottom.

5. Lake Management Recommendations

Tests and observations in 1997 indicate Grindle Lake is in good condition. The lake association appears involved and committed to protecting the existing quality of the lake, and improving it when possible. What more should be done? Here is a list of recommendations beginning with immediate action items followed by longer-range measures for consideration.

- **Require proper erosion control for home builders**

One of the surprising pieces of information that came out of the study was the extent of land in the watershed subdivided for development. Grindle Lake has a very small watershed of about 120 acres, but about 80% of the area is subdivided for residential development. Existing subdivision plats delineate about 122 lots in the watershed of which about 97 lots or 80% have homes now. About 25 lots remain to be developed. Construction site erosion is one of the leading causes of water quality problems in Wisconsin. In recent years the state and counties have taken a far more aggressive position in controlling construction site erosion.

Included in Appendix 6 is a publication entitled, *Erosion Control for Home Builders*. This publication provides many practical and effective methods with diagrams and step-by-step instructions to implement a proper erosion control plan for home construction. It also has equal value for home renovations, additions, garages and other lot disturbance activities. This publication is easy to read and straightforward. There are numerous other documents including the *Wisconsin Construction Site Best Management Practices Handbook* which describe additional erosion control and stormwater management practices. The handbook is a three ring binder document available from DNR as Publication WR-222. Generally the local building inspector is responsible to ensure compliance, but a more proactive approach for the lake association and neighbors is to know about such practices and then make certain the local building inspector enforces this building requirement.

- **Maintain your septic system**

Every home in the watershed has some type of wastewater disposal system. Most have septic systems with a conventional soil absorption field. Some homes have replaced failed systems with new mound systems. Maintaining a properly working septic system is one of the most important things each and every homeowner should do.

A properly maintained septic system adequately filters wastes. A clogged system does not and forces nutrients and wastes into layers of soil not capable of properly filtering the waste material which then flows beneath the ground surface to the lake. Most soil types around Grindle Lake are not suited for septic tank absorption fields, or do not

adequately filter septic tank effluent. Since Grindle Lake receives nearly all of its water through the ground, septic systems should be examined regularly.

A few guidelines regarding septic systems have been put together by the DNR.

1) Locate drain fields as far as possible from lake.
2) Divert surface water away from the drainfield.
3) Avoid driving or parking over the drain fields to prevent compaction of the soil and premature failure of the system.
4) Pump the tank in an at-grade or mound system at least every three years. Increase the frequency of pumping if you have a large family.
5) Pump the holding tank when the alarm indicates a full tank.
6) Keep roots of trees and shrubs away from drain field pipes to avoid obstructed drain lines.
7) Avoid using a garbage disposal; compost your vegetable scraps with lawn refuse instead.
8) Minimize use of phosphate containing detergents and water conditioners.

There are warning signs that indicate possible septic tank leakage.

1) Sewage backing up in the basement or drains.
2) Ponded water or wet areas over the drain field.
3) Bright green grass over the drain field may indicate the system is forcing effluent to the surface.

Enclosed in Appendix 7 are two publications with additional information entitled, *Maintaining Your Septic System* and *Is The Grass Greener Over Your Septic System?* Both offer excellent introductory information about how your septic system works, how it should be maintained, household hints that help minimize maintenance costs, protect the lake and groundwater, and prolong the life of a system, and what to notice when a system is not working properly.

- **Properly Handle Other Potential Wastes and Pollutants**

Beside the septic system, the other many other ways groundwater and the lake can become polluted. Some examples are:

- ✓ Pet waste
- ✓ Lawn and garden fertilizers
- ✓ Lawn watering
- ✓ Car care for cleaner water
- ✓ Bathing and washing in the lake

Each of these activities can affect the health of Grindle Lake, and properly dealing with pet waste, the application of fertilizers, washing a car, or bathing in the lake is usually a minor lifestyle adjustment. As further information on proper ways to handle these matters, the following brief publications are also enclosed in Appendix 7.

- *Pet Waste and Water Quality*
- *Lawn and Garden Fertilizers*
- *Lawn Watering*
- *Car Care for Cleaner Water*

One of the issues that came up during the lake association Labor Day meeting was bathing in the lake. Some people like the soft water of the lake for bathing. Bathing with soap and rinsing directly in the lake however can harm the lake by adding more phosphorus and other chemicals to the water. If one person does it, is it a problem? Maybe, maybe not. Several problems arise. If one person can do it, can everyone? When does it become too many? Also, what sort of image and respect for the lake does such a practice convey to others?

These are not easy issues to answer and generally it is best if such practices do not occur. In Wisconsin it could also be a violation of Wisconsin's water quality laws under Chapter 29.29 regarding discharge of a deleterious substance or waste to a receiving water. If bathing with lake water is important, is there another way to do that? Tim Rasman of the DNR suggested a person could take a bucket of lake water far enough on land and bathe, being careful the water does not drain directly back into the lake. If the gray water from bathing drains on a grass covered area the phosphorus and other chemicals can be absorbed by the grass and further filtered through the soil before ending up back in the lake. The same is true for washing pets, cars, ATVs and boats.

Another issue brought up by Coastal Planning & Design Inc. at the Labor Day meeting was the large number of bottle rocket sticks found on the bottom of the lake during the July 16 dive. Residents at the meeting mentioned it is common for several weekends before, during and after the 4th of July to shoot bottle rockets over the lake. What impact does this have? Maybe not much, but like drinking or doing most things, "moderation" is probably a proper mind-set for such an activity. The wood stems and paper firecracker cylinders will eventually decay but the chemical residue is added to the water and sediment. Since the lake is not very large it may also be possible to gather many of the spent bottle rockets by someone that is a diver or snorkeler on a volunteer basis.

- **Check Boats and Trailers for Aquatic Plants Before Launching Into the Lake**

!!! Eurasian Milfoil Alert !!!

!!! Zebra Mussel Alert !!!

Exotic aquatic plants and animals are significantly changing natural lake conditions in many Wisconsin lakes. So far Grindle Lake does not appear to have eurasian milfoil, zebra mussels, or other exotic invaders which can noticeably change lake dynamics. Several things can be done to reduce the chance of having such problems.

Signs are available free of charge from the DNR to be posted at lake access points to inform people about exotic plants and animals and how to reduce the chance of them entering the lake. They are available from Tim Rasman of the DNR.

The lake association should also take a proactive, educational position by providing information to residents and users of the lake with information about exotic alerts. A wealth of information is available from the DNR, Wisconsin Sea Grant and county zoning office.

- **Minimize Human Disturbance of Nearshore and Shoreland Buffer Areas**

Residents living around the lake should be commended for maintaining much of the shoreline and nearshore lake zone of Grindle Lake in a natural condition. Just because someone owns a 47, 75, 100 or 120 foot wide lot along the lake does not mean that riparian owner has the right to rake clean and bulkhead the entire shore width. A 35 foot wide area for a boat dock and beach are generally adequate. Shoreline owners on Grindle Lake have generally done a very good job of this.

When larger nearshore areas are cleared it becomes more dangerous for juvenile fish to avoid predators when passing from weed cover to weed cover in the shallow water. Bulkheading shorelines with vertical walls also makes it difficult for animals and amphibians to move from land to water and back. A vegetated shoreland buffer zone also provides a filtering mechanism trapping pollutants in surface runoff before the water reaches the lake.

Again there are many brief but excellent publications addressing shoreland buffer zones and why they should be protected. There are also many publications on building near wetlands, and beneficial landscape practices, shoreline plants and landscaping for Wisconsin lakeshore owners. Publications included in Appendix 8 are:

- *What Is A Shoreland Buffer Zone?*
- *Why Protect Shoreland Areas?*
- *Building Near Wetlands*
- *Beneficial Landscape Practices*
- *Shoreline Plants and Landscaping*

It is also important to know what to do with aquatic plants removed from around a dock or swim beach area. By law cut or raked plants must be removed from the water, but if

handled properly they can be valuable as mulch or compost. Also included in Appendix 8 is a DNR publication entitled, *What To Do With Harvested Aquatic Plants*.

- **Long-Term Monitoring and Lake Education**

The 1997 lake study and sampling work established a good benchmark of the health of Grindle Lake in 1997. There was some additional data collected in 1985 which is also included with the 1997 results in Appendix 4. As times change though so can the health of the lake.

Wisconsin has established and promotes a number of excellent ways for lake residents, lake associations and concerned citizens to become and stay involved in understanding and caring for a lake. For continued lake monitoring, the DNR has since 1986 established partnerships with citizen volunteers to monitor lake health through the "Self Help Lake Monitoring" program. Over 700 volunteers participate in the program statewide. The program begins the first year with water clarity measurements using a secchi disc. After participating in the Self Help program for one year, a volunteer can begin water chemistry monitoring. The volunteer collects and reports on clarity, water temperature, phosphorus, and chlorophyll. This information is then used to determine the ongoing trophic state (health) of the lake. Volunteers are trained and provided with a manual, sampling equipment, and data sheets. Openings for chemistry monitoring are limited and depend on the interest of the volunteers and the needs of the lake. With nearly 15,000 lakes in Wisconsin, the DNR does not accept every request to participate in this program. An advantage and credit for Grindle Lake however is the active and strong Grindle Lake Area Landowner's Association, and 1997 study, which will hopefully help in securing an opening in the program. Further details on the program and how to contact the DNR coordinator of the program are included in Appendix 9.

A second excellent program is the Adopt-A-Lake program through the University of Wisconsin-Stevens Point. The coordinator for the program is Libby McCann and she can be reached at 715-346-4038.

Adopt-A-Lake is an interdisciplinary program which encourages youth to learn about inland lakes in Wisconsin while actively working to protect those resources, especially through hands-on activities. It also supports youth and adults working together to protect lakes in their communities. A large folder of information about the Adopt-A-lake program, which also includes other programs, is include with the final report to the lake association.

A third program that appears to be another excellent educational and life-long resource is the Wisconsin's Aquatic Resources Education Program. It is operated by the DNR, Bureau of Fisheries Management and funded from anglers through the Dingell-Johnson Federal Aid in Sport Fish Restoration Act. The program is billed as "for fish, for fun, for the future!". It is about how fish live and what they need to survive. It is also about

learning and teaching fishing skills and protecting Wisconsin's diversity of waters, and developing lifestyles and skills that will keep the diversity alive for many generations. Additional information is included in the brochure in Appendix 9. The DNR contact is Aquatic Resources Education, 608-266-2272, in Madison.

Besides the programs just mentioned, there are also many books and publications with great ideas for living around and maintaining a lake. Two excellent books that accompany the report are:

Life on the Edge... Owning Waterfront Property
Produced by: University of Wisconsin-Extension

Lake Smarts "The First Lake Maintenance Handbook"
A Do-It-Yourself Guide to Solving Lake Problems
Produced by: Terrence Institute

- **Fishery Stability and Enhancement**

Grindle Lake has an established northern pike, largemouth bass and panfish fishery. This is a good mix of native species and the lake association should focus on protecting the survival of those species.

In a conversation with Russ Heizer, DNR Fisheries Manager, he stated the #1 problem on most lakes is the removal and destruction of nearshore fishery habitat. On some lakes the shoreline and aquatic weeds have been cleared from one property line to the next and there is no longer nursery habitat for young fish. As mentioned earlier, Grindle Lake waterfront owners have done a commendable job so far minimizing the human impact of bulkheading and nearshore clearing. He suggested a width of 10 to 15 feet alongside a dock for boat tie-up and swim beach. This offers young fish a better chance to avoid predators as they swim from weed cover to weed cover in the nearshore area.

Stocking walleye in Grindle Lake is not recommended. Survival competition between the walleye and largemouth bass will decrease the number of bass and unless restocked almost annually the walleye population will sustain itself at about five 15 inch size fish per acre. Catching a walleye this size will be rare and not offer enough fishing action for most people to enjoy. Largemouth bass on the other hand are naturally reproducing in Grindle Lake and can easily be 12 inch size. Catching a 12 inch bass in Grindle Lake is far easier to do than would be a walleye. Many fisherman also "catch and release" bass so the enjoyment of the catch is recycled two to three times for many bass. Bluegills and black crappies can also provide an enjoyable fishing experience on Grindle Lake.

If the lake association is interested in enhancing bass and panfish habitat, fish cribs can help. A fish crib in 13 to 17 feet of water can provide good cover for larger fish. In

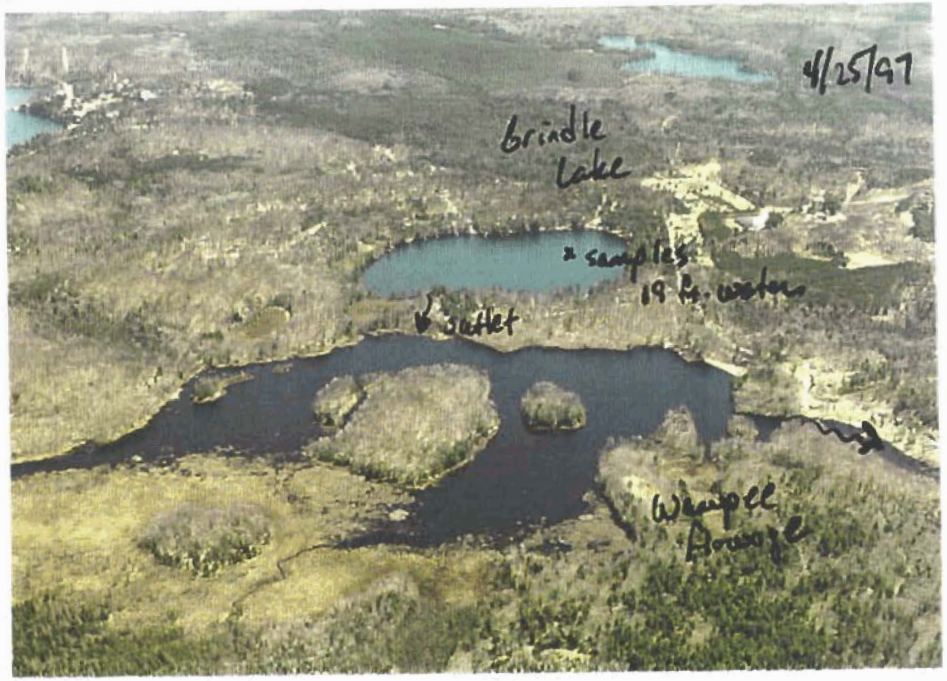
shallower water a eight to ten inch diameter x four foot long oak log in about three feet of water is good for largemouth bass. The log should have a concrete block on either end and set on the lake bottom on the blocks so the log is off the bottom and fish can use the log as cover. The log should be set perpendicular to the shoreline. Russ can be contacted at the DNR Peshtigo Office, 715-582-5009, for additional information. Generally the DNR does not manage lakes under 200 acres.

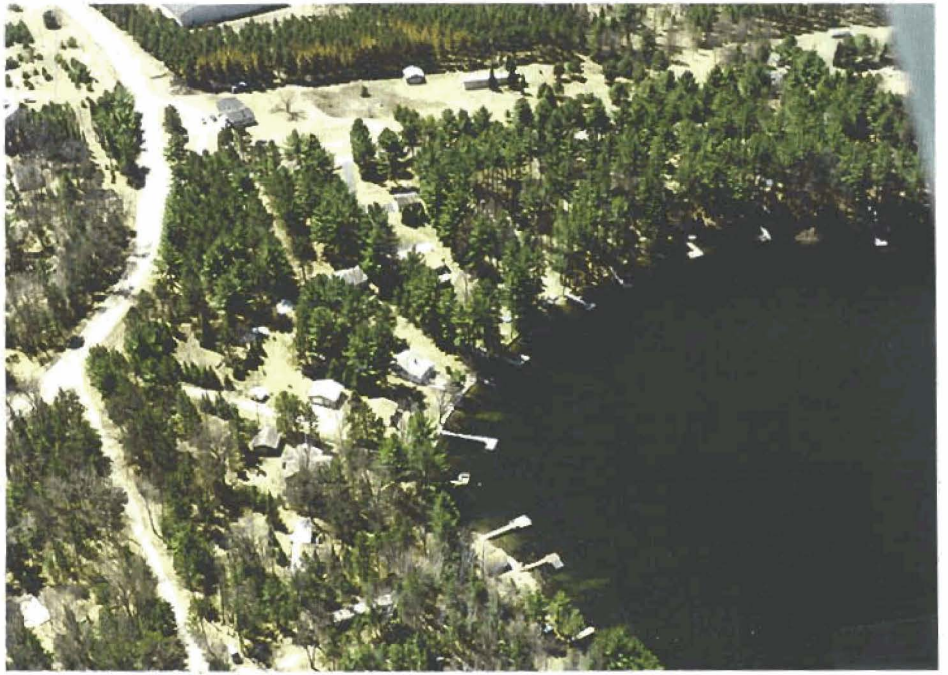
Appendix 2

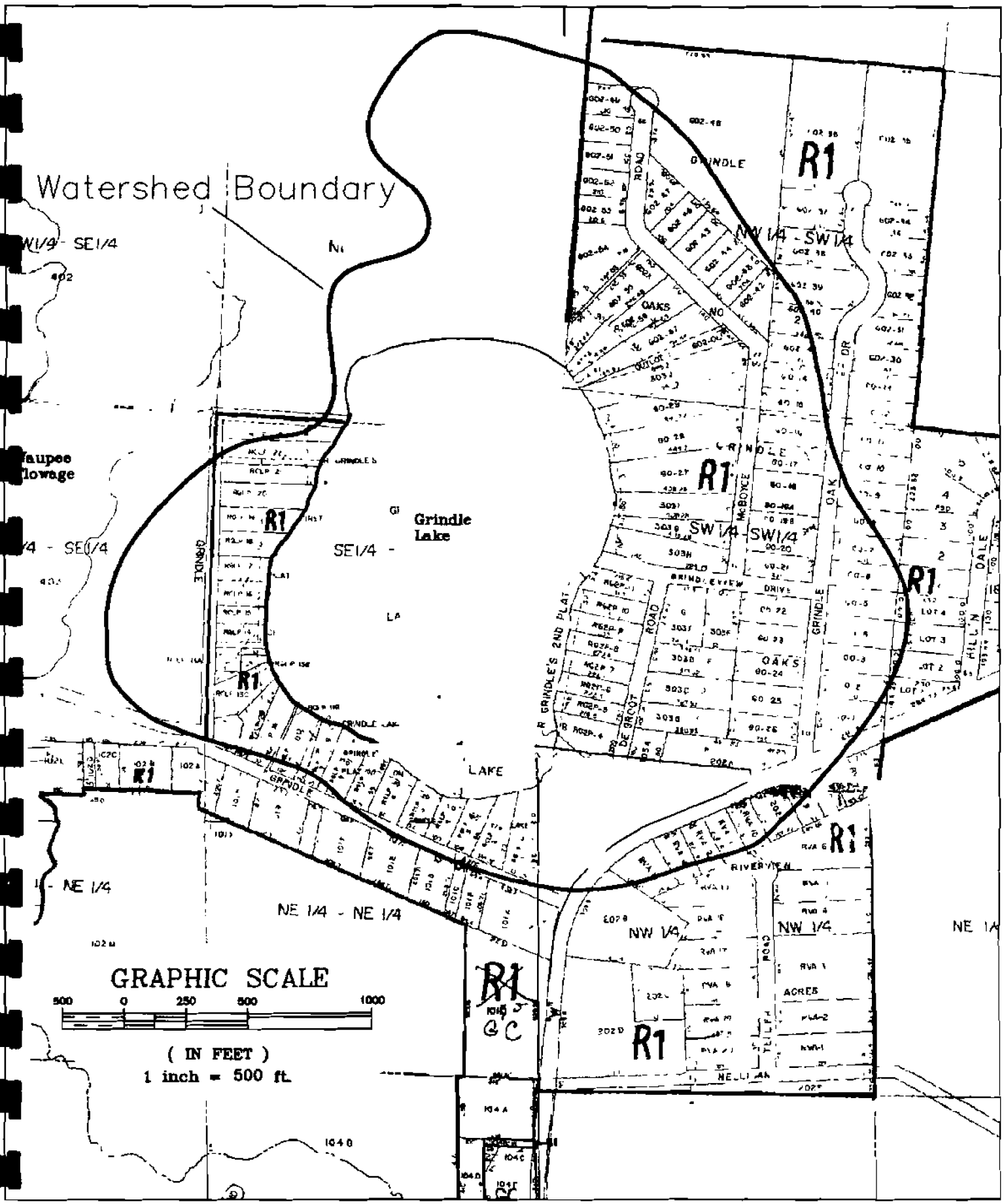
Aerial Photographs of Grindle Lake

April 25, 1997

Grindle Lake Management Plan


4/25/97
Brindle Lake
= samples
19 ft. water
outlet
Wampee Drainage




Watershed Boundary
Grindle Lake
GRINDLE
R1
NW 1/4 - SW 1/4
SW 1/4 - SW 1/4
SE1/4 -
NE 1/4 - NE 1/4
NW 1/4
LAKE
OAKS
McBOYCE
OAK
DE GROOT ROAD
RIVERVIEW
ACRES
GRAPHIC SCALE
500 0 250 500 1000
(IN FEET)
1 inch = 500 ft.