



Community Profile: Mayflower Lake

by Thomas J. Wilson and Don Genrich

Mayflower Lake is located in the extreme eastern portion of Marathon County, about 25 miles east of Wausau, and is one of the few lakes in the entire county. The lake is approximately 90 acres in size and has a maximum depth of around 16 feet.

The southern and eastern shoreline contains numerous seasonal homes, several permanent residents, and one resort. A campground is located on the northern shore of the lake and a public access is available on the eastern shore.

The Mayflower Lake watershed comprises approximately 600 acres. Much of the watershed is either marsh or lowland forest. The fishing in the lake is composed of walleye, largemouth bass, and a few northern pike. Abundant panfish include bluegill, yellow perch, and pumpkinseed.

The lake district was established in 1975 by resolution of the Norrie Town Board because of periodic winter fish kills and a problem of weed growth. In 1976, a tax was levied on all properties within the 6-square mile (3,800 acres) lake district boundary. The \$1,031.96 generated during that first levy was used to finance part of the district's share of the feasibility study. This has been the only time since the lake district's existence that property owners were taxed for lake district operational needs. Field work for the feasibility study on the lake was prepared by Northern Lake Services of Crandon, Wisconsin. The total cost of the study was \$7880, of which 60% (\$4728) was funded by the Office of Inland Lake Renewal, DNR. Much of the local dollar request came from "in-kind" support from lake district members.

Following the feasibility study, DNR staff listed a number of potential alternatives, including: lake deepening, watershed management activities, aeration, sediment consolidation by drawdown, weed harvesting, and chemical control. The lake district determined that survival of the fishery was the most important concern and that aeration was needed.

At the August annual meeting in 1980, the lake district decided to install a permanent aeration system. Prior to this date, several attempts were made to aerate the lake with temporary systems. The new, permanent system, costing approximately \$7750, was installed in November 1980, just prior to freezeup. Eighty percent of aeration costs were obtained through a Wisconsin Inland Lake Renewal Grant, \$1000 was received from Marathon County, and the remainder was financed by the lake district.

tract funds have been obtained by conducting raffles each year since 1978.

The system has been successful in maintaining high oxygen levels, thereby eliminating any potential winter fish kill since the winter of 1980-81. The aeration system has been operated for as little as three weeks to as much as three months per year, depending on the severity of the winter.

As the annual raffle was raising about \$3000 to \$4000 per year, substantially more money than necessary to maintain the aeration system, other management alternatives were considered. In 1984, the district purchased a weed harvester. The harvester is operated voluntarily by members of the lake district. Each summer, tons of weeds have been harvested and used by neighboring farmers.

In 1984, the Mayflower Lake District petitioned for self-governance and has elected their own Board of Commissioners. The Chairman of the Town of Norrie, however, was elected to the Commission and remains Chairman of the District.

Today, Mayflower Lake is a better place to live and recreate because of what has been accomplished by the lake district. The aeration system prevents any potential winter fish kills, and the weed harvester has helped to maintain a more usable area of water during the summer months. Lake district members are considering a bigger and better weed harvester in the future. The raffle is generating over \$4000 per year, which is enough to operate and maintain both the aeration system and the weed harvester—and liability insurance. However, if the liability insurance premium skyrockets again, the district may have to seek other alternative funding sources. Taxing and special assessments are not the preferred way to generate dollars by this enthusiastic group of property owners. Currently, the district is holding a second raffle this fall to purchase game fish for the lake.

Mayflower Lake is an excellent example, as many lake communities are, of a group of concerned citizens who have made a commitment to improve their living or vacation environment. It has been accomplished through cooperation between the State Department of Natural Resources, Marathon County, the Town of Norrie, and most importantly, the Mayflower Lake District volunteers. As a result, everyone benefits whether they use the water body for fishing, boating, swimming, water skiing, or natural beauty.

Tom Wilson is Marathon County Cooperative Extension Service Resource Development Agent. Don Genrich is Chairman of Mayflower Lake District.



The Role of the Cooperative Extension Service

by Lowell L. Klessig

The Cooperative Extension Service is a partnership of the federal, state, and county governments, designed to provide unbiased information and educational services. Two types of educators make up the Cooperative Extension Service.

Community-based Extension agents work in the courthouse or other facility in each county. The number of agents varies from county to county. The resource or community development agent is the most likely to be involved in water quality. In special situations, the agriculture, family living, or 4-H/Youth agent may be involved.

The second type of Extension educator is a state specialist. Specialists are faculty members at one of the campuses of the UW-System. Most have campus teaching or research responsibilities in addition to their Extension appointments. Specialists back up agents by providing them with educational materials, consultation, community presentations, and in-service training.

The Cooperative Extension Service model of communication is shown below:

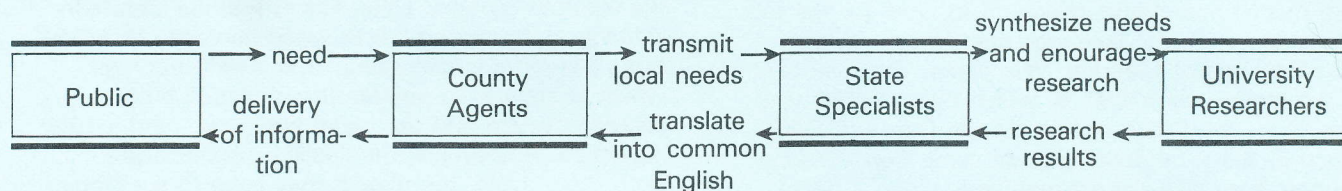
In the last issue of *Lake Tides*, Mary Ellen Vollbrecht outlined the specific role of Department of Natural Resources staff in the state's lake management program. The role of the Cooperative Extension Service is more general. Water quality is, however, a major educational priority.

State specialists are available at UW-Madison, UW-River Falls, UW-Stevens Point, and UW-Superior. Some deal with lakes and fisheries directly, others concentrate on soil and water conservation in the watershed, or on groundwater quality. The local Extension office can provide information and materials and, if necessary, put you in touch with the appropriate specialist.

The intensity of involvement of the local agent depends on the priorities in the county and the specific needs in the lake community. An agent is most likely to be involved in the educational activities surrounding the organization of a formal group. Some are able to also help secure financing, facilitate projects, and provide educational programming at annual meetings. Bernie Kasierski, the Green Lake County Resource Agent, edits the *Lake Puckaway District Newsletter*.

Given all the other demands on their time, agents are more likely to help you develop the ability to carry out a leadership function than to provide that service on a continuing basis. Many agents have specific training in natural resources; all have communication skills and knowledge of county government that they would be happy to share with you—if you ask them.

Lowell Klessig is Professor of Resource Management and Cooperative Extension Service Specialist, College of Natural Resources, UW-Stevens Point.



Prime Messages: What All Wisconsinites Should Know About Lakes

1. A lake is larger than its shoreline.
2. Get involved in political decision-making to protect lakes.
3. Know how lakes work—a simple explanation.
4. Lakes are important to human health and wellbeing.
5. Local leadership can effectively protect lakes.
6. We humans cause the changes in lakes that concern us.
7. A plan is a necessary tool for managing a lake.
8. Responsibilities—to the lake and to other lake users—accompany rights to use a lake.
9. Our lakes are deteriorating.
10. Build coalitions to concentrate efforts and get more done.

These are the ten most important messages for Wisconsin citizens to hear if we are to protect our valuable lake resources. The list will be a guide for DNR and Extension in preparing new information materials and education programs—and for local organizations in their own programs. Leaders of the Wisconsin Association of Lake Districts and Wisconsin Federation of Lakes, along with DNR and Extension staff, generated and ranked over 50 ideas for educational messages.

Network Forming to Share Liability Information

Liability was a hot topic at many lake meetings this summer. The current answers to liability questions are confusing and vary widely. Sally Benjamin, DNR citizen involvement coordinator, is building a network for organizations confronting liability questions: "I would like to develop a list of those interested in liability insurance. Such a list could be exchanged to help you share information among yourselves, discuss obstacles and solutions, and perhaps work together to find some answers." If you would like your name included in the network and to receive the names of others involved in liability questions, please send your name, address, and preferred phone number to Sally Benjamin, Bureau of Information and Education, DNR, P.O. Box 7921, Madison, WI 53707. (See page 7.)

How To: Fall Landscaping and Your Lake

Fall is the time of year when many homeowners think of—and nurseries recommend—landscaping the yard. Planting shrubs, trees, and ground cover on your property has definite environmental benefits: well-planned landscaping can reduce heating and cooling costs by as much as 30 percent; plant root systems can use excess nutrients from runoff, and, in certain situations, deacidify the rainwater pH. Unlandscaped property causes more rainwater runoff, increases soil and channel erosion, and delivers unnecessary sediment to your lake. Landscaping is one way to reduce the erosive force of runoff from the developed and developing portions of your lake's drainage basin. By choosing the appropriate trees and shrubs for your yard, you contribute directly to the lake protection effort.

All plants require different kinds of soil, nutrients, and exposure to the sun to flourish. The most common mistake people make when landscaping their yards is to buy plants that need much more or far less moisture than the soil provides. Plants that need a lot of water will not grow well on dry sites unless you supply the water they need. Plants with high nutrient requirements will only grow in poor soils if you apply fertilizer. Plants susceptible to insect and disease problems will flourish only when these pests are controlled by some biological, chemical, or mechanical means. By choosing plants appropriate to your yard, you help reduce these potential problems.

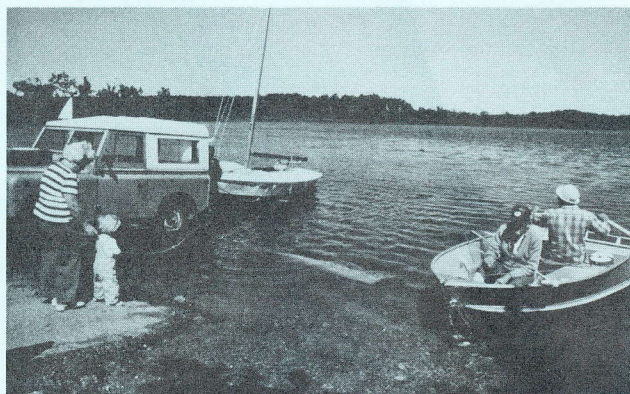
Fortunately, nature has given us a partial solution to the problem of plant selection. Over time, plants native to a particular locale have adapted to whatever growing conditions they encounter. Ask a competent, professional nursery to help you select plants, trees, and shrubs which are native to your area and appropriate for your yard and soil type.

Beautify your yard and do something good for your lake!

From The Chesapeake Citizen Report.

Funds Available for Boating Facility Improvements

With the passage of Chapter 29, Laws of 1985, the Recreational Boating Facilities program got a new breath of life. Funded at \$1,850,000 per year for two years, the program makes funds available to governmental units, including lake districts, for feasibility studies or the development of recreational boating facilities.



Cost sharing for both feasibility studies and development projects may be up to 50 percent of actual costs. In addition, sponsors may be eligible for an additional 10 percent cost sharing for a development project if the sponsor conducts a DNR-approved boating enforcement and education program.

The recreational boating facilities program is administered by the Waterways Commission, a five-member group appointed by the Governor. The commission has been meeting monthly and will continue to meet as needed to deal with organizational matters as well as to review any project applications received.

For further program information, applications, or meeting dates, potential sponsors should contact the DNR District Inland Lake Coordinator, who works with the Community Services Specialist for their area.

Eligible projects: Waterways Commission Funding

- Ramps and service docks to gain access to water
- Bulkheads and breakwaters necessary to provide safe launching conditions
- Dredging to provide safe water depths—only eligible when associated with an access development project

New Mercury Advisory for Fish

Early in July, Wisconsin health and resource officials issued a new fish-consumption advisory. It's designed to protect the health of children and pregnant women and ease the concerns of anglers. Lake districts and associations in the Wisconsin Federation of Lakes received the advisory directly from DNR. For others wishing a copy of the new advisory or for details on how to calculate acceptable consumption rates and facts on mercury, contact the DNR Bureau of Information and Education, P.O. Box 7921, Madison, WI 53707.

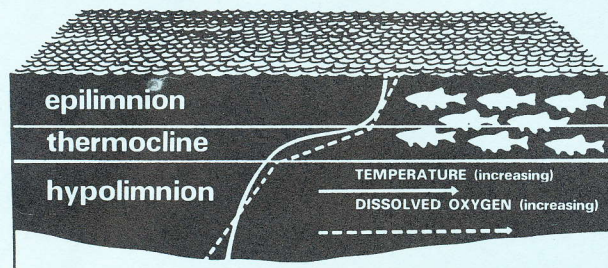
Econote: Why Sample Your Lake at Turnover

by Scott Olson

The circulation of water within a lake is an important physical characteristic to that lake. With a few exceptions, Wisconsin's inland lakes follow a similar yearly cycle of internal water movement. Understanding this cycle of water circulation is important to scheduling the testing of your lake's water quality.

Seasonal changes in the lake's circulation pattern result from wind, sunlight, and the unique density property of water—water is most dense at 4 °C (39.2 °F).

A Stratified Lake



In early summer, the strong sunlight is absorbed by the water near the surface of the lake. The water in this layer rapidly warms and becomes less dense, causing it to remain at the top. This warm layer, called the epilimnion, is distinct from the cold, dense layer of water beneath, called the hypolimnion. Between these layers is a zone of rapid temperature change called the thermocline.

Once stratified, the lake will remain stable, as the thermocline will prevent mixing between the upper and lower layers. (Exceptions occur because of strong winds, especially on shallow lakes.)

Because very little mixing occurs, the water quality can vary significantly with lake depth. Above the thermocline, the water will have more oxygen and fewer nutrients. Below, in the hypolimnion layer, the water will have lower quality. Cold water fish are often found near the thermocline where there is more oxygen. If the oxygen level becomes too low, a summer fish kill can result.

With the approach of fall, the upper layers of water begin cooling. In November, the temperature difference and thermocline disappear. Since the density is almost equal, the lake is no longer stable. Wind and convection currents mix the lake's water freely, causing the lake to turnover.

No longer stratified, the well-mixed water presents the best opportunity for testing the lake's average water chemistry. Tests taken at any single depth in the summer, while useful, won't provide as accurate average water quality.

As the lakes continue to get colder, the water below 4 °C (39.2 °F) becomes less dense. Since it is lighter, it remains at the top. When the water at the surface turns 0 °C (32 °F), a calm period will allow ice to form. The water on the bottom will remain close to 4 °C throughout the winter. In late winter, with the lake sealed off from the atmosphere above, a winter fish kill may occur if rotting vegetation consumes all the available oxygen.

Eventually, spring arrives and thaws the ice, soon warming the top layer to 4 °C. The lake is once again "turned over." This provides another brief opportunity to test your lake's average water quality before it once again becomes stratified.

DNR Surveys Algae Blooms for Toxins

Deaths of cattle, dogs, and waterfowl at Wisconsin lakes in recent summers prompted DNR to survey lakes for toxic algae this summer. Under certain conditions, some algae produce toxins or poisons that can kill animals and sicken humans.

There are many kinds of algae. Only a few produce toxins. In most cases, algae can be present on the lake without being toxic. But, when we heavily fertilize our lawns and farms, when our gutters and storm sewers carry trash to our lakes, or when we don't maintain our septic systems, we add nutrients (nitrogen and phosphorus) to the water that feed algae blooms. Nutrients, warm water (72-80° F), and calm weather combine to provide ideal conditions needed for algae blooms. Only a laboratory analysis can determine whether an algae bloom is toxic.

The DNR has sampled several hundred lakes with algae blooms throughout the state. The State Laboratory of Hygiene is analyzing the samples to see if

they contain toxins. A report will be released next spring when laboratory tests are completed. The results will show whether algal toxin production is widespread in Wisconsin. We can then make decisions on further study and perhaps suggest precautions for the public. Right now, we know that the best solution to this problem is to keep excess nutrients from entering our lakes.

Lake Priority Warms Up

The DNR Fish Management staff have produced a plan to place more emphasis on inland lake and stream fishery management. In the past, emphasis in funding has been on inland trout and Great Lakes management. The change is good news for the majority of Wisconsin's 2 million anglers, of which 90 percent pursue warm-water fish such as bass, panfish, walleye, northern pike, and muskies—while only 12 percent fish for inland trout. The proposal will be presented for additional public input sometime after October. More information in an upcoming issue.



Capitol Report: Looking Ahead

by Glenn Stoddard

Predicting the agenda of the state legislature and the governor can be risky business, particularly in an election year. Of course, people interested in lakes can help determine that agenda. In the next legislative session, look for:

BUDGET ISSUES:The state's biennial budget is the most important piece of legislation passed in any legislative session because it is used not only to establish funding levels, but also to make major changes in state policy. The 1987-89 state budget will be debated and passed in the spring of 1987. It appears now that the central budget issue for land and water resources will be the levels and sources of funding for existing programs. If continued progress is to be made in addressing soil erosion and related water quality problems throughout Wisconsin, larger budgets will be needed for the Soil Erosion Control and Animal Waste Management programs in Department of Agriculture, Trade, and Consumer Protection (DATCP) and the DNR Nonpoint Source Water Pollution Abatement Program.

These programs provide cost sharing to landowners. Perhaps even more important than the cost-sharing is the need for increased state and county technical assistance, much of which is provided through the DATCP County Conservation Aids Program and the DNR Lake Management Program—two programs which will need significant funding increases.

NONPOINT POLLUTION/SOIL EROSION REGULATIONS:Nonpoint source water pollution—caused by soil erosion, animal waste runoff and runoff from construction sites, urban areas, and other land uses—is now the most significant source of water pollution in Wisconsin. But unlike point sources, nonpoint source pollution is generally unregulated. To address this problem, the Wisconsin Chapter of the Soil Conservation Society of America (SCSA) has established a study committee to design potential soil erosion and nonpoint source control regulations.

This project, coupled with increased interest by key legislators, is likely to result in mandatory erosion control regulations for construction sites, urban stormwater runoff, and cropland in the next legislative session. Cropland erosion-control regulations should be far less controversial than in the past because of cross-compliance policies now in effect for all federal farm programs, as well as the state's own Farmland Preservation Program. These cross-compliance policies mean that erosion-control regulations will have little effect on the 80 percent of farmers who participate in federal farm programs. Therefore, the majority of farmers should support reasonable erosion control regulations.

TOXICS:The issue of toxic pollution has become a major environmental and health concern. While a comprehensive approach is needed, reform is expected to take place on an incremental basis, as new information becomes available that can be acted upon by policymakers. In the next session of the legislature there may be efforts to:

- Provide authority to set more restrictive groundwater protection standards when several contaminants are present together.
- Provide citizens with the right to sue state agencies for not enforcing environmental protection laws (citizen suits).
- Revise landfill siting procedures.
- Adopt 1984 federal hazardous waste amendments to the Resource Conservation and Recovery Act (RCRA).
- Reform the burden of proof in toxic pollution cases (toxic torts).
- Restore authority for water quality-based standards on effluents.
- Increase the monitoring of mercury and other toxics in the environment.
- Provide funding for victims of groundwater contamination.
- Establish policies and funding to deal with toxic pollutants in river and lake sediments.
- Limit application levels of road salt.

Finally, it is unclear what priority land, water, and environmental problems will receive in the next legislative session. Much will depend on the outcome of the November election.

Glenn Stoddard is Executive Director of the Wisconsin Land Conservation Association, which represents Wisconsin's county land conservation committees.

Municipal Plates for Lake District Vehicles

Vehicles owned and used exclusively for lake district purposes are eligible for municipal plates. Rollingstone District and Tri-Lakes have obtained such plates. Current fee is \$3.00. For further information contact Carl Johnson, Dept. of Transportation, 608/266-2235.

Delavan Lake: A Cooperative Plan for Improvement

by Scott Olson

Delavan Lake, 2000 nutrient-rich acres, is located in Walworth County about 80 miles southeast of Madison. For at least thirty years, algal blooms have plagued its waters. The resulting attempt to return to a clear, macrophytic lake presents a major cooperative effort.

The Delavan Lake Association began lake improvement efforts by chemically treating the algae. This provided temporary relief, but did not address the problem of high levels of nutrients entering the lake. Hoping to decrease the incoming phosphorus by 80%, the Delavan Lake Sanitary District completed a \$4 million sewerage system in 1981 that captured the wastes of nearly all households near the lake.

However, in 1982, Delavan Lake experienced its worst algae bloom. Homeowners and recreationists were surprised and upset. The DNR recommended that a comprehensive lake management plan be drafted, but first a lake study had to be completed.



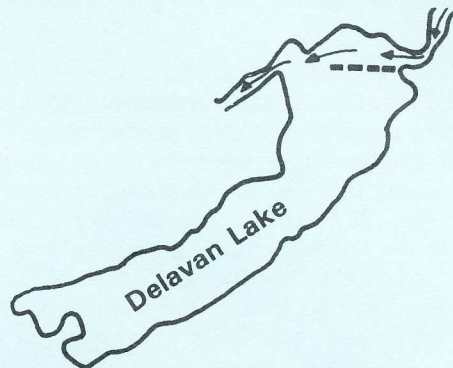
The sanitary district agreed to coordinate the study, which was completed by the U.S. Geological Survey. The USGS found that (1) the sediments contained a high accumulation of sewage-supplied nutrients which continued to recycle within the lake, (2) upstream sources of nutrients were still high, and (3) the carp and buffalo fish were eating the plants that competed with the algae.

Delavan Lake lies entirely in one township. The Delavan Town Board decided to create a Lake Committee with representatives from both the Town Board and the lake residents. Neal O'Reilly, DNR Southeast District Inland Lake Coordinator, feels that the lake committee has worked well and provides a viable alternative to a lake district. The Lake Committee has access to the Town Board and its power to regulate land use and enact ordinances.

To fund lake management efforts, the Delavan Town Board, at the recommendation of the Lake Committee, passed a 10% room tax to be used only for lake management efforts.

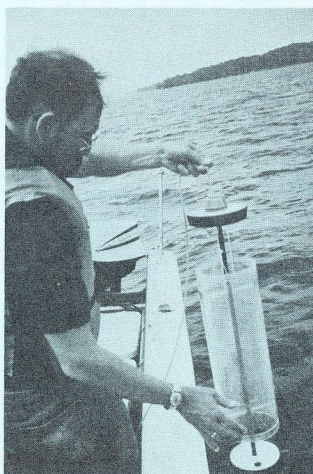
With the USGS lake study findings, the DNR and the Lake Committee led the way to providing an actual recovery and management plan.

The DNR hired UW-Madison Water Resources Management (WRM) students, organized under sociologist Tom Heberlein, to produce a comprehensive recovery and management plan proposal. The plan needed to be technically feasible, socially acceptable, and affordable.



After exhaustive study and debate, the plan was presented with the following elements:

- alum treatment to inactivate nutrients in the water
- a structure to keep nutrient-rich stream inflow flowing toward the outlet without mixing with lake water (see diagram)
- fish eradication followed by restocking
- preservation of wetlands
- incentives for soil conservation practices by farmers
- inspection of major point sources for compliance
- monitoring of lake and watershed be continued.



The proposal has a two million dollar price tag and includes a ten-foot drawdown of the lake to lower construction cost of the barrier and simplify the fish kill. Both the cost and the drawdown, lasting about a year overall, are major impacts, and have generated some controversy. But Delavan Lake residents and the various local, state, and federal agencies involved are committed to making this plan a reality. *Lake Tides* will have more on these exciting proposals as they are implemented.

Delavan Lake Workshop

by Paul du Breuil

Every summer, Water Resources Management (WRM), a graduate program in UW-Madison's Institute of Environmental Studies, undertakes a management project as a group workshop. The workshop is preceded by a seminar during the spring semester. This year, we worked on a management plan for Delavan Lake.

Our goal was to find an overall scheme that would improve Delavan Lake's water quality and reduce or eliminate the rough fish (carp, big mouth buffalo) population now dominating its waters.

WRM's task had several major components:

- a) to familiarize ourselves with the Delavan Lake area, its people, their history, and institutions. (This involved visits, meetings, studying census data, etc.)
- b) to find out what lake users and residents thought of and expected of Delavan Lake and what they were willing to pay to change it. (We conducted two major surveys.)
- c) to investigate ways of reducing nutrient supply to the lake, removing nutrients from lake water and sediment, and changing the fishery. (We consulted many experts and reviewed the literature to evaluate efficacy and cost of options.)
- d) to work out the responsibilities and capabilities of the federal, state, and local institutions with respect to a cleanup
- e) to find potential sources of funding
- f) to uncover the legal constraints facing any lake manipulation we might propose.

WRM's concrete task was to produce a report including a well-defined lake management proposal. We completed our report, "Delavan Lake - A Recovery and Management Plan," in August.

Paul du Breuil is a graduate student in the UW-Madison Water Resources Management Program.

New Publications

Liability Insurance: The Purchaser's Guide

This book is just out and we have not yet reviewed it. However, we are familiar with the nonprofit, public interest law firm that produced it. And given the difficulty and expense of obtaining liability coverage, we wanted you to know about the book immediately. Available for \$4.95 prepaid to Center for Public Representation, 520 University Avenue, Madison, WI 53703.


Dam Safety Guidebook

STS Consultants Ltd. has recently completed a comprehensive Dam Safety Guidebook to provide dam owners with a better knowledge of safety and liability as they relate to dam ownership. The Guidebook has been produced for the Federal Emergency Management Agency, as well as Wisconsin DNR and a number of other midwestern departments of natural resources. The focus of the publication is to help dam owners understand the state and federal role in dam safety, the role of a consultant in dam safety, and the liability and responsibility of dam owners. Dam owners in Wisconsin will receive a copy of the guidebook when their dam is inspected by the DNR. Or, they may order a copy in advance from Mr. Richard Knitter, Bureau of Water Regulation and Zoning, Dept. of Natural Resources, P.O. Box 7921, Madison, WI 53707.

VOICE - newsletter of the conservation/environmental network. The current issue lists the DNR secretary's priority issues, offers a new liability information network (see below), and provides advice on coping with volunteer "burnout" plus lots of other items of interest to lake community citizens. To join the network, write Sally Benjamin, Bureau of Information and Education, DNR, P.O. Box 7921, Madison, WI 53707.

Change Your Calendar

Please note that the time and place of the 1987 Wisconsin Lakes Convention has been changed to March 12-14 and the convention will be held in The Concourse, downtown Madison. The change was made to facilitate better interaction with legislators. The spring meeting of the Federation of Lakes, traditionally held in Madison, will be combined with the Convention.

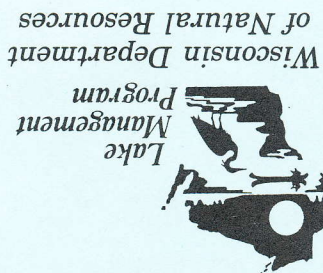


The shores of all the lakes had turned to red and gold, and on one quiet afternoon it seemed as though the islands were floating in a haze of color. Points of rock lay like giant spears on the surface, and at a distance it was hard to tell where shorelines began and ended, so completely fused were the reflections—blue and gold, bronze and yellow, red and mahogany, with infinite variations in between. A madness had seized the land, as though a painter in wild desperation had squandered his whole palette in a grand orgy of exaltation.

— Sigurd Olson (The Hidden Forest)

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LAKE TIDES

A Newsletter for People Interested in Wisconsin Lakes

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