

*A Newsletter for People
Interested in Wisconsin's
Inland Lakes*

Lake Tides

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UWEX COOPERATIVE EXTENSION PROGRAMS
UNIVERSITY OF WISCONSIN-EXTENSION

COOPERATIVE EXTENSION PROGRAMS

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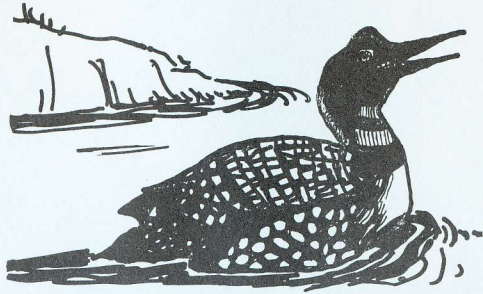
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IN THE WAKE OF A LOON

While your lake is still under ice, we would like to remind you that it is not too early to plan your summer activities for the care of the lake.

Those communities with a lake district should be preparing for the annual meeting. If a date has not been set, it should be set at the next meeting of the commission. A tentative agenda should also be discussed.

Those communities which are considering the establishment of a lake district should plan an educational program in May or June. The latter part of the summer is needed for petitioning and hearing if a decision is expected by the county board in September. Applications for technical assistance for fiscal year 1978 should be submitted to the Office of Inland Lake Renewal by October 1 and preferably before.

Due to unanticipated delays, several communities did not complete their organizational efforts in 1976. In order to avoid the frustrations they experienced, we urge you to develop a strategy now for whatever you hope to accomplish at the lake

this summer. Efforts begun after the "summer people" get to the lake often fizzle. Some communities go through the following cycle year after year: Concern builds each summer when the weeds become a nuisance, or the algae blooms, or the water level falls. One or two meetings are held. Enthusiasm builds for collective action but the summer is over and the summer people leave. The end result is that the lake gets no management, the leaders are discouraged, and it is even harder next year to motivate action.

It's a very unpleasant syndrome -- plan to avoid it!

Sincerely,

Ron Hennings & Lowell Klessig
Lake Management Specialists

LAKE HENRY RECEIVES GRANT

In January, the U.S. Environmental Protection Agency announced the seventh grant to a Wisconsin lake community. The recipient of this grant for \$180,000 is Lake Henry in Trempealeau County. The grant will be used for both prevention of soil erosion upstream along the river and for dredging of the impoundment to control weed growth. More details will follow in the next issue of Lake Tides.

FARMERS PROTECT WHITE CLAY LAKE

Herbert Tauchen
Soil Conservation Service
U.S. Department of Agriculture

White Clay Lake in Shawano County has the first lake protection project under Wisconsin's Lake Management Program. The White Clay Lake District was established April 15, 1975 by town board action. The lake is still in good condition but the nutrient and sediment loads coming from the agricultural area surrounding the lake were reaching the critical stage.

The lake district had selected the alternative that would provide funds to cost-share with individual land owners where corrective measures would be installed. Farmers in the watershed have large, concentrated dairy operations. One of the goals of the district was to reduce non-point pollution from animal waste by reducing run-off from feeding areas and by proper handling and disposal of manure.

Feedlots and manure storage facilities have been built on two farms. The feedlot on the Bernard Muck farm is 100 feet by 170 feet. The area was shaped and graded and surfaced with concrete. All of the run-off is filtered through a porous dam to separate solids. The liquid is then picked up in a diversion and filtered through a grass area. The manure storage facility is a combination of earth and concrete. The surface is concrete and will store up to 240 days of manure. A similar feedlot and manure storage facility has been built on the Albert Blum farm. Seven more farmers have plans to build similar structures in 1977.

Other measures are being installed on farms in the area to improve water quality and reduce non-point pollution. They include cropland practices of grass

waterways with tile, diversions, cropping systems with enough hay and grass to control erosion and contour strip-cropping. Streambank fencing and alternate cattle watering facilities will be built. The Soil Conservation Service provided the technical plans.

This has been a very successful lake district because of the outstanding cooperation of the involved land owners. This cooperation started prior to formation of the lake district. A research project was funded by the Upper Great Lakes Regional Planning Commission to monitor the surface and ground water running into and out of White Clay Lake. White Clay Lake watershed was an ideal site because the land was nearly all used for agriculture. Water quality of the lake itself was monitored. The objective of the research project carried out by University Extension was to find out how water quality was affected by different types of agricultural practices. By the time the lake district could be formed under the 1974 law, the farmers were already aware of what needed to be done to protect water quality.

The Wisconsin Lake Management law provided the vehicle to get the job done. The Department of Natural Resources and the U.S. Environmental Protection Agency provided the construction funds.

ECONOTES

NO RAIN - NO WATER

Was your pier a little higher above the lake last summer? Did you notice waves breaking over the "hidden" sand bar off the end of the island? Perhaps your beach was wider than normal and your motor hit more stumps or rocks in the channel?

These signs of low water level were all too common in many lakes last summer. The cause, of course, was the drought. But why did some lakes lose more water than others? Hopefully a review of where water comes from and where it goes in our environment will help you understand the answer to this question.

THE WATER CYCLE

Water is truly one of our most recycled natural resources. The glass of water you drank for breakfast could have contained some of the same molecules of water that helped to carry Cleopatra's royal barge down the Nile more than 2,000 years ago. Water used by the dinosaurs of 200 millions years ago could fall in your grass during the next rain. The earth's total supply of water is relatively constant but the distribution of that water in time, space, and quality governs life and the physical shaping of the earth.

Ninety-seven percent of our water is found in oceans with the remainder frozen in glaciers or stored in lakes, rivers, the atmosphere and in the ground.

Solar energy and gravity keep water moving in the cycle. Water falling on land flows downhill, evaporates, transpires through plants or infiltrates

into the ground. Eventually all the water that isn't "short cycled" back to the atmosphere by evapotranspiration will reach the ocean where solar energy causes it to evaporate and rise again into the atmosphere.

In Wisconsin, the water cycle generally operates with 30 to 32 inches of precipitation during an "average" year from which about 75% (22-26 inches) returns to the atmosphere by evapotranspiration and the remainder runs off on the surface or infiltrates into the ground as recharge to the ground water reservoir. The ratio of runoff to recharge varies considerably around the state depending on many factors such as topography, soil type, vegetative cover, rainfall intensity, and individual farming and general land use practice. In the gently rolling topography of Dane County, approximately 2 inches of water runs off the land surface and 4 inches infiltrates to the water table. In the sand plains of Portage County, only 1 inch of water is able to run off the surface and 9 inches infiltrates the soil as recharge to a highly productive aquifer. These are examples of average values for large areas. Your U.S. Soil Conservation Service District Conservationist is the best source for any available runoff and infiltration information for your individual lake watershed.

LAKE WATER BUDGET

Each lake in Wisconsin has a watershed (surface and subsurface) which is in turn part of a larger watershed leading to the Mississippi River or the Great Lakes. If a lake has a small watershed, its water level is more likely to drop faster during periods of below normal rainfall. A large watershed can store more excess water from the spring snow melt

or from extended rainstorms and gradually release it over a longer period of time. A watershed's ground water reservoir can be very efficient at storing and releasing water during the growing season because it is protected from evapotranspiration losses.

The relationship between a lake and its watershed can be observed and measured. Commonly the lake can be treated as an account and a water balance or budget can be calculated. This involves measuring all the water that flows in a lake from all possible sources. Water entering a lake by streams, surface runoff, ground water discharge (springs and seeps) and direct rainfall over the lake are credits. Water leaving the lake by streams, evapotranspiration, ground water recharge (seepage from the lake) or pumping are debits. The difference either plus or minus is reflected by the changing lake level. Careful measurement of these variables helps to pinpoint how and where water may be conserved, stored or added to the lake.

GROUND WATER, THE INVISIBLE PARTNER

Did you ever wonder why some streams continue to flow during dry periods or during the winter even though there is no rainfall? The answer is that winter stream flow is largely ground water discharge (or baseflow), which is relatively warm (about 50°F). Streams and some lakes are constantly replenished during the winter by ground water discharge while the water table in the uplands surrounding that stream or lake steadily lowers. It is not until the following spring thaw that water can once again infiltrate the ground and thus cause the water table to rise.

Water table fluctuations and ground water discharge to streams and lakes can be measured. These measurements support the fact that ground water is actively flowing through the ground. This flow is away from recharge areas, where water infiltrates to the water table, toward discharge areas where ground water moves back toward the land surface.

In many cases, ground water is the major contributor to a lake's water budget by discharging directly into the lake basin and by providing baseflow to streams feeding the lake. The water levels in these lakes tend to follow natural fluctuations in the ground water table very closely. Natural water table changes are, of course, dependent on yearly precipitation and recharge, but the slow velocity of ground water (inches to feet per day) has a dampening or buffering effect on the irregular occurrence of precipitation. Lakes that have a large ground water resource may not be adversely affected by a summer drought if there is sufficient snow melt and rain in the spring to recharge the aquifer.

Determination of the water budget is an essential part of the feasibility study that most lake districts conduct prior to adopting a management scheme. This information is then used to help manage the lake by separating and quantifying the factors that control water level, lake water residence time and loading rates to the lake by nutrients and sediments.

Reference: Wisconsin's Ground Water: An Invaluable Resource, D. A. Stephenson and J. W. Clark, UW-Extension, 1974.

NEW DISTRICTS ENTER PROGRAM

For fiscal year 1977 the following districts had applied for technical assistance from the Office of Inland Lake Renewal:

Big Round - Polk County
Black Otter - Outagamie County
Bone - Polk County
Cary - Waupaca County
Chute - Oconto County
Comus - Walworth County
Deer Spring - Shawano County
Enterprise - Langlade County
Honey - Walworth County
Lazy - Columbia County
Redstone - Sauk County
Rib - Taylor County
Tahkodah - Bayfield County (under appeal)
Wapogasset/Bear Trap - Polk County
White Ash - Polk County

MECHANICS OF LAKE RESTORATION

A technical conference for lake management professionals from Canada and the U.S. is scheduled for April 25-28 in Madison. The topics for the four days are:

1. Funding and Administration
2. Understanding the Watershed
3. Collection and Interpretation of In-Lake Data
4. Implementation

Consultants and commissioners have been sent brochures. If you are interested and have not received a brochure, please contact Lowell Klessig. (608) 262-3634.

COMMISSIONERS' CORNER

By now all commissioners should have received the brochure on the second annual workshop on "The Operation of a Lake District."

This is your once a year opportunity to meet with other commissioners and with several state staff at the same time. We hope you will take advantage of one of the three regional workshops:

March 24 - Eau Claire - Holiday Inn
March 25 - Antigo - Riverside Country Club
March 26 - Fond du Lac - Holiday Inn

Two major topics of interest in 1976 will be the subject of hour-long discussions again this year. These are the many topics of Taxes and of Grants.

Legal issues relating to external affairs of the districts such as bidding, contracts, and insurance will be discussed.

The annual meeting, budget hearing, and internal legal issues relating to by-laws will also be an hourly topic.

Finally, participants will be introduced to related programs of several agencies on wetlands, area-wide water quality planning, and watershed projects.

If you are not a commissioner but have an interest in a present or future lake district, you are also welcome to attend. Please send \$4 registration fee (payable to UW Extension) to Lowell Klessig, 1815 University Avenue, Madison, WI 53706.