

ON THE WATERFRONT is published by:
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Inside: Coping with low water levels

Contacts to help protect lakes, rivers & shorelands

Private citizens, especially shoreland property owners, are the first line of defense in preventing irreparable damage to our waters and shorelands. But **do not trespass** to investigate a suspected violation! Please contact the following authorities:

DNR Water Regulation Violations:

Dan Harrington (Water Management Specialist, Spooner Office).....635-4097
Brian Knepper (Conservation Warden for Southern Washburn County).....635-4099
Dave Swanson (Conservation Warden for Northern Washburn County).....466-5428
 If wardens are in the field, call them through the Washburn County Sheriff's Dept.....468-4720
 or through the **DNR's toll-free 24-hour tip line**.....1-800-TIP-WDNR (847-9367)

County Shoreland Zoning Questions or Violations:

Web Macomber (Zoning Administrator).....468-4690

County Planning, Land/Water Resource Management:

Brad Robole (Director).....468-4654

Aquatic Invasives:

Kris Larsen, DNR.....635-4072



ON THE WATERFRONT

The newsletter of the
 WASHBURN COUNTY LAKES & RIVERS ASSOCIATION, INC.
 PROMOTING THE ENVIRONMENTAL PROTECTION AND RESPONSIBLE USE OF
 WASHBURN COUNTY WATERS, SHORELAND AND WILDLIFE RESOURCES

President's Comments

Special Edition addresses low water levels

The challenges of low water levels and drought came up often at WCLRA meetings this year, including during the roundtable discussion at our annual meeting Sept. 8. It prompted us to produce this Special Edition addressing some of the implications of low water conditions.

WCLRA's 2007 annual meeting was an unqualified success. An audience of 45 people heard Peter Murray, the Executive Director of the Wisconsin Association of Lakes, speak on "Mad Town Disease." Peter's talk ranged widely over how happenings in Madison affect all of us who are concerned about lakes and rivers.

Peter noted that, during the legislative budget process, WAL strongly supported the reauthorization of the Stewardship Fund and attempts to increase funding for reducing runoff pollution. WAL is also working toward legislation to a) restrict the use of phosphorus-containing fertilizers on lawns and turf, b) to make it illegal statewide to transport aquatic invasive species (AIS) on boats and trailers that travel our public roads, and c) to create a 200-foot "slow-no-wake" zone around our shorelines. In addition, they are suggesting further changes to the newest version of NR115, which does not restrict expansion of existing buildings in the 35-foot shoreland buffer zone. Peter also updated the group on VHS and noted that legislation on piers has again surfaced. And ... all of this was only part of his fascinating and informative description of the complexity of the Madison scene.

Today, the WDNR Secretary is a political appointee. This was not always the case, and Peter said that WAL is supporting legislation to return that appointment to the Natural Resources Board (NRB). It certainly appears that many of the decisions that should be made based on sound science are instead being based on politics. That is unfortunate for our lakes and rivers, and we endorse WAL's efforts to improve the system.

Next, an election was held to fill expiring officers' terms, and appointments were made to fill the director positions vacated by the election. The process could be likened to a game of "musical chairs" except that no current board members left the game. The resulting WCLRA Board of Directors is as follows:

- President: Cathie Erickson
- Vice President: Craig Walkey
- Secretary: Charlotte Shover
- Treasurer: Ed Fischer
- Past President: Fred Blake
- Directors at Large: Ron Brown, Earl Cook, Wayne Sabatke, Patricia Shifferd, Tony Tubbs, Chip Wood

I would like to pay tribute to Fred Blake and Earl Cook who have served as President and Vice President effectively for the past four years. Their expertise and energy have been instrumental in making WCLRA an outstanding organization. My thanks go out to them and the other officers and directors for their commitment to the future as well as their past service. I consider myself fortunate to be working with such an outstanding group of people.

Input from WCLRA members is vital as we plan and carry out our program. I encourage you to contact any member of this Board whenever you have an idea or concern related to the protection of Washburn County waters.

--Cathie Erickson, WCLRA President

(Shell Lake photo by Kris Larsen)

Special Edition
 Winter 2007
 WCLRA #17

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WCLRA provides copies of its *On the Waterfront* newsletter to individual members and to the officers of member associations. If your association has recently had elections, please make us aware of the address changes. Contact Fred Blake at (715) 469-3228 or by email at blakelake@centurytel.net

Algae blooms may be one effect of lower water levels

Living on a small undeveloped lake with no shoreline lawns and no farm runoff, one would not expect to see algae blooms occurring. I certainly didn't! Yet, three to four years ago, in just such a situation, I began to observe the tell-tale green tint. There was no apparent source of increased phosphorus that could lead to an algae bloom, but there it was.

It was at about this time when the drought (that became severe over the last year or two) began. My lake level records began to show a steady decline, starting several years back. As the lake level steadily fell, the intensity of the algae blooms increased.

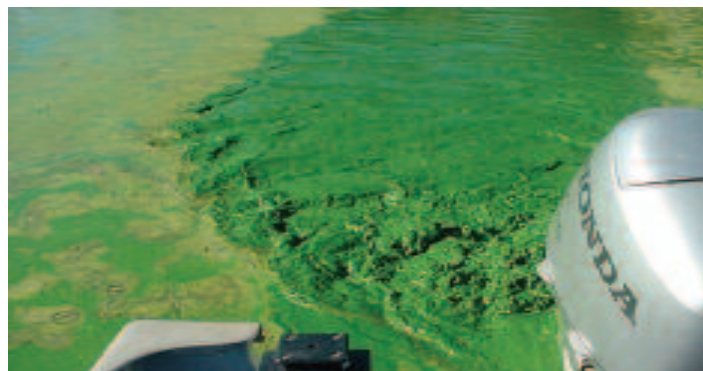
This summer, with the lake approaching 7 feet below just a few years ago, it looked like split pea soup (without the chunks of ham) and the Secchi disk reading dropped to 3.5 feet -- from its normal 9 to 10 feet earlier in the year. The phosphorus concentration had risen to 46 parts per billion (ppb or micrograms per liter) in comparison to values in the low 20's just several years ago. (For reference, a concentration above 20 to 30 ppb suggests that algae blooms may occur.)

Where was the extra phosphorus coming from? I was disturbed with myself for perhaps having missed some potential source of phosphorus that was finding its way into the lake. I looked all around the lake for evidence and found none. The shoreline is naturally vegetated and has not been disturbed (there were no signs of erosion). Yet the phosphorus level had doubled in the last several years.

The north shore of the lake had, at one time, been pastured and that undoubtedly resulted in some input into the basin, yet my early testing showed the phosphorus level to be at about 20 ppb with no evidence of algae blooms for the first ten years that I owned the property. There are no other property owners on this small, 7-acre basin.

Then the potential cause became apparent and I realized that I should have seen it sooner.

When we measure phosphorus, we measure it as a concentration. A concentration of 20 micrograms per liter refers to the weight of phosphorus in a liter of water, meaning there are 20 millionths of a gram of phosphorus in one liter (approximately a quart) of water.



Wolfske Bay, Lake Menomin, Dunn County

The problem was not that more phosphorus was coming into the lake. It is likely that, because of the drought and the very low lake levels, that same amount of phosphorus was now "concentrated" into a much smaller volume of water. This small lake has lost roughly half its water to the drought, so the same 20 micrograms of phosphorus noted earlier was now concentrated into only roughly half a liter of water. That 20 micrograms of phosphorus in a half-liter of water is the same as 40 micrograms in one liter of water and that is very close to what the actual testing showed.

My reason for going through this scientific exercise is to explain what others may also have seen on their lakes with the very low water of this last summer. Limnologists are reporting algae blooms that are new occurrences on a number of lakes in the drought-stricken area and these may reflect effects of the drought rather than increased nutrient pollution.

Don't let the science throw you. Just be aware that the drought may be having some effects that are not necessarily obvious and unusual algae blooms may be one of them. Not all algae blooms would, obviously, fall into this category.

Testing should be done if you are concerned about your lake, but as lake levels (hopefully!) begin to rise again at some point, the phosphorus "concentration" in all our lakes should drop because we are then reversing the concentrating effects of the drought and "diluting" the nutrient concentrations in the lakes.

Yes, there is hope ... if the autumn rains and early winter snows are a signal of an end to the drought of the last several years!

--Fred Blake, WCLRA Director

Beware of blue-green algae

Wisconsin lakes can be a great place to spend the dog days of summer, but swimmers and others need to pay attention to water quality and avoid blooms of blue-green algae, cautions the Wisconsin DNR.

Blue-green algae can produce a variety of toxins that can affect human and animal nervous systems, kidneys and skin. While these algae are common in most Wisconsin lakes, the blooms last summer were unusually large in some popular southern Wisconsin recreational waters -- probably because of low-water conditions.

People should avoid coming into contact with water with heavy, visible concentrations of blue-green algae, and make sure their children and pets, who won't know better, also avoid entering or coming into contact with such water, according to Jim Vennie, a limnologist in the DNR's lakes & wetlands program.

Check the following link for more information: <http://dnr.wi.gov/org/water/fhp/lakes/LakeQuestions.htm>

Nothing like drought to prove the value of water

"Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principal measure of how we live on the land."

These words were written by Luna Leopold, one of the children of Aldo Leopold, great Wisconsin conservationist and writer. Is it possible to put an economic value on water? What is clean water worth?

Water was the mode of transportation for native Americans and early French explorers, who named so many of our waters -- all the Great Lakes; inland lakes such as Winnebago; rivers like the Flambeau, Chippewa, Namekagon, St. Croix, Mississippi; and countless other waters.

The waterways brought goods and services and settlers to the area. The rivers were used to transport timber and other trade goods from the forests and lands of the state. Waters provided rice and fish and other creatures to eat and pelts to wear. Water flow was diverted through waterwheels for sawmilling and the grinding of grains. Eventually, water was used to provide other another form of energy, generating electricity.

Not that long ago, ice taken from lakes was used for refrigeration (Outside our Lake Nancy cabin we still have an "ice house" which used to be filled with big blocks of ice each winter to use through the summer).

All creatures use the waters for drinking; we humans use the water for waste disposal. Water has been used for farming and irrigation. Finally, water has historically been used for esthetic enjoyment and recreational activities such as boating, fishing, swimming and canoeing. The sound of waves lapping on the shore or bubbling in a creek is certainly soothing and pleasant!

We can easily understand and think about how to put a dollar value on some of the use values such as: bottled water, beer and food, hydropower, drinking, sanitation, paper, cooling and transport. Some other use values are more difficult to quantify: swimming, boating, fishing, fish habitat, filtering, and biological diversity.

But others, such as residential and commercial real estate value, now are being studied extensively, and it is possible to place a value on clean water or proximity to water. Real estate agents can easily prove that a home on water is much more valuable than one that is "landlocked."

Studies have been done in Minnesota and Maine looking at the value of water in terms of housing, that show it is possible that clean/clear water is worth billions of dollars statewide. In southern Wisconsin, the community of Lake Delavan has been working for years to restore the condition of its namesake lake, which had deteriorated drastically. A multi-year \$7 million clean-up was completed. The Delavan Lake Association believes the importance of cleaner water will be easy to measure for the economy of the community and real estate values.

Back in the 1970's, the city of Waupaca spent a lot of

"How can we measure the value of a gorgeous sunset over the lake, or of a fish jumping in front of our boat on the river?"

money cleaning up several lakes in the area. Long-term studies have shown that over the years the area property is 2 to 2.5 times as valuable as it might have been if the lakes had not been cleaned up. Since property is more valuable, that means that local and state tax collections improve!

There are numerous other values of water worth preserving, such as future recreation options, maintenance of biodiversity, rare fish and plants, historic artifacts, climate control, and wilderness. There even is value to water as a bequest that we leave for future generations, and there is value in knowing that water exists -- that it is there to use or just view.

How can we measure the value of a gorgeous sunset over the lake, or of a fish jumping in front of our boat on the river? Perhaps we could think more clearly about the value of water if we compared the evaporation/precipitation water cycle to the circulatory system in our bodies -- which, of course, is approximately 90% water!

Since 1950, the amount of water withdrawn and used in Wisconsin has tripled while the population only went up at half that rate. The amount of water available to Wisconsin is constant. There will never be more. How can we, the public, ensure that our waters will continue to be pure and clear and available for our children and grandchildren?

To paraphrase a Mastercard ad once shown on TV: the cost of a small bottle of water? \$1 A new septic system? \$4,000. A family swim in a clear, clean lake? PRICELESS!

--Sam Lewis,

WCLRA and Lake Nancy Association member

New water management specialist named

SPOONER -- Dan Harrington is the new Water Management Specialist for Burnett and Washburn counties at Spooner. He can be reached at 635-4097.

He replaces Ed Slaminski, who served in that position for many years before taking another job in the DNR Community Assistance program.

Dan started work in the Spooner office at the end of November. He is very familiar with the area and the water regulation and zoning program, having worked in a similar position in Cumberland for the last 7 years.

He also worked for both the Washburn County Zoning and Health Departments before his present job with DNR. He has a Biology degree from the University of Wisconsin at Platteville.

In his spare time, Dan likes to spend time outdoors, hunting and fishing.

How does low water affect fragile aquatic species?

What happens to the plant and animal species in the littoral zone of a lake when the water recedes, such as we observed during drought conditions this summer?

Some adapt and move to suitable habitat while the less "adaptive" species can find themselves to be refugees. And, believe it or not, some species thrive during low water!

Fish, insects and other more mobile species can crawl or swim out to the habitat where they fare best. In some cases, fish can become stranded in isolated pools, making them easy prey for herons and raccoons. This can happen even in a normal spring when lakes and rivers are high after the snowmelt and then recede, leaving species trapped in disconnected pools and puddles.

Amphibian eggs are sometime laid in water and then the water level drops, either before hatching or before the tadpoles and other species mature enough to hop out of the pool. Luckily, it's usually later in the summer when we see the lowest lake levels.

Other animal species are not fortunate enough to be able to move to their preferred water depth, or even to know which direction to go to find it. In recent drought years, mussels (commonly called "clams") on the St. Croix River have been left high and dry. Individual mussels have tried to "crawl" back in the water only to slide onto drier ground and perish. Resource agency staff members have spent time moving mussels back into the water, and actually guarding sections of stream from people who come to harvest these mussels illegally.

Loss of mussels is especially of concern on the St. Croix, where there are several endangered species, some of which are only known to occur on this river, and nowhere else in the world!

Similarly, there are many snails that get trapped on shore and die, along with vegetation that dies and gets washed up on the shore. Bugs, fish, and ducks love this washed up smorgasbord of stuff, so if you can stand it, let it be! If you cannot, you may rake it out, but be sure to dispose of it somewhere away from the lake -- perhaps in your compost pile (see accompanying articles on activities allowed on exposed shoreland).

Like prairie plants that need fire to flourish in the long-run, many of our northern native aquatic plants need water level changes to flower and eventually germinate. Therefore, raking rooted native aquatic plants is usually not good for the lake. The plants that live on the edge are often sensitive species that disappear with certain activities (e.g. raking, construction site erosion, or storm water problems). These species look like tufts or blankets of short grasses on exposed shorelines.

Sometimes water level changes result in one or two plants "taking over" the lake. Watershield and purple bladderwort are two native species that seem to thrive during drought. While people may be alarmed, this often is just the natural variation that lakes experience over the



Yes, you CAN make a difference!

Although we don't have starfish in Washburn County lakes and rivers, efforts to rescue stranded mussels on the St. Croix River brings to mind this story by the late scientist and essayist Loren Eiseley:

One day a man was walking along the beach when he noticed a boy picking something up and gently throwing it into the ocean.

Approaching the boy, he asked, "What are you doing?"

The youth replied, "Throwing starfish back into the ocean. The surf is up and the tide is going out. If I don't throw them back, they'll die."

"Son," the man said, "don't you realize there are miles and miles of beach and hundreds of starfish? You can't make a difference!"

After listening politely, the boy bent down, picked up another starfish, and threw it back into the surf.

Then, smiling at the man, he said, "I made a difference for that one."

(St. Croix River photo by Terry Margenau, WDNR)

years, decades, and even centuries. Unfortunately, that nasty invader Eurasian watermilfoil is relatively new to northern Wisconsin, and it too is a species that can quickly infiltrate the new areas in a lake that accommodate plants as a result of the low water.

This past summer was a good time to observe adaptation and "survival of the fittest". The turtles were probably the least affected, but they always face threats with egg predation and road crossings, regardless of the weather. Whether the water is high, normal, or low, it's still imperative that we keep the littoral zone as healthy as possible. Most of our aquatic species depend on the first few feet of water depth for some stage of their life cycle. While we can't control the rainfall, we can be sure our activities have the least impact possible on this vital edge where the land meets the water.

--Kathy Bartilson, Pamela Toshner, WDNR

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Who expected to see LOW water levels?

In the span of just 10 years, we have seen historically high water levels and also the opposite extreme. Who would have thought that less than 10 years after the City of Shell Lake built its system to divert the lake's excess water to the Yellow River, we would be in the throes of a profound drought with some of the *lowest* water levels in recent history? With the fall rains, we have recovered some of the losses in water levels, but the lakes are still far below where they were just two or three years ago.



The high and the low of Shell Lake in the past few years.

(Photos provided by Tim Asplund (left) and Kris Larsen, WDNR)

When water levels fall to what we have experienced lately, some of the effects are obvious and others are not. This Special Edition of *On The Waterfront* discusses several effects of low water. If nothing else, they point out that lakes are very complex systems and that one change may well lead to another -- not necessarily bad, or permanent -- change.

Fortunately, without our intervention, lakes have the ability to adapt to the normal cycles from high to low water levels and back again. We have to understand that these cycles are normal and will continue to occur over time. In some cases, there will be the well-meant desire to try to tinker with the hydrology of lakes, but care needs to be taken not to create more problems than we solve!

The articles in this Special Edition deal with some of the obvious and perhaps some less obvious possible effects of the low water period -- which, for all we know, is not yet over. **Read on!**

--Fred Blake, WCLRA Director



A stranded Lake Superior boat landing under near-record low water conditions.

(Photo provided by Jason Laumann, Northwest Wisconsin Regional Planning Commission)

Lower water levels raise beach management issues

Lower water levels in the past few years have left many lake front property owners with additional exposed beach areas. These lake front owners get to enjoy the exclusive right to utilize these exposed areas, however this added benefit comes with added responsibility. Any exposed land below the ordinary high water mark (OHWM) of a waterway is held in trust for the public. This means that these areas are protected, and activities in these areas, even when temporarily high and dry, may require DNR approval and or permits.

Why do we want to protect these areas? Because vegetation along the shoreline plays an essential role in maintaining water quality by filtering water that runs off the land surface. The vegetation also provides important fish and wildlife habitat and protection from wind and wave action.

What's allowed?

* Washed-up debris can be removed by hand (with a pail, shovel, or wheelbarrow) and composted or disposed of in an upland location.

* Wood, tree trunks and branches that were formerly under water should be left in place for fish and aquatic life habitat when the water levels come back up.

* Vegetation can be removed (by hand with non-motorized tools) in a 30-foot-wide access path to the waterline without a permit, provided the plants are not in a sensitive area and wild rice is not present. The cut material must be removed and composted or disposed of in an upland location.

* Non-native, invasive species can be hand removed in an unlimited area (greater than a 30-foot -wide path). To prevent the spread of invasive plants (such as purple loosestrife) removed plant remnants should be bagged and sent to the landfill (if the local landfill will accept them).

What's not allowed?

* Washed-up debris cannot be pushed back into the waterway.

* Chemical treatment of plants (herbicide use), mechanized plant removal, or removal of more than a 30-foot-wide path cannot be done without first getting a permit from the DNR. DNR would require justification of extenuating circumstances if asked to issue a permit for removal of native plant species.

* Wild rice cannot be removed.

* Placement of sand, rocks, pea gravel or other fill below the OHWM without first getting a water regulation permit



from DNR.

* Driving a golf cart, ATV, snowmobile or any other motorized vehicle on exposed lakebed of a public waterway is strictly prohibited, with the exception of backing in a vehicle to launch a boat. Permits may be obtained for work that needs to be done by machine, such as dredging or larger-scale invasive species harvesting, etc.

What happened this summer?

With low water, a lot of the "what's not allowed" activities (listed above) occurred, and Department staff are still following up on a long list of violations. Many similar violations happened in the water as well:

* Herbicide and power mower use on exposed lakebed.

* Heavy equipment and ATV use.

* Dredging new channels to get large boats to shore or through channels between lakes.

* Installing a driven point well and small pressure tank below the OHWM.

* Illegal placement of riprap and fill in streams, rivers and lakes.

What about the trees?

Waterfront property owners may be tempted to cut down dead and dying trees on the edge of newly exposed lakebed, but they should weigh their options, advises Larry Damman, DNR fisheries biologist at Spooner.

Unless the trees are threatening to fall on buildings or in areas people frequent, consider leaving some of the dead trees until they topple on their own, he suggests. "They are a woodpecker paradise and provide essential habitat to a variety of other bird species, like wood ducks," he says.

Winter is an ideal time to cut and remove dead trees, because they can be felled toward the lake, onto the ice. **The trees can't be left on the ice** but can be cut up into manageable sizes there and removed before ice-out.

As long as the ground is completely snow-covered, the woody debris can be burned without a burning permit, but burning it on shore is much easier than on the ice. "It's hard to sustain a fire on the ice and difficult to clean up the unburned material and ashes afterward," Damman explains. By law, all unburned materials must be removed from the ice before ice-out, because leaving unburned materials on the ice is not only unsightly, but is considered littering.

Felling the tree into the water to provide fish habitat is an attractive option, but that requires a DNR permit and site inspection to ensure that the trees are an appropriate size and won't interfere with navigation or infringe upon the rights of neighboring property owners.

For more information on dealing with woody debris, contact Larry Damman at the DNR Spooner Service Center, 635-4089.

--Wisconsin DNR

(At left: snail shells on Shell Lake by Kris Larsen, WDNR)

Location affects how lakes respond to drought

During the drought of the last several years, it has become apparent to many of us that all our lakes were not behaving the same. Some are now down six to seven feet over that period and others have dropped to a much lesser degree.

The water levels of flowages, which have inlets and outlets, are generally more stable than those of seepage lakes which have no surface input and are supplied by groundwater, rainfall and runoff. A large number of the lakes in Washburn County (such as Shell Lake) are seepage lakes.

It might seem that seepage lakes, because they are isolated from surface water flow, should all behave similarly, but there can be wide variations between them. It turns out that the effect of drought on seepage lakes relates to where they are located in their watersheds, which scientists call their **"landscape position."**

The groundwater that feeds seepage lakes starts on the high ground and moves downhill just as our surface waters do. Like our surface water, groundwater tends to increase in amount as we proceed further down the watershed, in the same way as surface streams are joined by tributaries. As with our streams, groundwater begins with relatively little flow at the top of the watershed and grows as it moves downhill until it meets or becomes a stream or lake. I'm sure you get the idea!

The significant point here is that seepage lakes at the top of the watershed receive much less groundwater input because the drainage areas that feed them are still relatively small. In times of drought, like our last three years, available groundwater at the top of the watershed can be dramatically reduced because there is only a small area to collect it. Lakes high in the watershed can lose a large percentage of their groundwater input and their water levels can drop very rapidly. Lower in the watershed, where more groundwater has had the chance to collect, the groundwater input will not be as severely affected.

So the "landscape position" concept predicts that, in a drought, lakes higher up in the watershed will suffer more loss in water level than lakes lower in the watershed. For those of you who are on seepage lakes, you might want to assess your lake's position in the watershed and see if that is consistent with the drought effects that you have observed.

There is a secondary effect associated with

"Lakes are complex systems and they are not constant. Fluctuations in groundwater flow and an associated change in lake level and acidity go largely unnoticed unless the effects become severe. They are part of the normal variation in the life of a lake."

changes in groundwater flow. This relates to lake acidity. Acid rain and lake acidification have been topics of discussion for a number of years. The chemical substances that protect lakes from acidification are found in groundwater and are largely dissolved alkaline materials like limestone from underground aquifers. These alkaline materials neutralize acidity and give the lake its "buffering capacity."

If, in a drought, the groundwater supply to a lake is greatly reduced or stops, the lake can lose its ability to neutralize acids and its acidity can increase to the point where fish and other aquatic life are endangered. This is the kind of change that will go unnoticed unless a pH measurement is taken. Fortunately, as normal weather cycles begin to bring rains and snow, and water levels begin to cycle upward, groundwater flow will increase and the buffering capacity of the lake will be restored.

In lake systems, pH is critical to aquatic life. The pH scale, used to measure acidity, ranges from 0 to 14, with a pH of 7 being neutral (neither acidic nor alkaline) and each lower number indicating ten-fold increases in acidity.

Many fish will not reproduce with the pH at less than 6.0 and fish survival is questionable at a pH of less than 5.0. One seepage lake in our area had maintained, over the last ten years, a pH of 6.5. Then in 2006, in the midst of the drought, the pH suddenly dropped to 5.5. The lake had already lost four feet in elevation suggesting that its groundwater input had been significantly reduced. The change of one pH unit here indicated that the lake had become ten times as acidic as it was before the drought began and that reproduction of some of its fish species would be affected.

Limnologists report that pH fluctuations like this are not uncommon under drought conditions. Fortunately, when rains come and water levels begin to rise again, groundwater flows will increase and the lakes will begin to return to their natural states.

--Fred Blake, WCLRA Director

Water level fluctuations depend on the lake type

No one needs to be told that lake levels move up and down, sometimes very significantly.

We have seen major changes, from very high to very low water in just the last ten years. It has also been obvious that the degree of fluctuation varies widely from lake to lake.

Limnologists have found that the extent of lake level fluctuation relates to the type of lake being observed.

All lakes receive water via precipitation and runoff and lose it through evaporation. The lake types defined differ in their other sources of input and output.

The four types of lakes usually discussed are:

1) **Groundwater flow-through lakes** (sometimes called seepage lakes). These lakes have no surface inlet or outlet, but subsurface groundwater moves into and out of them. They have a moderate annual level variation, peaking in June and lowest in November.

2) **Perched lakes**. These lakes have no surface inlet and have a high annual variation in levels. Being dependent on precipitation (snow and rain), their levels tend to peak in June and are lowest in November.

3) **Groundwater discharge lakes**. These lakes have no surface input, but do have a surface outflow. Groundwater is the sole input to the lake beyond precipitation and runoff. They tend to peak in May and are lowest in August-September.

4) **Surface water flow-through lakes**. These lakes have both a surface inlet and outlet and may also have a groundwater contribution. They have a moderate long-term variation but the highest annual variation, peaking in May and lowest in March.

A study carried out on 28 lakes over a 20-year period and reported in 1978 showed that groundwater flow-through lakes are the most variable over time and that groundwater discharge lakes are the least variable, with surface water flow-through lakes falling in the middle.

Over the 20-year period of the study, groundwater flow-through lakes varied up to 10.5 feet; surface water flow-through lakes varied up to 7.8 feet and groundwater discharge lakes varied only up to 3.8 feet.

In Washburn County, we have a large number of seepage lakes, and during the recent drought period, we have seen the high levels of water fluctuation that the study would lead us to expect.

The further we look into lakes and their behavior, the more complexity we find. While it may be true that "A rose is a rose is a rose ...", the same cannot be said for lakes. Their very complexity makes each one a unique entity deserving to be treasured and protected.

--Fred Blake, WCLRA Director

Drought reduces the wild rice harvest

PARK FALLS -- State and tribal officials say this summer's drought in the north left some traditional ricing areas high and dry. Lake and stream levels remained low all summer and fall, affecting the quality and quantity of available rice.

Peter David, wild rice biologist for the Great Lakes Indian Fish and Wildlife Commission, said that while some rice beds will be affected by the drought, the rice -- like any wild annual plant -- will recover and may produce better harvests in wet years.

Rice harvest on a number of the most productive wild rice lakes and rivers in Wisconsin is regulated cooperatively between the Department of Natural Resources and representatives of area Chippewa Indian Bands. Ricing is only allowed on regulated lakes on the days opened by the tribal ricing authority. Those lakes are posted at the public access points. Rice waters not regulated may be harvested whenever the rice is ripe. Ricing hours are from 10 a.m. to sunset on all regulated and non-regulated waters and only Wisconsin residents may harvest rice in the state, after obtaining a license (unless they are younger than 16 or over age 65).

To protect wild rice beds, harvesting boats may be no longer than 17 feet and no wider than 38 inches. The crafts may only be propelled by muscle power using a push-pole or paddle. Ricers must use smooth, rounded, wooden rods or sticks that are no longer than 38 inches and operated by hand. No mechanical devices may be used to harvest or gather wild rice.

More information on wild rice can be found on the DNR Web site (www.dnr.state.wi.us) or at the DNR's Spooner Service Center, 635-2101.

--Wisconsin DNR

Do you have newly exposed shoreline? Let it be!

With the drought of the last several years dropping our lakes to the lowest levels in most memories, the scene around our lakes is a very different one.

The most obvious difference is that it is now a longer walk to the water or an extension to the dock. The mud which was uncovered had vegetation growing on it during the summer. If not properly managed, this newly-vegetated shoreline can be misused to an extent that will be damaging to those lake bottom areas when the lake levels rise again (see Page 4).

It is important to understand two factors. First, the riparian owners have exclusive use of the newly exposed lake bottom in front of their lake lots. Even though it is held in trust for the public, no one else can legally build a fire, have a picnic or otherwise use that new dry land area without the riparian owner's permission. There have been cases where people have been running ATV's on these areas. That is definitely not a legal use; it is trespassing, which can be reported to the sheriff's department or conservation wardens.

There are, however, limits on what we ourselves

can do with the exposed shoreland in front of our lake lots. Even though we have exclusive use of the area, we do not *own* it. That means we cannot modify it or build on it as we could if we actually had ownership. We have exclusive use primarily for access to the lake itself.

The logic is fairly simple. At some point, the water levels likely will rise again. If we remove the vegetation and tear up the shoreland areas with human activity, those areas will be open to erosion when again covered by water and the result may be a spike in nutrient pollution.

It is in all our interests to protect these newly exposed areas for the time when they will again be water-covered lake bottom -- that is, aquatic habitat. The health of our lakes depends on these areas and it is no less damaging to disrupt them now than it would have been to dredge them when they were underwater.

--Fred Blake, WCLRA Director

Some beneficial plants require low water levels

As water levels decrease, some very beneficial plants are stimulated to grow along the shore. In fact, one of our state's rarest shoreline plants, Fassett's locoweed, requires big fluctuations of water levels to grow. This plant is found on only six lakes on the planet and all of these lakes are subject to wide fluctuations in water levels.

"They are really important for fish spawning and stabilizing sediment," says aquatic plant expert Dr. Susan Borman. "They have a whole community associated with them, of fish fingerlings and invertebrates."

Likewise, bulrushes (photographed by the author at right) provide critical spawning areas for bass, crappies and other fish. Bulrush seeds require exposed shoreland for germination and development.

"If you talk to any fish manager, they say, 'At all costs, protect our bulrush and spikerush beds,'" said Dr. Borman. The plants can be killed by being crushed or cut.

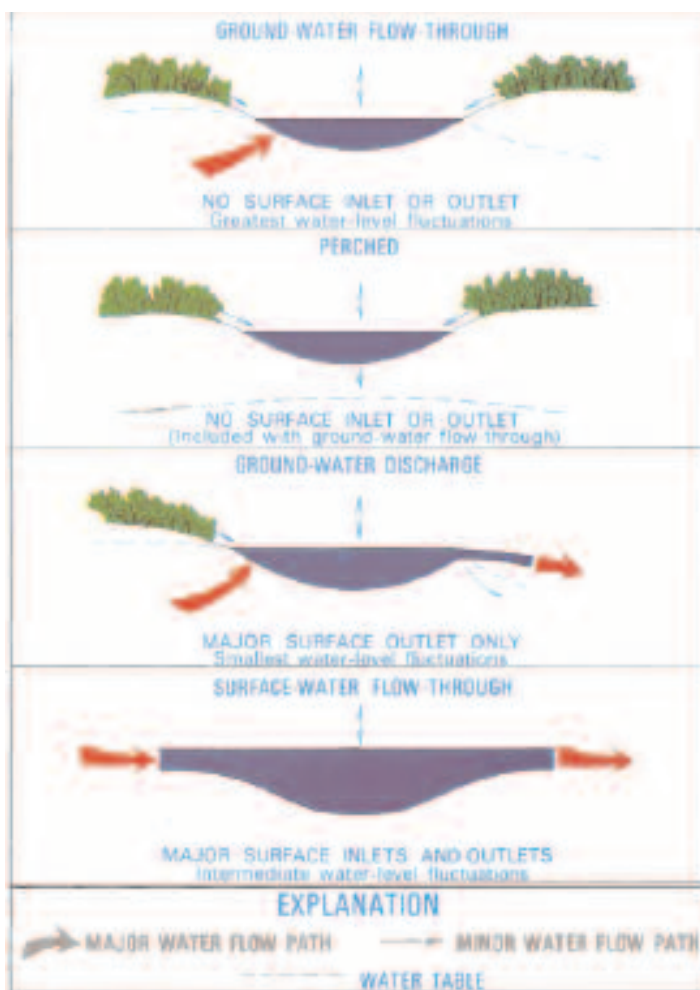
By state law, manual removal of aquatic plants is only permitted in an area confined to a path 30 feet

wide on your shoreline. Anything more than that, or by any other mechanical or chemical means, needs a permit from the Department of Natural Resources.

"Disking or dragging exposed lake bed with any type of motorized vehicle is not permitted," explained Conservation Warden, Brian Knepper.

Protecting shoreland areas becomes even more important as lakes and rivers see more intensive development patterns. In most cases, the plants that are expanding across the lakebed are actually public property, no different than the trees in a federal, state or county forest (since the waters and lakebeds are held in public trust).

--John Haack, UW-Extension Basin Educator



Source: USGS/WGNHS 1978