Why Wisconsin Has So Many Lakes & Wetlands

Release Date: 7/15/2003 -- (EDITOR'S NOTE: This is the second in a biweekly series of articles aimed at celebrating Wisconsin's Year of Water by highlighting water resources and some of the major challenges to sustaining these resources for now and future generations. Paul Garrison, has a been limnology researcher with the DNR Bureau of Integrated Science Services since 1977.)

Nearly all of Wisconsin's 15,000 lakes are glacial gifts, a legacy laid down 12,000 to 14,000 years ago by melting glaciers. In fact, glaciers are by far the greatest creators of lakes around the world. All areas that have large numbers of lakes were once covered by continental glaciers including North America, northern Europe and Russia.

As glaciers move they scrape and scour the land surface, removing large amounts of gravel, sand and boulders and carrying this debris along. When glaciers recede, this debris, or "moraine," is left behind, changing the landscape until the next glacial age. Melting glaciers forms large lakes immediately in front of the glacier that become permanent water bodies in the ensuing years.

About 10,000 years ago central Wisconsin was covered by glacial Lake Wisconsin. This area, now known as the "central sands area," was once larger in size than Green Bay and covered with water 70 to 150 feet deep. Islands that were present in the lake are now visible along Interstate 90/94 at the Mill Bluff area near Fort Douglas. The rapidly draining glacial Lake Wisconsin shaped the Wisconsin Dells in just a few days.

Glacial activity was directly responsible for the formation of the Great Lakes, the largest continuous surface of liquid fresh water in the world. While the Great Lakes now drain eastward into the Atlantic Ocean, at one time they drained southwestward into the Mississippi River and Gulf of Mexico.

The continental ice sheets that covered Wisconsin were thousands of feet thick. Their weight scoured and flattened landscapes. As they retreated, the glaciers formed landscapes, wetlands and lakes that determine the kinds of waters we have today. Vast amounts of rock debris were deposited in terminal moraines. These deposits dammed up valleys and depressions in a highly irregular way and formed lake basins. Some depressions were deep enough that they were subsequently below groundwater levels and filled with water. Others were perched above groundwater, but filled with meltwater and drainage from the surrounding topography.

Still others, the kettle pothole lakes, formed when blocks of ice deposited in glacial drift took several hundred years to melt completely. The edges and bottoms of these resulting lakes correspond to the irregular shapes of the original ice blocks. Kettle-type lakes, like Trout Lake in Vilas County and most of Vilas County's 1,318 lakes, have underwater topography with multiple depressions, irregular ridges and mounds that are as varied and interesting as the terrain above water. This area has one of the densest areas of lakes in the world. In fact, 15 percent of Vilas County is water, equal in acreage to about the land area of the state of Rhode Island. A large part of the rest of the county is covered by wetlands, which also result from glaciers.

Glaciers left their mark elsewhere, and through other lake-forming mechanisms. Valleys that existed before the glaciers were dammed up with rocks and other morainal debris, forming lakes including the Madison chain of lakes. The "Isthmus" in Madison, which separates lakes Mendota and Monona, is such a morainal dam. Green Lake, the deepest natural lake in the state, and Lake Winnebago, the Wisconsin lake with the largest surface area, 137,708 acres, were also formed by morainal dams.

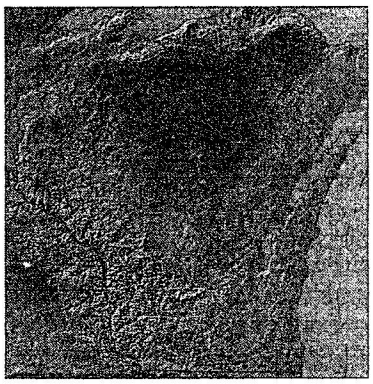
Devil's Lake in Sauk County represents a slight variation on this theme; during glaciation, the Wisconsin River flowed through the valley of present day Devil's Lake. With the retreat of the glacier, morainal deposits blocked the valley, rerouting the river. During glaciation, the valley was 800 to 900 feet deep. The maximum depth of the lake is now 43 feet, but there is 300 to 350 feet of deposits beneath the lake.

Finally, Big Cedar Lake in Washington County demonstrates yet another type of lake formed by glaciers. This lake lies between two parallel morainal ridges that were formed between successive winters as the glacier melted. This type lake formation is very rare.

The importance of glacial activity in forming lakes and wetlands is illustrated by the lack of these waterbodies in southwestern parts of Wisconsin. This area, known as the "driftless area," because it was never covered by glaciers, has few natural lakes and wetlands and is much hillier than the rest of the state. Waterways in this part of the state are found only in river valleys.

Understanding how lakes were formed and how they receive their water are important to researchers, planners and anyone who uses or cares about lakes because a lake's background defines some of its potential -- and how each reacts to the challenges of human habitation.

There are big, groundwater-fed lakes and small shallow lakes. There are cold, infertile waters, warm eutrophic waters and a host of types in between. Every lake will not be equally good for swimming, wildlife, fishing and boating, but all lakes have value. Some lakes are especially susceptible to human activities like home building, road construction and other developments along their shore. Others can sustain some shoreland pressure.



Groundwater seepage lakes and spring-fed lakes are especially susceptible to contaminants that can enter the groundwater like wastes from overburdened septic systems or spills from leaking underground tanks. Perched lakes are vulnerable because runoff can carry soil, nutrients and surface contaminants to these waters.

Understanding those natural limitations can help lake property owners and lake users define their expectations, appreciate the lakes' natural values, and determine how best to care for these fragile resources.

For more information about Wisconsin lakes, including a link to an online publication of lake type, size, depth, public access, fish species, and exotic species, visit the DNR Web pages highlighting Wisconsin's Year of Water: http://www.dnr.state.wi.us/org/water/division/yow/

Source: Wisconsin Department of Natural Resources