

Measuring Lake Levels



When, Where, and How to Measure

If a lake is selected to be in the Lake Level Minnesota Monitoring Program, DNR Waters installs a gage in the lake. A permanent gage is installed on a structure such as a bridge pier or dam abutment, or a temporary gage is fastened to a steel fence post and driven into the lake bed at a location convenient for the volunteer observers. Temporary gages are checked or reset each spring. The elevation of each gage is determined annually so that water levels can be compared from year to year. Currently, DNR Waters maintains about 1,050 gages in Minnesota lakes.

A lake gage should be read once per week at approximately the same time and should be read within 12 hours to 24 hours of a substantive rainfall event. Gage readings taken after a rainfall event help show the interaction between the lake and its watershed.

DNR Waters provides training materials for gage-reading volunteers. The volunteers submit the lake gage reading and the date to DNR Waters by email, postcard, Internet, or fax. The volunteers submit their readings at periodic intervals, from every week to every 6 weeks.



Why Monitor Lake Levels?

Fluctuations of lake levels are important to document, whether they result from floods, droughts, or just a normal water year. Lake levels are recorded regularly thanks to the efforts of volunteer observers. These volunteers join with DNR Waters' staff to create permanent and credible public lake level records.

Lakeshore properties are often adversely affected by lake level fluctuations such as flooding damage, drought-related access problems, and aesthetics. Knowing and understanding the history of lake levels can help shoreland owners and others who use the lake to accept and cope with the natural fluctuations of a lake.

The levels of all lakes fluctuate, primarily in response to changes in precipitation (rain and snow). Although lake level fluctuations in Minnesota are typically 1 foot to 2 feet per year, historical fluctuations exceeding 10 vertical feet have been recorded. Fluctuations can also result from human activities such as the construction or operation of a dam or from acts of nature such as beaver activity.

Historical lake level data are useful in developing computer simulations of lake fluctuations. The data are used to estimate flood levels, which are used by local officials to locate buildings or sewage treatment sites and to establish low-floor elevations for construction. The data also are used to administer DNR Waters' public waters permit program and to help determine the ordinary high water levels. Watershed managers and planners use historical lake level data to prepare local water management plans and to model water quality characteristics on lakes. Lakeshore owners use the data to better understand the impacts of lake levels at their properties.



DNR staff member installs a gage in a Polk County lake.



The elevation of each temporary lake gage is surveyed during spring.

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Storage of Lake Data

Water level readings of monitored lakes are stored in the Lakes Database maintained by DNR Waters, from which they can be retrieved easily by staff. Volunteer observers receive a graph of the annual water levels of the lake. The public can access the data at the DNR website under Lake Finder: <http://www.dnr.state.mn.us/lakefind/index.html>. A Lake Finder user can view and retrieve all reported lake levels by downloading lake level data in the center of the Lake Water Level Report screen. This site is updated frequently and includes a graph of the past 10 years of the recorded water levels.

Lake water level report: Minnesota DNR - Microsoft Internet Explorer provided by MN Dept of Natural Resources

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Lake water level report

Lake name: **Pokegama** County: **Pine**

Water Level Data

Period of record: 10/11/1940 to 10/06/2007
of readings: 3233
Highest recorded: 939.3 ft (04/09/1997)
Highest known: 942.1 ft (1972)
Lowest recorded: 931.1 ft (11/22/1963)
Recorded range: 8.2 ft
Average water level: 933.21 ft
Last reading: 933.36 ft (10/06/2007)
OHW elevation: 934.2 ft
Datum: 1929 (ft)

Download lake level data as: [\[dBase\]](#) [\[ASCII\]](#) (If you have trouble try right clicking on the appropriate link and choosing the "Save ... As" option.)

Benchmarks

Elevation: 947.23 ft Date Set: 05/04/1992
Datum: 1929 (ft)

Description: Brass disc in southeast abutment of CR 11 bridge on the north end of lake.

Pokegama - 58014200

Elevation (ft)

1998 1999 2000 2001 2002 2003 2004 2005 2006 2007

Last 10 years of data, click to enlarge.

Benchmark Location
Township: 39 Range: 22 Section: 14

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Lake level graphs are available at the Lake Finder page on the DNR website.

DNR Contact Information



DNR Waters website lists Area Hydrologists:
www.dnr.state.mn.us/waters

DNR Waters in St. Paul:
500 Lafayette Road
St. Paul, MN 55155-4032
(651) 259-5700

DNR Information Center

Twin Cities: (651) 296-6157
Minnesota toll free: 1-888-646-6367
Telecommunication device for the deaf (TDD): (651) 296-5484
TDD toll free: 1-800-657-3929

This information is available in an alternative format on request. Equal opportunity to participate in and benefit from programs of the Minnesota Department of Natural Resources is available regardless of race, color, national origin, sex, sexual orientation, marital status, status with regard to public assistance, age, or disability. Discrimination inquiries should be sent to Minnesota DNR, 500 Lafayette Road, St. Paul, MN 55155-4049; or the Equal Opportunity Office, Department of the Interior, Washington, DC 20240.