# Estimating the 100-Year (1% Annual Chance) Flood Elevation on Lakes

For many of Minnesota's lakes, the 1% annual chance flood elevation has not been determined by a detailed engineering study. However, it may be possible to estimate the 1% annual chance flood elevation using the shoreland management rules method.

## What is the shoreland management rules method?

The statewide rules for shoreland management (Minnesota Rules 6120.2500–3900) have minimum elevation requirements for structures within the shoreland district. They require minimum elevations based on floodplain regulatory elevations, if available. If not available, the lowest floor of structures must be at least 3 feet above the highest known water level (HKWL) or the ordinary high water level (OHWL), whichever is higher. Since Minnesota floodplain regulations require the lowest floor of structures to be at least 1 foot above the 1% annual chance flood elevation, the 3-foot requirement under shoreland management rules includes 1 foot of freeboard. Therefore, the estimated 1% annual chance flood elevation using this method is 2 feet above the OHWL or HKWL, whichever is higher (See Figure 1).

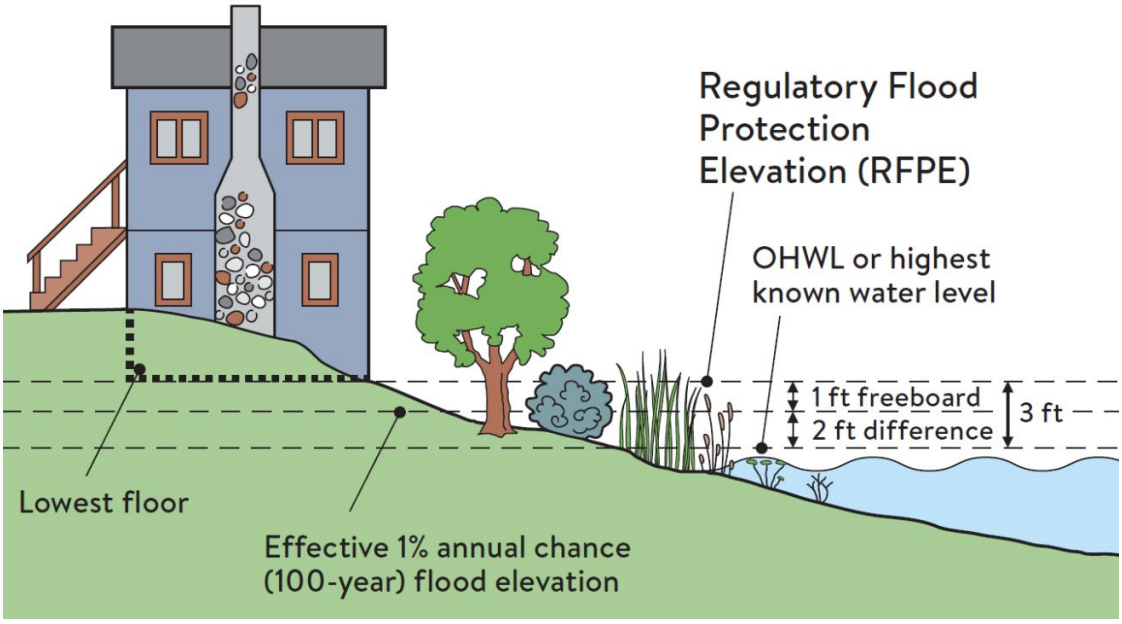


*Figure 1. For lakes without established base flood elevations, the 1% annual chance flood elevation using the shoreland management rules method is estimated by adding 2 feet to the OHWL or HKWL, whichever is higher.*

## When is it reasonable to use the shoreland management rules method?

Using this simplified method may be appropriate under the following conditions:

- The lake has an outlet.
- Available data include either the ordinary high water level or an extensive water level history (ideally documenting a severe hydrological event, such as the 1% annual chance flood), preferably both.
- The development is small. (For developments larger than 50 lots or 5 acres, whichever is smaller, federal regulations require a detailed study to determine the 1% annual chance flood elevation.)

The shoreland management rules method for estimating the 1% annual chance flood on lakes can be used for floodplain developments even when a community does not have a shoreland ordinance. FEMA recognizes this as an effective method to determine flood risk. However, if extensive development has occurred or is anticipated on a lake, the DNR recommends a more detailed study than this method provides.

## Where can I find lake level data?

DNR staff, volunteers, and local agencies or officials record water levels on hundreds of lakes across the state. To find the lake for which you need data, go to the DNR LakeFinder website (mndnr.gov/lakefinder) and enter the lake name and county. In the search results, click the lake name for a list of lake reports (See Figure 2). On the left sidebar under "Lake Reports," a link for "Water Levels" will be displayed if there is data available.

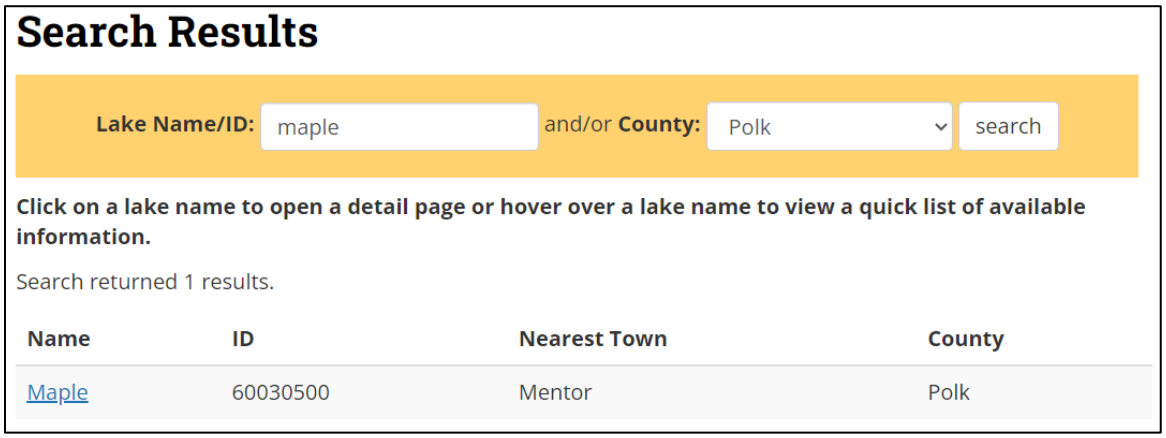


*Figure 2. In LakeFinder, enter the lake name and county to view the search results.*

## How do I calculate the 1% annual chance flood elevation using this method?

If a relatively extensive history of water levels for the lake is available, or if the history includes all known high-water periods, the OHWL and HKWL (or the "highest recorded" water level) will be listed in the report. In the example below (see Figure 3), the highest recorded elevation of Maple Lake (1173.95) is higher than the OHWL (1173). Adding 2 feet to the highest recorded results in an elevation of 1175.95, which would be rounded to 1176. This would be the estimated 1% annual chance flood elevation using the shoreland management rules method.

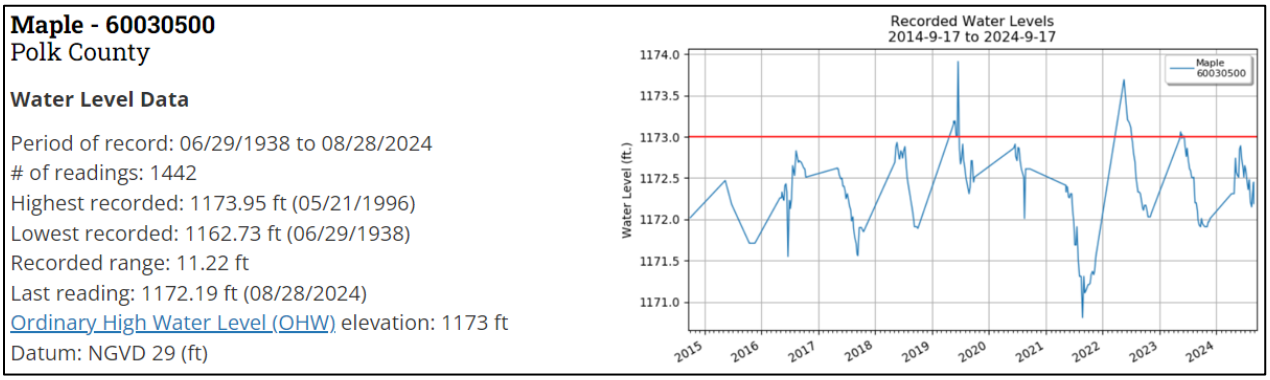


*Figure 3. In the DNR's LakeFinder database, users can access water level data reports for individual lakes.*

## Can this method be modified?

If a severe hydrological event (100-year magnitude event or greater) has been well documented, this methodology can be modified with consultation from DNR staff. In those cases, the estimated 1% annual chance flood elevation must be at least 2 feet above the OHWL **or** at or above the highest known water level documented as the result of a severe hydrological event, whichever is higher.

If the Federal Emergency Management Agency (FEMA) agrees that the historical lake level data adequately represent the flood risk, the agency has accepted this method for Letters of Map Amendments (LOMAs) and Letters of Map Revision based on Fill (LOMR-Fs).