



Estimating the 100-Year Flood Elevation on Lakes

For many of Minnesota’s lakes, the 100-year flood elevation has not been determined with a detailed engineering study. This flood elevation refers to the level that flood waters might reach or exceed in a flood that has a 1-percent chance of occurrence in any given year. However, enough information often is available for a lake to use the shoreland management rules method to approximate the flood elevation of a lake.

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 (see 6120.3300, subpart 3, B). The shoreland rules recommend using flood elevations determined through detailed studies if they are available. If they are 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 the Minnesota floodplain regulations require the lowest floor of structures to be at least 1 foot above the 1-percent chance (100-year) flood elevation, the 3-foot requirement under shoreland management rules includes the foot of freeboard. Therefore, the 100-year flood elevation would be 2 feet above the OHWL or HKWL, whichever is higher. (See Figure 1.)

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 an extensive water level history, water level documentation associated with a severe hydrological event (100-year flood or larger), or both.
- The flood elevation estimate is **unsuitable** for a development larger than 50 lots or 5 acres, whichever is smaller. Federal regulations (44 Code of Federal Regulations, Chapter 1, Section 60.3 [b] [3]) require that a detailed study be done for “all new subdivision proposals and other proposed developments.”

If extensive development has occurred or is anticipated on a lake, DNR Waters recommends a more detailed study than this method provides.

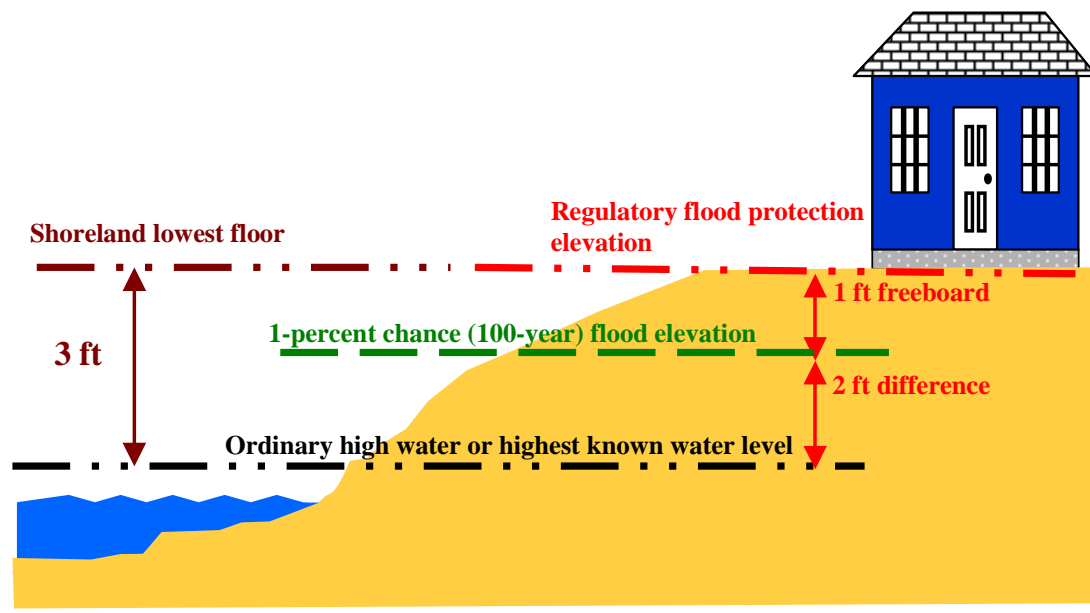


Figure 1. Comparison of 1-percent chance (100-year) flood elevation to shoreland management rules method.

Where are additional data available?

DNR Waters works with volunteers and local agencies or officials to record water levels on hundreds of lakes in the state. Go to “Lake Finder” (<http://www.dnr.state.mn.us/lakefind/index.html>) to find the lake for which you need data. If the lake is listed there, you will see choices similar to those in Figure 2 below. If “go” appears under the lake water levels symbol, click on that and a screen appears with water level history for that lake.

Displaying records 1-10 of 14.

[Next 4 -->](#)
[Display all 14](#)
[Search again](#)

	lake information	lake maps	lake water levels	fish consumption advisory MDH	lake water quality	lake water clarity	lake water clarity by satellite USA	recreation compass	topographic maps
Maple - 11018100 <i>Cass</i>	go	go					go	go	go
Maple - 14000100 <i>Clay</i>	go						go	go	go
Maple - 18004500 <i>Crow Wing</i>	go	go					go	go	go
Maple - 21007900 <i>Douglas</i>	go	go	go	go	go	go	go	go	go
Maple - 31077300 <i>Itasca</i>	go	go			go	go	go	go	go
Maple - 47000100 <i>Meeker</i>	go	go		go			go	go	go
Maple - 60030500 <i>Polk</i>	go	go	go	go	go	go	go	go	go

Figure 2. Lake water levels available with the Lake Finder on the DNR website.

How can the data on Maple Lake be used to determine the shoreland management method?

If a relatively extensive history of water levels for the lake is available (preferably 30 years or more) or if the history includes all known high-water periods, look at the “OHWL elevation” and the “Highest recorded” (or the “Highest known” if listed). Add 2 feet to the higher elevation of the two. In Figure 3, the highest recorded elevation of Maple Lake (1173.95) is higher than the OHWL. Adding 2 feet results in an elevation of 1175.95, which would be rounded to 1176.

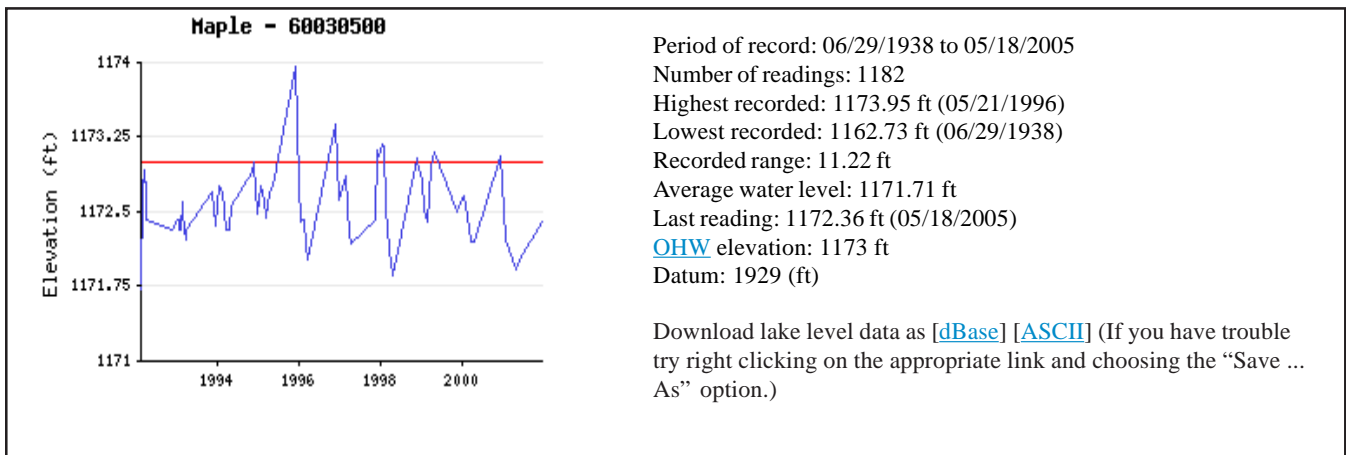


Figure 3. Example of water level data available for Maple Lake, Polk County, in the Lake Finder.

This method has been modified if the highest recorded or known elevation documents the impacts of a severe hydrological event (100-year magnitude event or greater). In those cases, the 100-year flood elevation is estimated to be the OHWL plus 2 feet **or** the highest known water level documented as the result of a severe hydrological event, whichever is higher. Consult DNR Waters staff when this method would apply.

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).