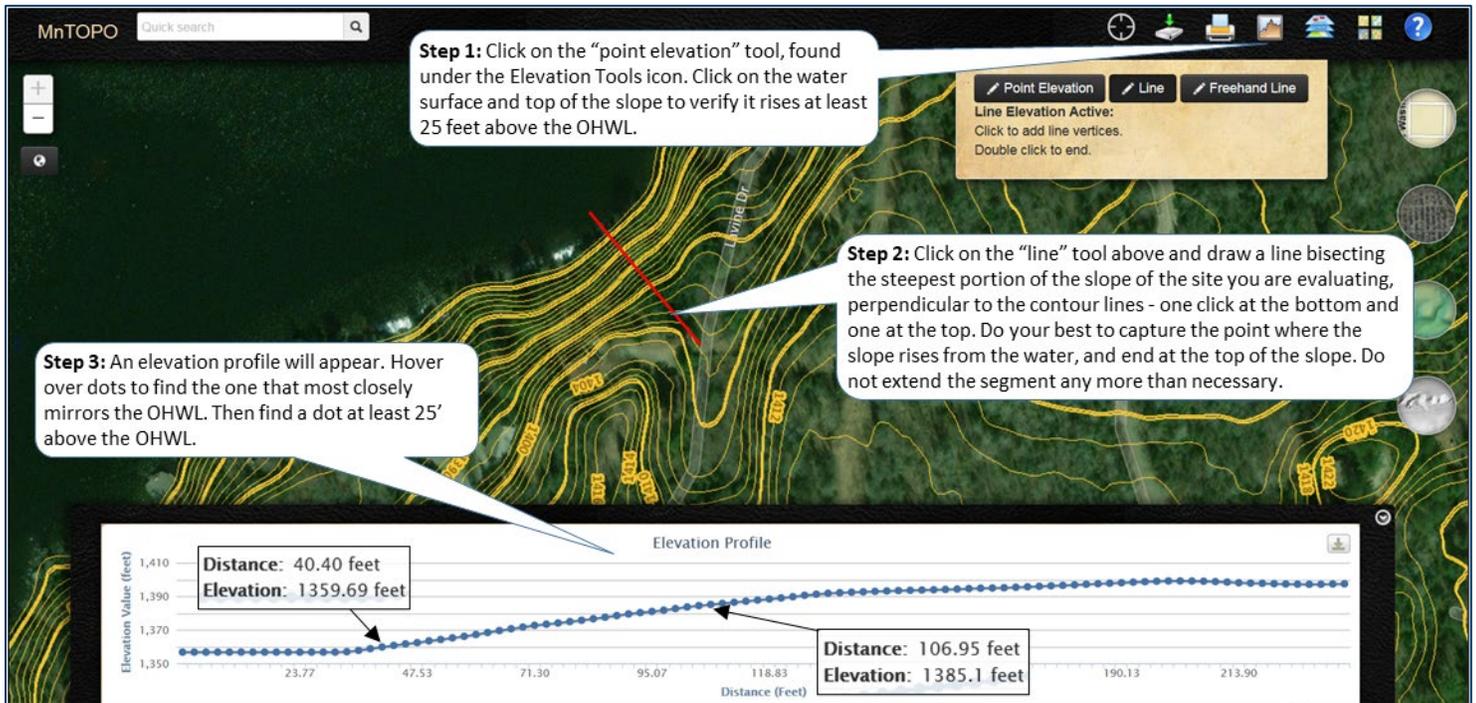**DEPARTMENT OF NATURAL RESOURCES**

Quick Guide to Analyzing Slopes with MnTOPO

MnTOPO is a handy web-based tool to quickly evaluate slope percentage to help determine if a slope feature meets the bluff or slope definition of local regulations. It uses LiDAR-derived elevation data and is accurate to within ±1 foot. This program gives users the ability to analyze a cross-section of any slope in the state.

The following example uses the bluff definition in the shoreland regulations (Minn. Rule 6120.2100 Subp. 1b) to evaluate whether a bluff likely exists. This same approach can be used with other bluff and slope regulatory definitions. Most permitting situations typically require a deeper level of analysis than what's outlined in this document.

Open MnTOPO, and zoom to your site.

Step 4: Calculate rise ÷ run between your two dots to determine whether the slope exceeds 30%. Since you are looking for a 30% slope at an elevation of 25 feet OR MORE above the OHWL, you may need to evaluate multiple line segments.

$$\frac{1385.1 - 1359.69}{106.95 - 40.40} = \frac{25.41}{66.55} = \mathbf{38.2\%}$$

In this example, a bluff is likely present. There may be some situations where analysis of additional, adjacent cross sections would be needed.

In a shoreland district, this method works best for slopes that rise immediately from the water's edge. Where a detailed analysis is needed, or when the slope starts away from the shore, the Shoreland Bluff Profile Tool may be useful.

A site survey is needed to determine the precise location of the toe and top of bluff, the bluff impact zone (BIZ), and structure setbacks.

GIS users can download shapefiles detailing the 2' contour lines through MnTOPO. Click the "Download Data" icon in the top right corner.

> Most shoreland bluff evaluations require a determination of an **Ordinary High Water Level (OHWL)** elevation. The OHWL is the point where natural vegetation changes from aquatic to terrestrial. For many lakes, the OHWL can be found on LakeFinder. For watercourses, the OHWL is the elevation of the top of the bank of the channel. Zoning administrators should contact their DNR Area Hydrologist find out the OHWL elevation where it's unavailable.