

# METHOD DESCRIPTION



## Detailed Method for Mapping Lake Levels

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### Introduction

This document describes the mapping process used by the National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management to map lake level change for the Lake Level Viewer for the U.S. Great Lakes. Generally, this process can be described as a bathtub approach.

### Goals of Mapping

- Use best publically available and accessible elevation data.
- Map historically and scenario-supported levels of lake level variation.
- Reference water levels to both the long-term average water level defined by the Great Lakes Water Level Dashboard (GLWLD) and the International Great Lakes Datum of 1985 (IGLD85).

### Caveats and Assumptions

- These data are for planning, educational, and awareness purposes only and should not be used for site-specific analysis, navigation, or permitting.
- The mapping does not incorporate future changes in coastal geomorphology and assumes present conditions will persist, which will not be the case.
- The digital elevation model used to map changing lake levels does not incorporate a detailed pipe network analysis, or engineering-grade hydrologic analysis (for example, culverts and ditches may not be incorporated resulting in incorrectly mapped areas). Therefore, hydrologically unconnected areas of inundation are still displayed.
- Hydro connectivity was not enforced in this analysis (unlike in the Digital Coast's Sea Level Rise and Coastal Flooding Impacts Viewer mapping methods).

## Mapping Process

The rise and drop in water levels were mapped using a bathtub method. This simple mapping approach assumes a single-value, flat-water surface for each lake. The process was limited by availability of elevation data, which may be lacking in some nearshore areas, rivers, streams, etc. Thirteen levels were mapped, -6 feet through +6 feet, which includes zero.

### Inputs

- Digital elevation model (DEM)
- Lake's long-term average referenced to IGLD85
- Lake level change values

### Process

1. Determine the long-term average water level for each lake from the Great Lakes Water Level Dashboard. The value will be referenced to IGLD85. This value can be treated as zero and the water level to map can be added or subtracted from this value.
2. In a GIS, perform a conditional statement where the DEM is less than or equal to the water level; subtract the water level from the DEM. This results in negative depths. The subtraction could be flipped if positive depth values are desired.