

MODEL ZONING REGULATIONS FOR LAKE MICHIGAN BLUFF AND RAVINE SETBACKS

These model regulations are primarily based on recommendations for bluff and ravine setbacks developed by Wisconsin Sea Grant. The regulations are intended to provide bluff and ravine setbacks along Lake Michigan for new development and, where lot depth is adequate, redevelopment to help protect structures and properties from bluff and ravine erosion and failure without reliance on shore protection measures. In addition to calculating a stable bluff slope, the model recommends including a setback equivalent to a 60-year bluff recession distance (twice the typical home mortgage loan period) and a 100-foot setback from the top of the calculated bluff (including the recession rate and stable slope distance). The additional 100-foot setback is recommended to provide for uncertainties related to future stable slope angles, recession rates, the effect from nearby shore protection structures, and other factors. See Figure 1.

These regulations are not intended to be applied in areas of existing urban development, where deep setbacks would be difficult to implement. In such cases, bluff and ravine stabilization, subsurface and surface water control, bluff and ravine toe protection, or other measures may be needed in addition to maintaining existing bluff and ravine setbacks.

Additional recommendations and sources of information about bluff and ravine setbacks and other coastal protection measures are available from county hazard mitigation plans, Wisconsin Sea Grant, and the publication “[Protecting Coastal Investments](#),” published by UW-Extension and Wisconsin Sea Grant in 2008.

The attached model regulations are intended to be incorporated as a section in an existing county, city, village, or town zoning ordinance, including a county shoreland zoning ordinance. The attached regulations do not include provisions for appeals, variances, severability, nonconforming uses and structures, and similar considerations that would typically be addressed in other sections of a full zoning ordinance.

Please contact Commission staff at (262) 547-6721 or sewrpc@sewrpc.org if you have any questions or would like a Microsoft Word version of this model section.

2. **EROSION HAZARD SETBACK FROM BLUFFS AND RAVINES**

(Include in the "General Provisions" section of the zoning ordinance and number as appropriate.)

- A. **Purpose.** Structures and soil absorption fields shall be set back from the top of bluffs and ravines along Lake Michigan in order to reduce erosion hazard and related damages to structures and property. These regulations do not guarantee nor warrant that development in compliance with its terms will be free from all erosion damage over the useful life of a structure.
- B. **Setback from Bluffs.** The bluff setback shall be based upon the expected bluff recession distance over a 60-year period, plus the distance that would be needed to establish a stable slope, plus a minimum structure setback from the edge of the computed stable slope, as set forth below (See Figure 1):
1. The bluff recession distance for a 60-year period shall be calculated using a minimum recession rate of one foot per year, unless site-specific information justifying a greater distance is provided by the Zoning Administrator. The bluff recession distance shall be measured from the toe of the bluff.
 2. The distance required to achieve a stable slope shall use a ratio of one foot vertical distance to 2.5 feet horizontal distance. The measurement shall be made from the landward edge of the bluff recession distance.
 3. Soil absorption fields and structures, except those listed in paragraph 4 below, shall be set back a minimum of 100 feet from the landward edge of the stable slope distance.
 4. Storage sheds, driveways, walkways, patios, and fences accessory to a principal use may be permitted within the bluff setback area.
- C. **Setback from Ravines.** All structures and soil absorption fields shall be set back from the top of a ravine. The ravine setback shall be based upon the distance that would be needed to establish a stable slope plus a minimum structure setback from the edge of the computed stable slope, as set forth below:
1. For ravines having a depth equal to or greater than 10 feet, as measured from the bottom of the ravine to the horizontal level of the land adjacent to the ravine, a distance required to achieve a stable slope using a ratio of one foot vertical distance to 2.5 feet horizontal distance shall be calculated. The measurement shall be made from the center of the deepest part of the ravine.
 2. For ravines having a depth less than 10 feet as measured from the bottom of the ravine to the horizontal level of the land adjacent to the ravine, a distance required to achieve a stable slope using a ratio of one foot vertical distance to three feet horizontal distance shall be calculated. The measurement shall be made from the center of the deepest part of the ravine.
 3. Soil absorption fields and structures, except those listed in paragraph 4 below, shall be set back a minimum of 100 feet from the landward edge of the stable slope distance determined in accordance with paragraphs 1 or 2 above.
 4. Storage sheds, driveways, walkways, patios, and fences accessory to a principal use may be permitted within the ravine setback area.

- D. **Modifications.** The Board of Zoning Appeals/Plan Commission may grant a conditional use permit as provided in Section _____ allowing a modification of the erosion hazard setback from bluffs or ravines upon presentation by the applicant of a detailed report by a registered Professional Engineer with demonstrable geotechnical expertise documenting lower recession rates, more stable slope conditions, plans for structural protection against wave attack, or plans for stabilization of the bluff or shoreline. Engineering studies evaluating slope stability shall use the top of the lake sediments or 0.75 the height of the bluff, whichever is greater, as the groundwater surface. The 100-foot setback from the top of bluffs and ravines required by Sections 2.__B.3 and 2.__C.3 above shall be provided from the landward edge of the modified stable slope distance.

RELATED DEFINITIONS

(Include in the "Definitions" section of the zoning ordinance.)

Bluff

A hill, ridge, or similar landform significantly elevated above the surrounding landscape, having a broad, steep face or cliff, and adjoining the shoreline or coastal lowlands of Lake Michigan.

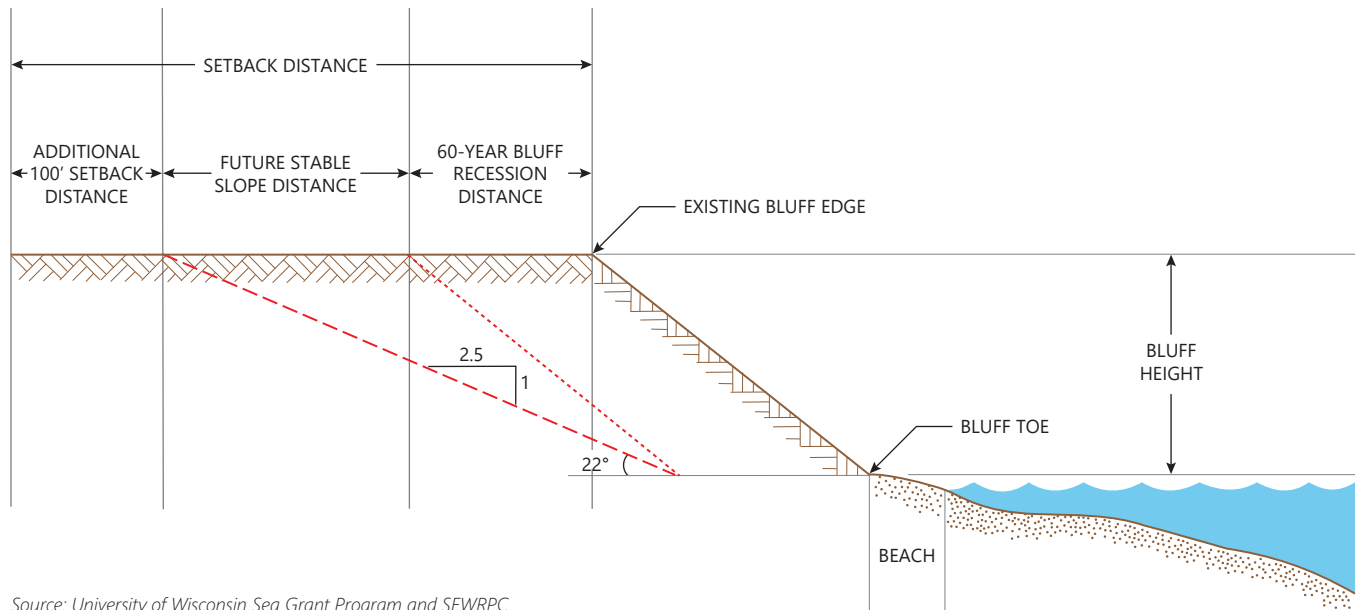
Bluff Recession Rate

The rate at which a bluff recedes because of erosion by the waters of Lake Michigan and because of unstable slope conditions.

Ravine

A small, steep sided valley worn by running water that opens onto a bluff located along the Lake Michigan shoreline.

Figure 1
Recommended Erosion Hazard Setback from Lake Michigan Bluffs and Ravines



Source: University of Wisconsin Sea Grant Program and SEWRPC