



# Management of Bluffs and Slopes

## Bluffs and Steep Slopes: Sensitive Resources in Shoreland Areas



Some of Minnesota's lake and riverfront properties are steep and sensitive resources that are susceptible to damage if not properly managed. Erosion is a natural process, but our activities can accelerate erosion of these sensitive shorelines and can even result in bank failure.

Bank instability threatens property and negatively affects natural resources. Some common activities that reduce the stability of steep slopes include removing natural vegetation, reshaping the slope to create level areas, installing cuts in the bank for stairs, installing retaining walls, or channeling runoff that creates erosion and compromises the integrity of the bluff.

These impacts can be measured in both physical and aesthetic terms. Physically, development that encroaches on bluff tops can accelerate soil erosion, loading, and slope failure. Aesthetically, development that encroaches on bluff tops can compromise or eliminate the natural appearance of this topographic feature in shoreland areas.

### Preventing Problems

To manage bluffs and slopes properly, communities use preventative controls. These include zoning for compatible land uses, implementing appropriate bluff setbacks for structures, and



### Definitions

**Bluff:** A topographic feature such as a hill, cliff, or embankment having all of the following characteristics:

- Part or all of the feature is located in a shoreland area.
- The slope rises at least 25 feet above the ordinary high water level of the waterbody.
- The grade of the slope from the toe of the bluff to a point 25 feet or more above the ordinary high water level averages 30 percent or greater.
- The slope drains toward the waterbody.

An area with an average slope of less than 18 percent over a distance for 50 feet or more is not considered part of the bluff.

**Bluff impact zone:** A bluff and land located within 20 feet from the top of a bluff.

**Shore impact zone:** Land located between the ordinary high water level of a public water and a line parallel to it at a setback of 50 percent of the structure setback.

**Steep slope:** Land where agricultural activity or development is either not recommended or described as poorly suited due to slope steepness and the site's soil characteristics, as mapped and described in available county soil surveys or other technical reports, unless appropriate design and construction techniques and farming practices are used in accordance with the provisions of these regulations. Where specific information is not available, steep slopes are lands having average slopes over 12 percent, as measured over horizontal distances of 50 feet or more, that are not bluffs.

**Toe of the bluff:** The lower point of a 50-foot segment with an average slope exceeding 18 percent.

**Top of the bluff:** The higher point of a 50-foot segment with an average slope exceeding 18 percent.

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requiring modern erosion-control and stormwater measures that are necessary to preserve the integrity of steep slopes and bluffs. These preventative measures also preserve property values, minimize the visual impact of built features, and preserve native vegetation that stabilizes slopes and provides habitat for wildlife.

## Bluff Impact Zone

Setbacks from bluff tops for structures are needed in order to protect the bluff tops from adverse environmental impacts of development and construction activities.

A bluff impact zone is established for preservation and management of shoreland vegetation and soils, and all structural development is excluded from this zone, except for stairways, lifts, and landings. Consequently, the zone can reduce or avoid erosion problems. Preserving and maintaining vegetation can protect soils, screen development, and maintain the natural appearance of bluff areas.



This is an example of eroded bluff in Meeker County.

## Alterations to Vegetation and Topography

Alterations to vegetation and topography should be controlled by local governments because the mismanagement of soil and vegetation can adversely affect the natural resources. Where grading and filling is absolutely needed, local permits should be required for grading or filling topography in bluff impact zones and on steep slopes. Grading or filling impacts include sedimentation to receiving water bodies, soil deposition onto adjacent properties or into wetlands, and significant erosion or soil slumping problems on steep slopes or on highly erosive soils.

Vegetation is important to bluff and steep slope stability in several ways. The vegetation softens the impact of raindrops that otherwise can loosen soil particles. Vegetation slows runoff and filters out suspended sediments. Native vegetation is preferred over turf grass and other non-native species because native vegetation generally has deeper roots, which better stabilize the slope. As a condition of allowing vegetation alterations in the shore and bluff impact zones and on steep slopes, a permit should specify performance standards and provisions to ensure that natural characteristics of these areas will be properly managed.

## Stormwater Management Issues

The importance of managing site drainage and precipitation runoff from natural and impervious surfaces cannot be understated. It is essential that the landowner, developer, and the contractors plan for and manage runoff where bluffs or steep slopes are nearby. Developing a lake lot generates greater amounts of runoff from the impervious surfaces. Directing excess water to a lake or river would be a big mistake. Allowing water to flow over bluffs or steep slopes will cause erosion problems. Designing the site so infiltration is promoted and runoff is directed away from the steep areas is crucial to protecting our lakeshores. Restoration of failed bluffs and steep slopes can be extremely expensive, and the repaired hillside often is not as stable so recurrent erosion becomes more likely.

*The comments in this brochure address jurisdictional matters and concerns of the DNR, Division of Waters. Please contact your DNR Area Hydrologist to discuss issues relating to your project or this brochure. More information is available at this website: <http://mndnr.gov/waters/shoreland.html>*

