Landslide susceptibility in fine-grained sediments

- Slope less than 5 percent.
- Slope equal to or greater than 5 percent.
- Slope equal to or greater than 5 percent and one or two of the following terrain-related risk factors: slope aspect, curvature, or local relief.
- Slope equal to or greater than 5 percent and two or three of the following terrain-related risk factors: slope aspect, curvature, or local relief.

Landslide susceptibility in other sediments

- Slope less than 5 percent.
- Slope equal to or greater than 5 percent.

Sites of past landslides

This map can be used to identify areas with historical landslide activity and to identify areas that are susceptible to future landslide activity where additional studies should be undertaken before construction or other development is started that could be at risk due to a future landslide. Ninety-three percent of mapped landslide sites in Maine are associated with fine-grained sediments, and eighty-two percent are associated with fine-grained alluvial deposits. Some sites are associated with sediments of other types, such as rocks and boulders, that were exposed during the past several thousand years. From this, we conclude that there is a significantly greater risk of a landslide occurring in areas containing one or more of the geomorphic risk factors than in areas that do not contain any of these risk factors.

Sources of information used to make this map


Terrain-Related Risk Factors

- **Slope:** Slope is the primary driving force for landslides and earth movements. Slope is defined as the inclined surface of the land. The steeper the slope, the larger the shear stress produced by the weight of the materials and the more susceptible the slope is to failure. For this map, a slope of 5% or greater is considered a risk factor.
- **Slope aspect:** Slope aspect is the direction toward which the surface of the soil faces. South-facing slopes undergo more extensive freeze/thaw cycles in winter months than slopes with other aspects. Repeated freeze-thaw cycles preferentially reduce the shear strength of the shallow soil material and increase the likelihood of shallow soil slumps. Ultimately, small movements steepen the slope and lead to larger slope failures. For this map, a slope aspect facing between South 45º East and South 45º West is considered an additional risk factor.
- **Carverate (concave shape):** Hill shapes influence landslides by its effects on soil and water distribution. Concave surface topography will tend to concentrate the flow of surface water and ground water, raising ground-water pore pressures and reducing the shear strength of the soil. As a result, concave slopes are more susceptible to failure than straight slopes or convex slopes. For this map, a concave shape is considered an additional risk factor.
- **Local relief (slope height):** As the thickness of the potential landslide block increases, the slope steepens on its lower section of the block increases and the block (or slope) is more susceptible to failure. As a consequence, thicker sections of surficial materials will be more susceptible to failure and possibly deeper and larger failures. For this map, local relief greater than 6 meters (approximately 20 feet) is considered an additional risk factor.

Common Types of Landslides in Maine

- **Rockfall:** abrupt movement of masses of materials, such as rocks and boulders, that become detached from steep slopes or cliffs.
- **Debris flow:** rapid mass movement in which a combination of loose soil, rock, organic matter, air, and water mobilize as a slurry that flows downslope.
- **Earthflow:** a downslope viscous flow of fine-grained materials that have been saturated with water and move under the pull of gravity.
- **Creep:** the imperceptibly slow downslope movement of soil or rock caused by shear stress sufficient for permanent deformation, but too small to cause shear failure.

Limitations of the data

This map may be used to identify areas that are susceptible to landslide activity. Based on the risk factor analysis, if a landslide or earth movement does occur, it is very likely to be in the areas containing one or more of the geomorphic risk factors shown on this map, but it is not possible at this time to predict whether a landslide or earth movement will occur. The landslide site mapping and risk factor analysis were done in 2008. Some mapped landslides may have occurred since the photography and digital elevation model were mapped or generated.

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Landslide Sites and Areas of Landslide Susceptibility
Dayton, Maine - Maine Geological Survey