Landslide susceptibility in fine-grained sediments

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

Landslide susceptibility in other sediments

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

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 greater 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 may steepen the slope and lead to larger slope failures. For this map, a slope aspect facing between South 45º East and South 45º W is considered an additional risk factor.

Curvature (concave shape): Hill slope influences 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 shear stress 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.

Sources of information used to make this map

Terrain-related risk factors were calculated from the National Elevation Dataset 1/3 Arc Second product and published by the U.S. Geological Survey. The horizontal resolution of the 1/3 Arc Second dataset is approximately 10 meters. Horizontal accuracy meets the National Map Accuracy Standard for a 1,240,000 scale dataset of ± 40 feet or 12 meters. Absolute vertical accuracy of the elevation data is ±7 meters or 1:24,000. Mapped landslides in the town of Hollis are located in areas shown as having a slope of 5 percent or more, and 89 percent of the mapped landslides are located in areas containing at least one additional geomorphic risk factor.

This map may 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 future landslide.

Mated landslides in the town of Hollis

The map displays the extent of the landslide and the letter indicates the type of landslide, defined in the diagram entitled Common Types of Landslides in Maine. Two or more letters indicate multiple processes were involved at the site or contributed to landslide morphology. Past landslides were mapped from aerial photo interpretation and field investigations in 2008.

Common Types of Landslides in Maine

- Rotational landslide: The surface of rupture is curved and the failure is usually rotational.
- Translational landslide: The surface of rupture is curved, not rotational, and the shear movement is roughly rotational.
- Rockfall: Abrupt movement of masses of materials 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.
- Creep (Flow): Immobile flow 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.

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