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LANDSLIDE DEPOSITS IN THE DUCHESNE 30' X 60' QUADRANGLE, UTAH

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EXPLANATION

Landslide deposits--Areas underlain by landslide deposits resulting from rockfall, avalanching, landsliding, slumping, sagging, or flowing of rock and colluvial debris. Many small deposits have not been shown, especially in mountainous areas. Rates of movement are not known but vary from slow to rapid. Most landslides in the quadrangle are inactive or moving very slowly. Estimated thicknesses range from less than a few meters for skin slides to 100 m (330 ft) for some large deposits. Most of the deposits formed in Pleistocene or Holocene time, but a few larger ones may have begun forming in Pliocene time. Arrows in landslide areas indicate the inferred direction of movement (not shown in small areas). Question mark indicates area may or may not be a landslide deposit.

IDENTIFICATION AND ORIGIN OF LANDSLIDE DEPOSITS

Landslide deposits result from the downslope movement of earth materials in response to gravity. Many occur in or adjacent to areas where movement has occurred before, and old deposits may be reactivated by natural or man-made causes. Therefore, it is important to recognize their presence and to understand some of the conditions that may trigger them.

Landslide deposits can be identified by anomalous topography, drainage, or vegetation patterns as compared to adjacent terrain. These features vary with the type of slide movement, material, age, and other factors, but usually include some of the following: (1) prominent scarp(s) at the head of the slide; (2) surface cracks within the deposit; (3) hummocky ground surface or anomalous topography; (4) anomalous stratigraphy and structure; (5) disrupted,

erratic, or internal drainage, including undrained depressions and seepage zones; (6) lack of vegetation or abrupt changes in type or growth habit of vegetation (curved or tilted trees, for example); and (7) displaced cultural features.

Landslides are classified by type of movement (fall, topple, slide, slump, lateral spread, or flow) and kind of material (rock, debris, or earth). Most landslide deposits are complex and involve a variety of materials and types of movement. Slump-earthflow deposits (fig. 1) are particularly common in this area.

Landslides are caused by a combination of geologic, topographic, and climatic conditions that increase the stresses acting on the material and (or) decrease the frictional resistance of the material. Some of the conditions favorable to landsliding include (1) soft, weak materials such as shale or weathered rock, especially when overlain by hard, resistant units such as sandstone or gravel deposits; (2) steep slopes, particularly on weak rock or soil units; and (3) the presence of surface or ground water, which adds weight to the material and reduces its internal strength. In addition, man's activities may alter otherwise stable conditions and induce new slides or reactivate old ones; the two most common activities are (1) addition of water, such as from irrigation systems, leaking pipes, and canals, and (2) undercutting or oversteeping of potentially unstable slopes by construction projects.

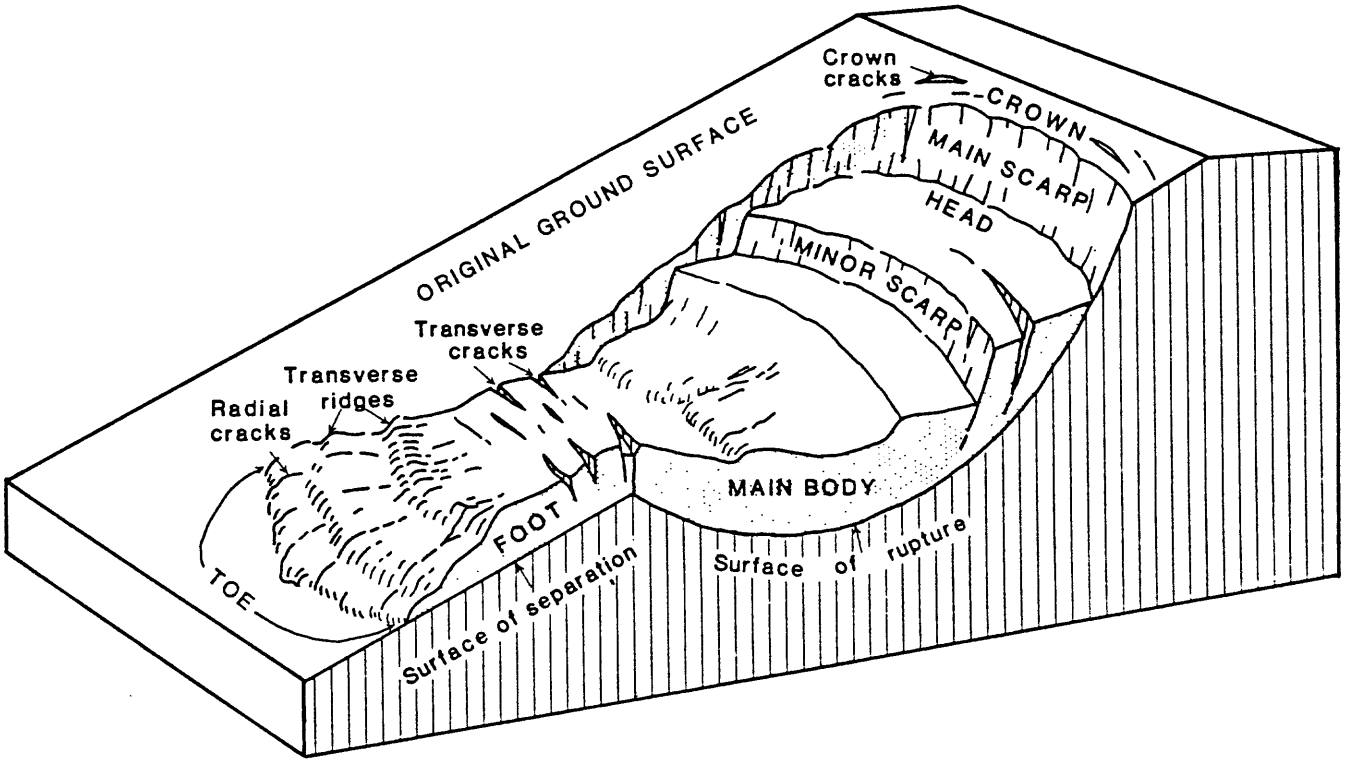
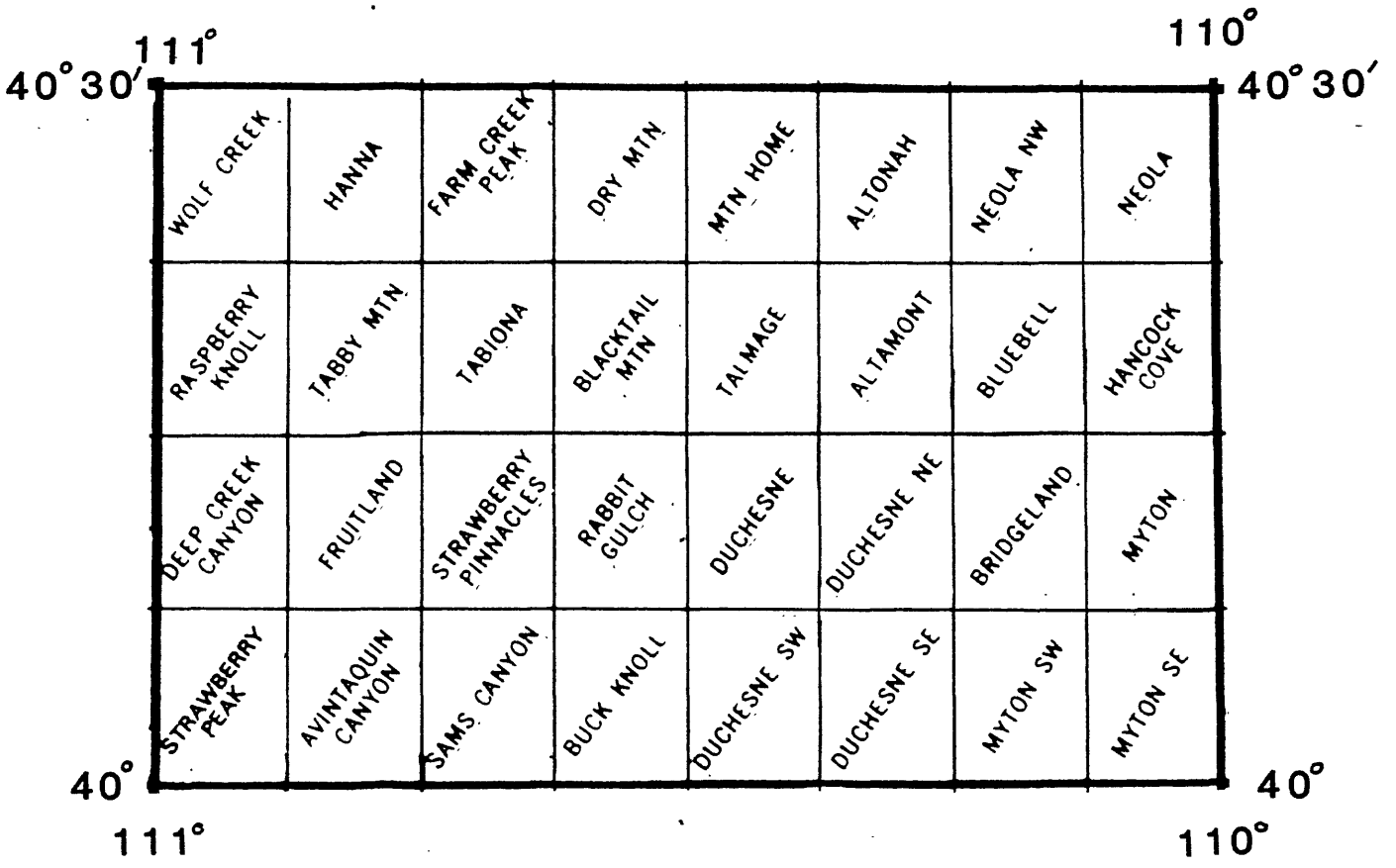


Figure 1.—Features of slump-earthflow. (Modified from Varnes, 1978.)



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IN THE DUCHESNE 30′x 60′ QUADRANGLE, UTAH

METHODS OF COMPILATION

Reconnaissance mapping of some of the landslide deposits in the Duchesne 30' x 60' quadrangle occurred in 1979-80 as part of the mapping of the geology in the Salt Lake City 1° x 2° quadrangle (in press) by Bruce Bryant. The emphasis was on stratigraphy and structure, and only the larger landslide deposits are shown at a scale of 1:250,000. Aerial photographs from USGS project GS-VEFM (scale 1:80,000) taken in 1976 in Bryant's mapping. Colton mapped the landslide deposits in the east half of the Duchesne 30' x 60' quadrangle using 1:24,000 scale aerial photographs (GS-VAMR, 1962) as a part of a statewide cooperative project with the Utah Geological Survey. The west half of the 30' x 60' quadrangle was mapped by Colton using USGS aerial photographs (GS-VQR, scale 1:48,000, 1958). All outlines of deposits were compiled on 1:24,000 scale topographic maps (please see index). These compilations were photographically reduced to 1:100,000. Some of the large landslide deposits have been seen in the field, many small ones have not.

REFERENCES CITES

Varnes, D.J., 1978, Slope movement types and processes, in Schuster, R.L., ed., Landslides--Analysis and control: Washington, D.C., Transportation Research Board, National Research Council, Special Report 176, Chap. 2, p. 11-33.