UNITED STATES DEPARTMENT OF INTERIOR

GEOLOGICAL SURVEY

LANDSLIDE DEPOSITS IN THE OGDEN 30' X 60' QUADRANGLE, UTAH AND WYOMING

By

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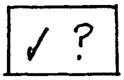
Open-File Report 91-297

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

EXPLANATION

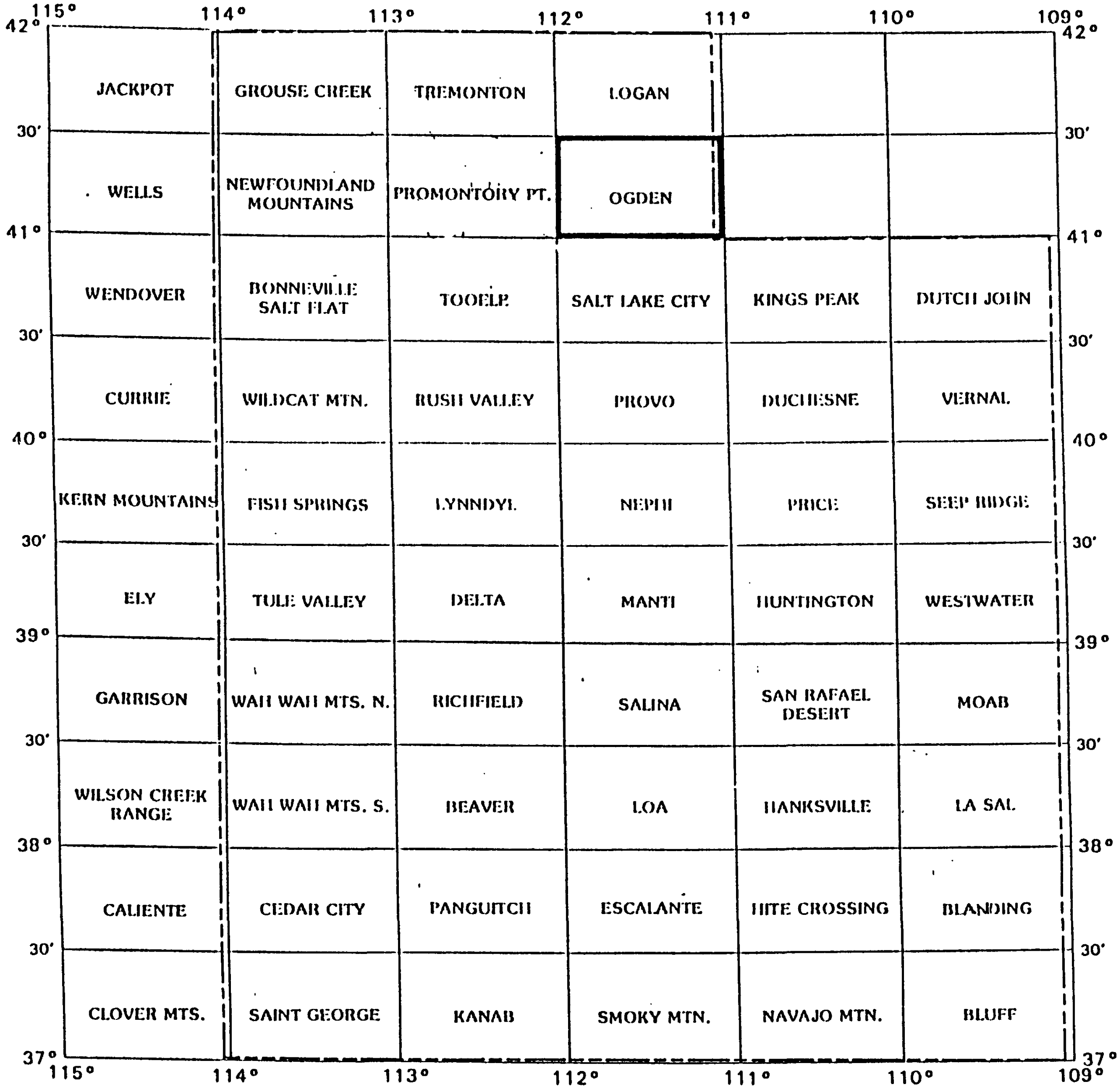


Landslide deposits--Areas underlain by landslide deposits resulting from rockfall, avalanching, landsliding, sagging, or flowing of rock and colluvial debris. Many small deposits have not been shown, especially in mountainous areas. Rates of movement vary from slow to rapid. Most landslides in the quadrangle 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 and question marks indicate possible landslide deposits

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



INDEX TO 1:100,000 SCALE TOPOGRAPHIC MAPS OF 30' x 60' QUADRANGLES IN UTAH. HEAVY OUTLINE INDICATES LOCATION OF THIS MAP OF LANDSLIDE DEPOSITS 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 the map 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.

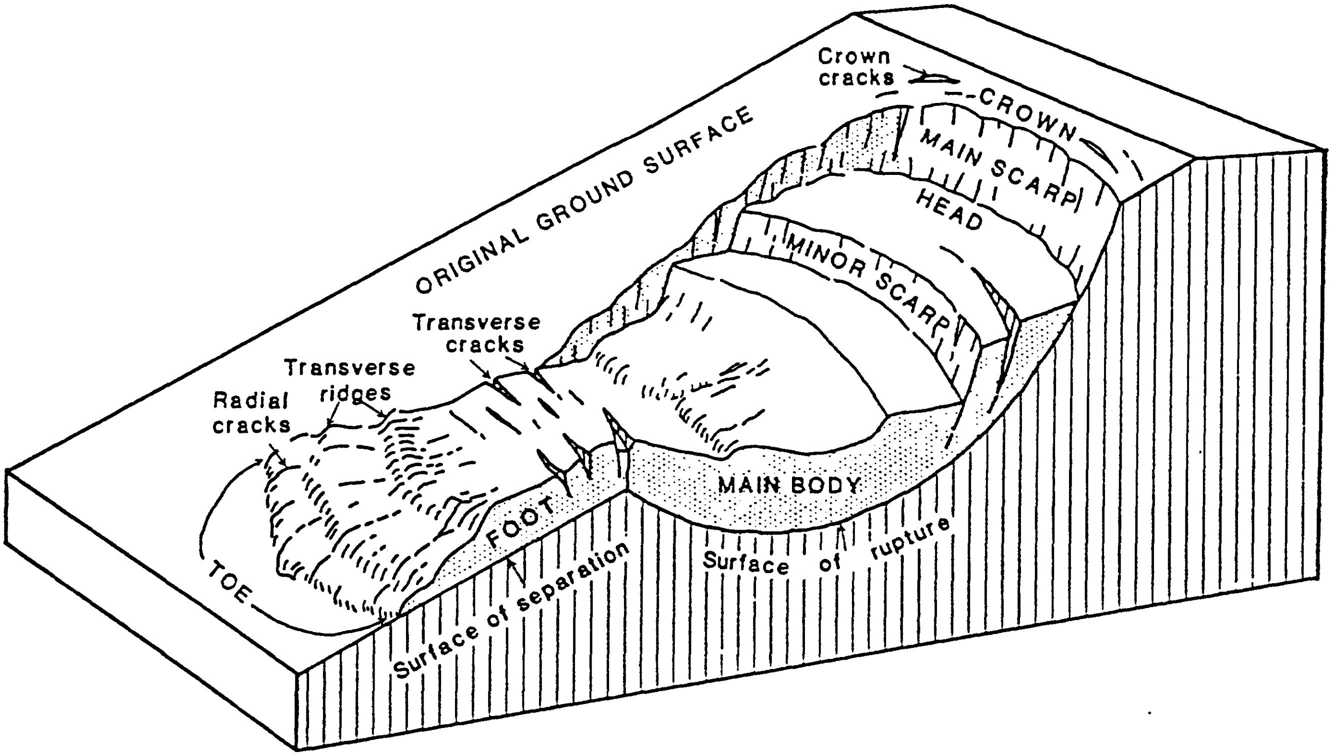


Figure 1.—Features of slump-earthflow. (Modified from Varnes, 1978.)

OGDEN

Landslide deposits in the Ogden 30' x 60' quadrangle were mapped by interpreting aerial photographs ranging in scale from 1:30,000 to 1:36,000 taken in 1959, 1964, 1968 and 1986. The following U.S. Geological Survey photography was used:

GS-VWE, 1959, scale 1:50,000

GS-VAWS, 1964, scale 1:36,000

GS-VCAL, 1968, scale 1:34,000

GS-VFKS (color), 1986, scale 1:30,000

Please see index map for location of above aerial photography. No field check was performed. Previous geologic mapping was examined and incorporated in this map. The following sources of geologic mapping were used:

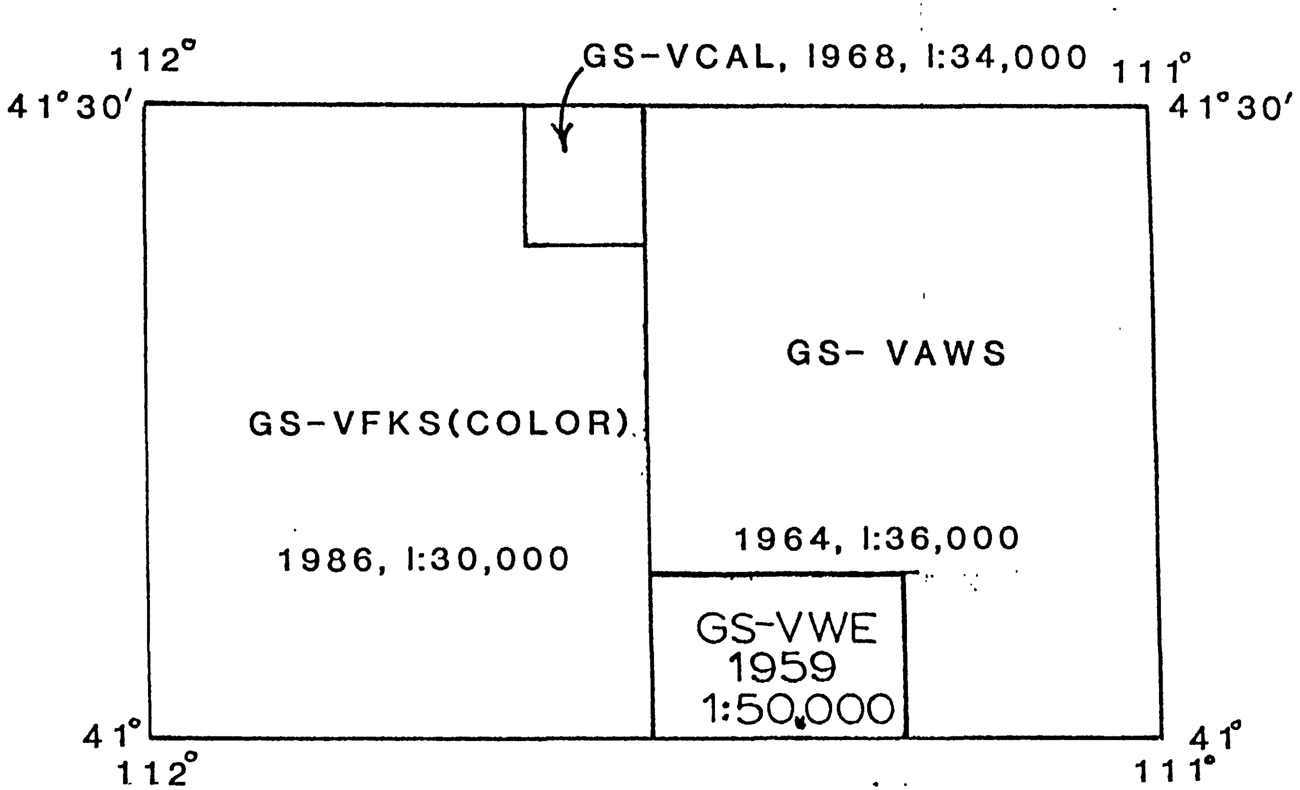
Crittenden, M.D., Jr., 1972, Geologic map of the Browns Hole quadrangle, Utah: U.S. Geological Survey Geologic Quadrangle Map GQ-968.

Crittenden, M.D., Jr., and Sorensen, M.L., 1985, Geologic map of the Mantua quadrangle and part of the Willard quadrangle, Box Elder, Weber, and Cache Counties, Utah: U.S. Geological Survey Miscellaneous Investigation Series Map I-1605.

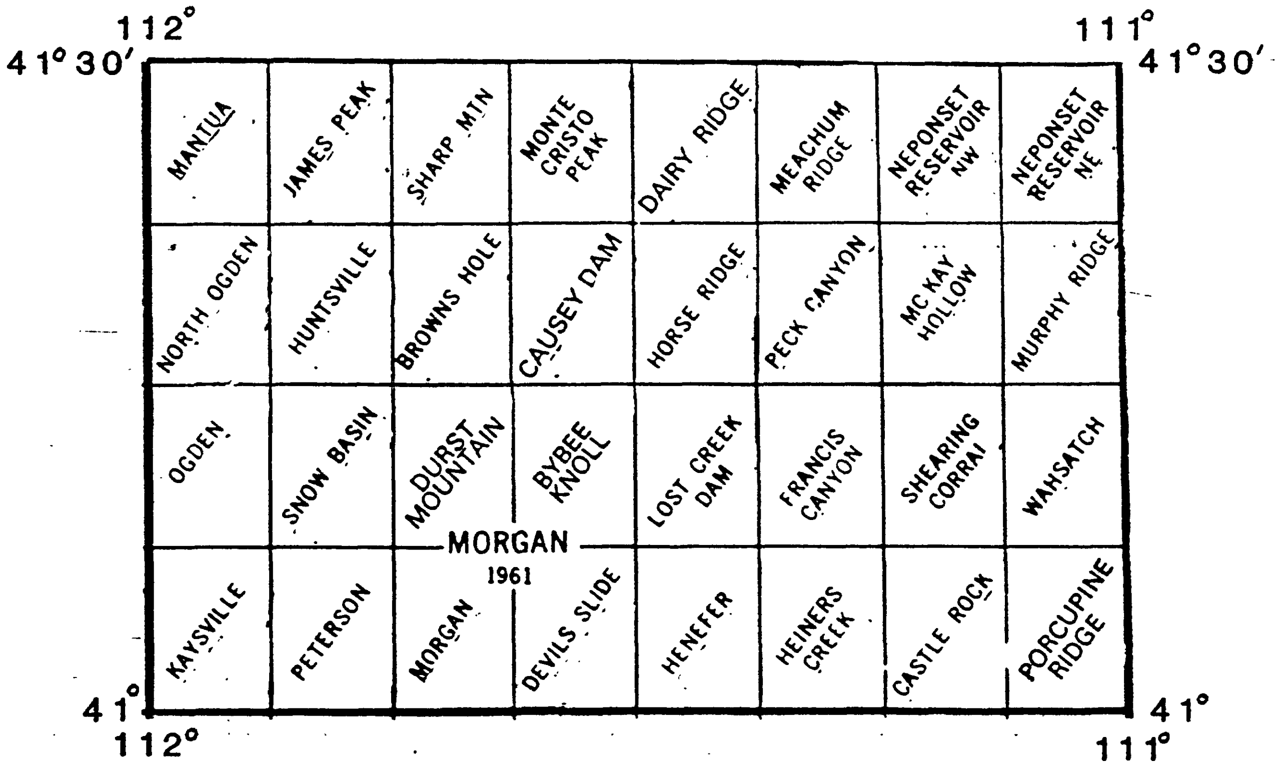
Mullens, T.E., and Laraway, W.H., 1973, Geologic map of the Morgan 7-1/2 minute quadrangle, Morgan County, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-318.

Sorensen, M.L., and Crittenden, M.D., Jr., 1974, Preliminary geologic map of the Huntsville quadrangle, Weber and Cache Counties, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-592.

Stokes, W.L., 1962, Northwest quarter of geologic map of Utah: College of Mines and Mineral Industries: scale 1:250,000.



INDEX TO U. S. GEOLOGICAL SURVEY AERIAL PHOTOGRAPHY USED TO COMPILE A LANDSLIDE DEPOSIT MAP OF THE OGDEN 30′ X 60′ QUADRANGLE, UTAH



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