U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

LANDSLIDE DEPOSITS IN THE GROUSE CREEK 30' X 60' QUADRANGLE, UTAH, NEVADA, AND IDAHO

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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. Queried areas may not be landslide deposits. Dashed line indicates inferred or approximate boundary of landslide deposit

The location of the Grouse Creek 30' X 60' quadrangle is shown on figure 1. The location of the thirty-two 7 1/2-minute topographic maps and five published 15-minute topographic maps in the 30' X 60' quadrangle is shown on figure 2.

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 manmade 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. 3) 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

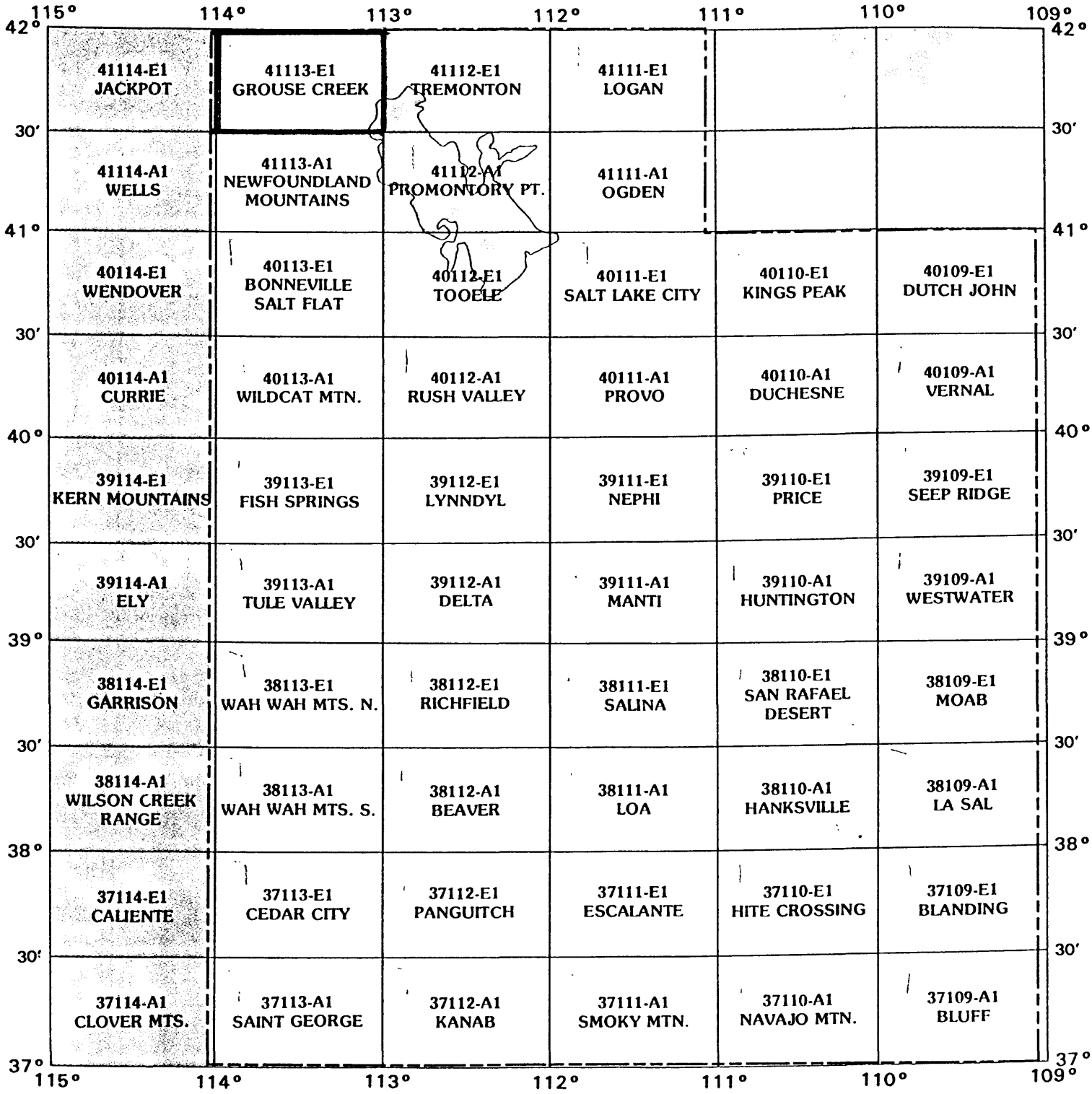

Figure 1.--Index to 1:100,000 scale topographic maps of 30' X 60' quadrangles in Utah. Heavy outline indicates location of Grouse Creek quadrangle.

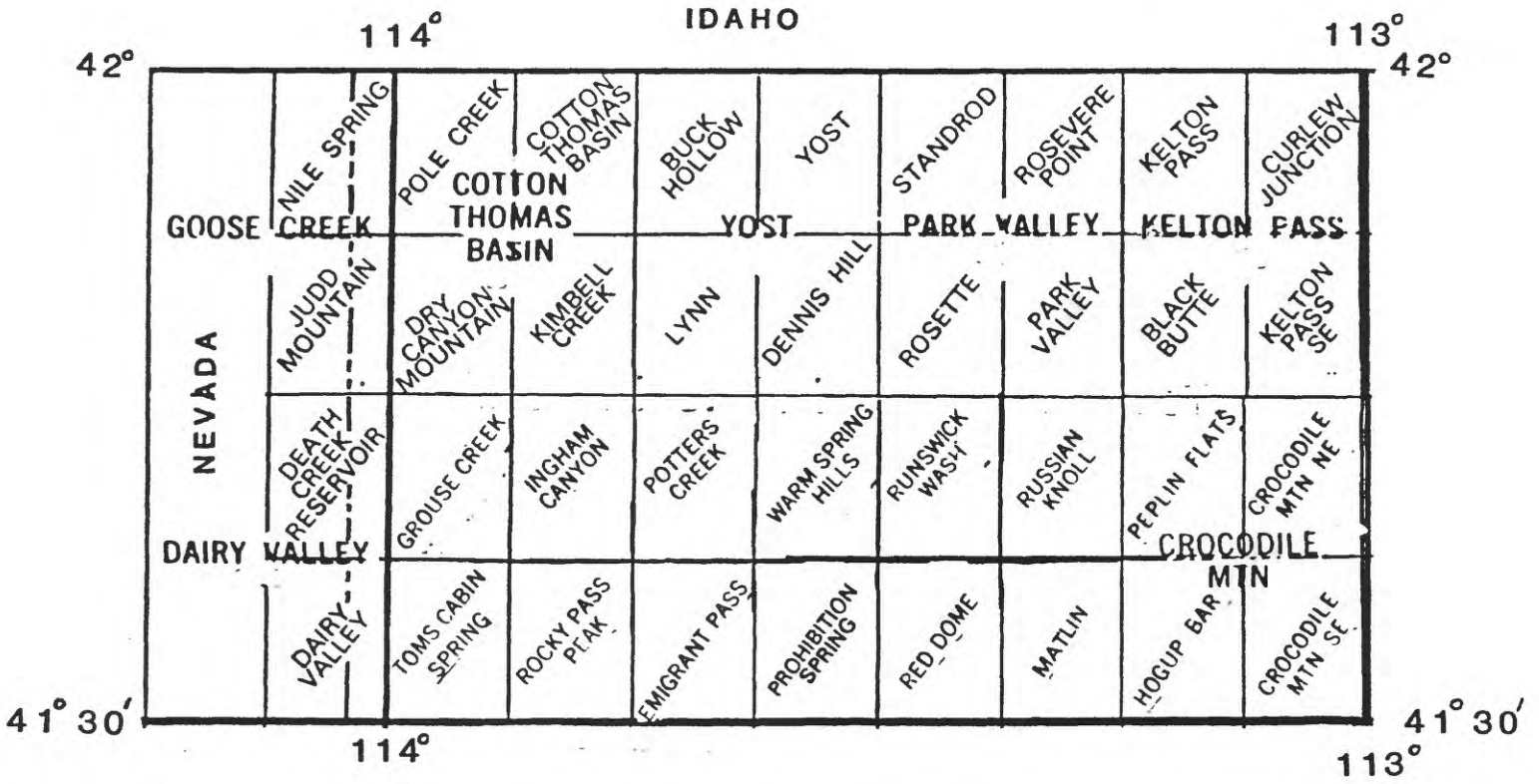

Figure 2.--Index to topographic maps in the Grouse Creek 30' X 60' quadrangle Utah, Nevada, and Idaho.

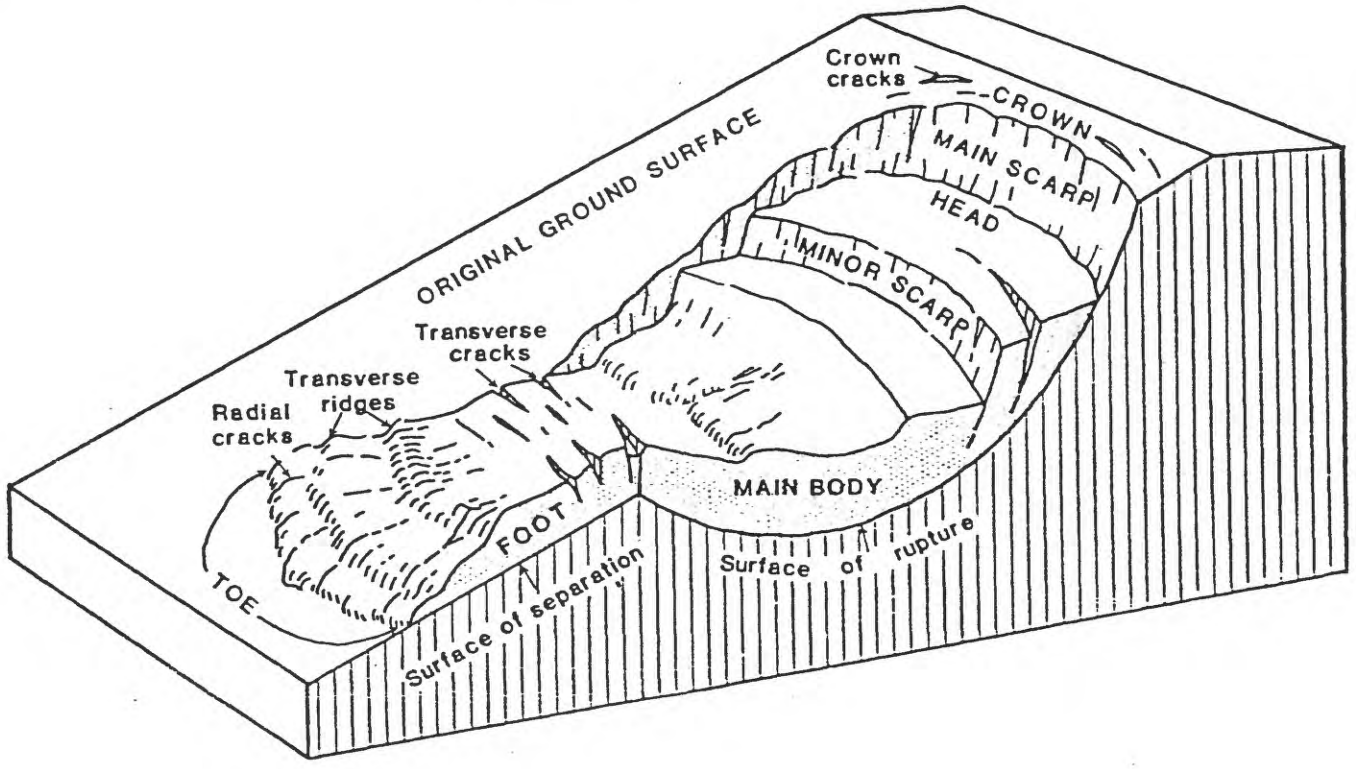

Figure 3.--Features of slump-earthflow. (Modified from Varnes, 1979)

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.

Landslide deposits in the Grouse Creek 30' X 60' quadrangle (see fig. 1) were mapped by interpreting aerial photographs ranging in scale from 1:16,500 to 1:24,000 taken in 1968-69, and 1982-83. Compilation of landslide deposits was on 1:24,000 scale topographic maps (see index to topographic mapping). The compilations were reduced photographically to 1:48,000 and then to 1:100,000.

The following aerial photography was used:

GS-VCAM, 1968, 1:24,000
GS-VCGV, 1969, 1:18,500
GS-VFEE (color), 1982-1983, 1:16,500

Please see index map (fig. 4) for location of aerial photography.

No field check was performed. Previous geologic mapping was not examined.

REFERENCES CITED

Nilsen, T.H., 1972, Preliminary photointerpretation map of landslide and other surficial deposits of the Mount Hamilton quadrangle and parts of the Mount Boardman and San Jose quadrangles, Alameda and Santa Clara Counties, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-339, scale 1:62,500.

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.

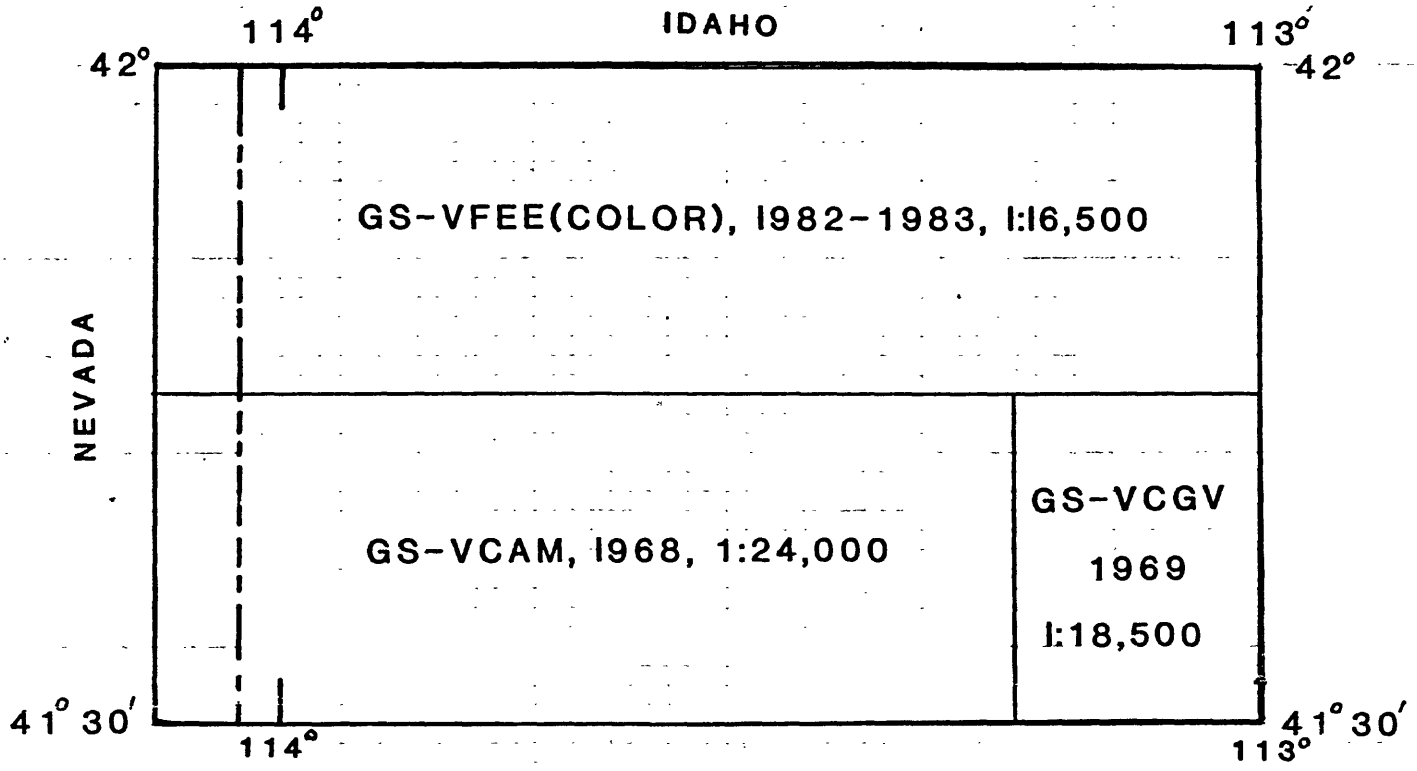

Figure 4.--Index to U.S. Geological Survey aerial photography used to compile a map of landslide deposits in the Grouse Creek 30' X 60' quadrangle, Utah.