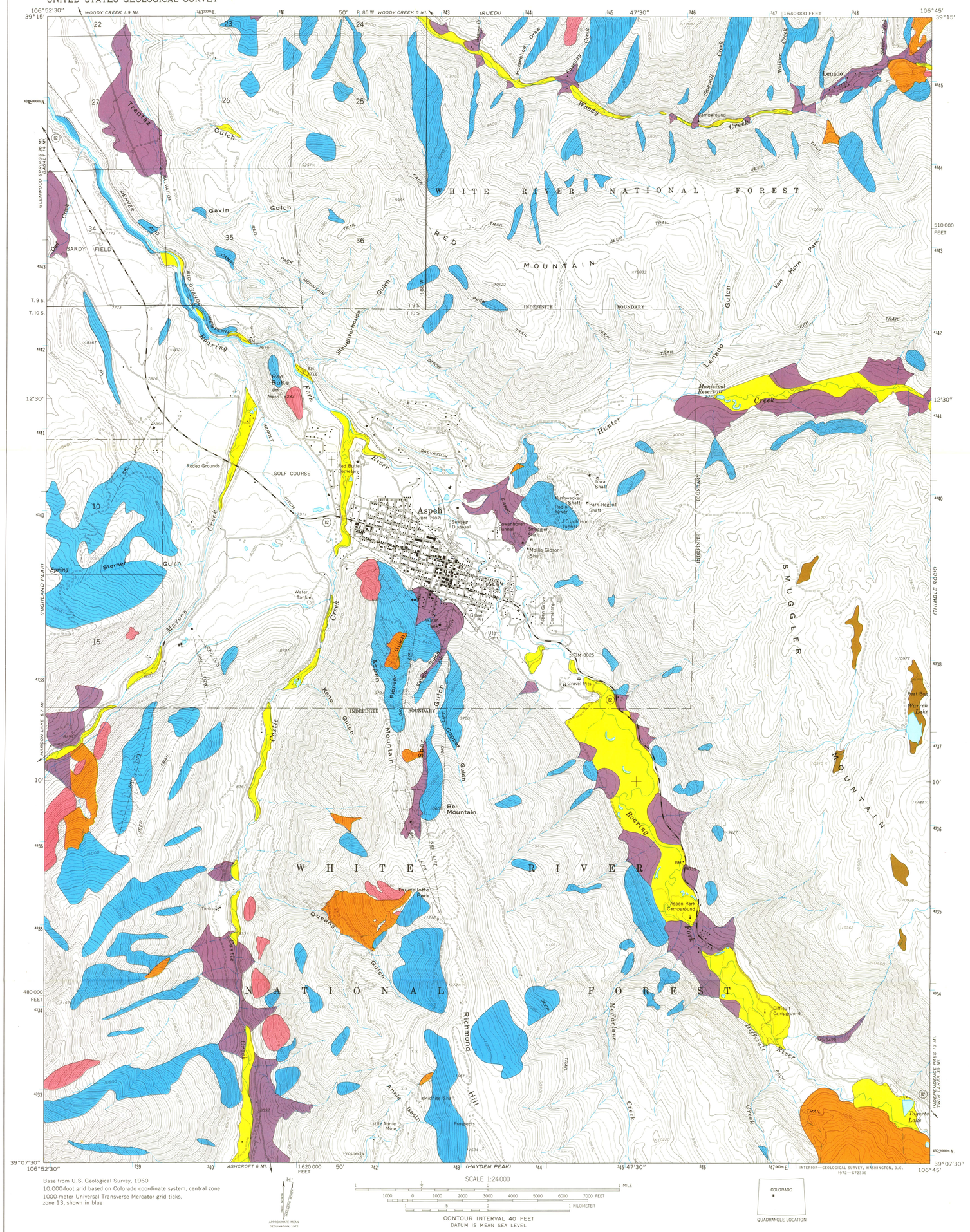
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

FOLIO OF THE
ASPEN QUADRANGLE, COLORADO
MAP I-785-A



Base from U.S. Geological Survey, 1960
10,000-foot grid based on Colorado coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks,
zone 13, shown in blue

MAP SHOWING AREAS OF SELECTED POTENTIAL GEOLOGIC HAZARDS IN THE ASPEN QUADRANGLE, PITKIN COUNTY, COLORADO

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EXPLANATION

- Flood Plains
- Alluvial fans
- Landslides
- Rockfall areas
- Wet meadows
- Potentially unstable slopes

NOTES

INTRODUCTION

Geologic processes may act more vigorously and with greater frequency within the areas outlined than elsewhere. Rockfalls, floods, mudflows, and landslides have occurred in these areas during the past 100,000 years; other slopes where geologic conditions are favorable for such events also have been included. The areas outlined are ones where special precautions should be taken before the natural features are disturbed.

Running water and gravity acting on earth materials are the principal active geologic processes in the Aspen quadrangle that may affect human activities. These processes work together, so areas of potentially unstable ground are more likely to move when saturated by heavy rainfall or when weakened from having been undercut by a stream in flood. Such conditions may form new landslides or reactivate old ones.

FLOOD PLAINS

Flood plains are areas subject to flooding. On the west slope of the Rocky Mountains, where Aspen is located, high water occurs in late May or June during the melting of snow in the nearby high mountains. Generally such high water stays within the stream banks, but unusually heavy snowpack combined with a late spring and sudden warming may cause floods. In June 1921 such a combination of events accompained by rain resulted in a flood in the Snowmass Creek and Capitol Creek drainages west of the Aspen quadrangle.

Since the diversion of water from the head of the Roaring Fork River in 1935, the danger from floods has been greatly diminished along the river in the Aspen quadrangle. Diversion of water from Hunter Creek in connection with the Fryingpan-Arkansas project will have a similar effect and lessen the probability of flooding along that stream. Castle Creek, Maroon Creek, and Woody Creek have no major artificial constraints, however, and flood plains of those streams are likely to be flooded periodically.

ALLUVIAL FANS

Alluvial fans are accumulations of boulders, sand, and silt at the mouths of tributary streams and gullies. This debris is deposited during floods, which may be accompanied by mudflows.

For instance, in 1965 a cloudburst on Aspen Mountain resulted in a thin mudflow which covered part of the alluvial fan at the mouth of Pioneer Gulch and caused some property damage. The small size of that alluvial fan indicates that no large mudflows have come down that gulch since the gravels on the valley floor were deposited.

Many of the fans are much larger than the one at Pioneer Gulch and could have formed in one or more major floods. A large part of the material in the fans may have been deposited soon after the retreat of glaciers from the main valleys. At that time much unconsolidated morainal material was clinging to the valley side and could have been dislodged by melt water from the adjacent hillsides. Nevertheless, most of the fans could be reached today by floods of unusual magnitude, and in many places loose rock and other debris in the valleys of the parent streams can be washed down gullies during heavy rainfall or rapid snowmelt.

LANDSLIDES

Construction on mapped landslides requires special precautions even if the landslides appear to be inactive. Excavation in landslides is one of the most effective ways to reactivate them or, if they are active, to speed their downslope movement.

ROCKFALL AREAS

Areas particularly subject to rockfall are on or just below cliffs. No information is available on the frequency of rockfall, but this uncertainty makes these areas potentially hazardous building sites. If the rocks at the foot of the cliffs are all lichen covered, the cliffs probably are not shedding much rock, and the area beneath them is relatively safe.

WET MEADOWS

In wet meadows the soil is saturated much or all of the year, and it is rich in organic material. One meadow north of Warren Lake has been mined for peat. Construction on such ground requires special care.

POTENTIALLY UNSTABLE SLOPES

Several types of potentially unstable slopes are outlined on the map. The most widespread type is that in which bedding in sedimentary rocks is nearly parallel to the slope. Extensive excavation could undercut the slope and promote sliding of the rock downward along the bedding planes. Where this situation is found, the steeper the slope the greater the potential for failure. Slopes in claystone or shale have more potential for failure than slopes in other rock types. A second type of potentially unstable ground consists of steep slopes overlain by relatively thick unconsolidated debris that might slide or slump if undercut. Some large roadcuts at about 8,800 feet in altitude on the north face of Aspen Mountain are difficult to maintain because of the steepness of the slope and the type of material excavated. General instability of the slope on the north side of Aspen Mountain was noted by D. W. Brunton in 1888. Precise surveys of mining claims showed a downslope movement rate of 1.7 feet a year on the lower part of that slope. This movement may have been in response to the initial disturbance of the natural slope by construction of mine roads; it does not appear to have continued at that rate to the present time. A third type of unstable slope consists of steep slopes underlain by fractured granitic rock. Saturation by rainfall, snowmelt, or water diversion or undercutting by streams in flood may cause landsliding. Special care should be taken during any construction in such areas,