

EXPLANATION

EROSION AND DEPOSITION ON SLOPES

- GULLIES**—Cut in thick sandy slope wash deposits on grassy slopes and in thin stony colluvium over bedrock on forested slopes. Gullying most extensive along dirt roads, roadside drainage ditches, and in preexisting gullies. As large as about 600 ft long, 7 ft deep, and 20 ft wide on gentle grassy slopes and commonly cut to bedrock (generally less than 6 ft) on steep forested slopes. Small gullies not shown in densely forested areas.
- LANDSLIDES**—Mostly developed in thin colluvial mantles over bedrock, primarily on north- to northwest-facing slopes of about 60 to 85 percent. Includes rockfalls (RS), rockfalls (RF), debris slides (DS), debris flows (DF), debris avalanches (DA), and undifferentiated landslides (LS). Tail on triangle indicates mapped upslope extension of deposit or associated erosional scar.
- SHEETWASH DEPOSITS**—Composed mostly of very fine to very coarse pebbly sand, commonly less than 4 inches thick. Locally may include thicker, coarser grained deposits near the mouths of gullies and small gulches. Usually eroded from steep forested slopes and deposited on adjacent gentler grassy slopes. Areas of sheet erosion, which are mostly limited to forested slopes, are not shown.
- Deposits of sand to pebbly sand that accumulated in areas near the mouths of gulches and small gulches, where the mode of flow changed from confined to unconfined and in areas where the flow was impeded by obstructions such as fallen trees, road embankments, and fences. Locally may include some coarser grained deposits with a small amount of cobble-size material and some sheetwash deposits. Usually less than 5 ft thick.
- Areas of varied erosional and depositional features too small, discontinuous, or indistinct to map individually. Includes one or more of the following: shallow gullies, sheetwash deposits, areas of bent grass, or gravelly lag deposits.
- MINOR EROSION AND DEPOSITION IN TRIBUTARY GULCHES**

EROSION AND DEPOSITION ALONG MAIN STREAMS

- Moderate erosion and deposition**—Characterized by continuous channel scour and deposition of sandy to bouldery material eroded from the bottom and sides of the gulch. Bedrock floor of gulches locally exposed. Includes short segments with minor erosion and deposition or major erosion and local deposition. Overbank sediments are mostly sands to pebbly gravels. Colored areas represent approximate extent of flooding; long-dashed red line used where channel is too narrow to show actual width.
- Major erosion and local deposition**—Characterized by continuous deep channel scour and by local deposition of bouldery gravel mostly at inside of sharp bends. Much of the bedrock and bank materials less than about 3 ft in diameter commonly washed out of the gulches. Bedrock floor of gulches is exposed; locally mantled by thin discontinuous floor deposits and lag boulders. Overbank sediments are mostly sands to pebbly gravels that locally contain some cobbles and boulders. Colored areas represent approximate extent of flooding; solid red line used where channel is too narrow to show actual width.
- Erosion and deposition along main streams**—Minor to moderate channel scour within floodways of Big Thompson River and North Fork; intensive scour restricted to outside of relatively sharp bends and areas along constricted reaches. Channel deposits range from sand to bouldery gravel; overbank sand to pebbly sand occurs locally. Colored areas represent approximate extent of flooding.
- Widespread deposition of sand to pebbly sand**. Includes some small deposits of pebbly to cobbly gravel. Dotted red line used along North Fork above Glen Haven where channel is too narrow to show actual width.
- Fine stipple** indicates areas of widespread deposition of pebbly to cobbly gravel; includes some small deposits of pebbly sand and cobbly to bouldery gravel. Coarse stipple indicates widespread deposition of cobbly to bouldery gravel; includes some small deposits of pebbly to cobbly gravel.
- Local areas of intense lateral scour**.
- Extensive channel scour within floodways of Big Thompson River and North Fork**; deposition of cobbly to bouldery gravel. Bouldery gravel bars common, especially along inside of bends. Overbank sands to bouldery gravels occur locally. Colored areas represent approximate extent of flooding. Fine stipple indicates areas of widespread deposition of cobbly to bouldery gravel; includes some small deposits of pebbly to cobbly gravel. Coarse stipple indicates widespread deposition of bouldery gravel; includes some small deposits of cobbly to bouldery gravel.
- Intensive channel scour throughout floodways of Big Thompson River and North Fork**; local deposition of cobbly to bouldery gravel. Much of the sandy to bouldery material scoured from the channel was deposited farther downstream along reaches with lower gradients. Overbank sands to bouldery gravels occur locally. Colored areas represent approximate extent of flooding. Coarse stipple indicates local deposition of bouldery gravel. Fine stipple indicates areas of widespread deposition of cobbly to bouldery gravel; includes some small deposits of pebbly to cobbly gravel. Coarse stipple indicates widespread deposition of bouldery gravel; includes some small deposits of cobbly to bouldery gravel.

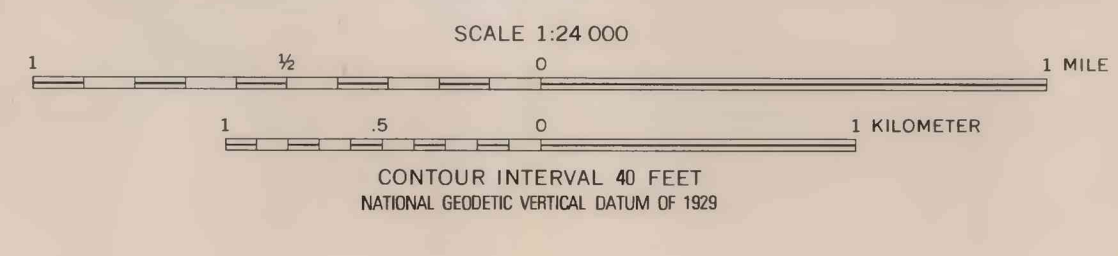
Other symbols:

- B-53.3 Boulder measurement site—Number after letter B corresponds to river mileage of site. Sizes of largest boulders are summarized in tables 7 and 8 in text.
- ND/ND/30/Br High water and scour measurements on intermittent and perennial streams—Numbers, left to right, represent width of floodwater, height of floodwater above present floor of gulch or present stream level, postflood width of channel, and postflood depth of channel. All measurements are in feet. Letters ND in place of measurement indicate not determined. Letters br after depth of channel indicate that the channel was scoured to bedrock.
- 3,210 ft³/s Peak discharge measurements (in cubic feet per second) by Water Resources Division of the U.S. Geological Survey.
- Isobars (in inches) for July 31–August 2, 1976 storm, slightly modified from unpublished data provided by the National Weather Service.
- 0.5 1.0 Mileage marker—Indicates distance in miles along riverbed.

NOTE
Much of the mapping on plate 2A-C is based on the interpretation of postflood stereographic aerial photographs, including black and white imagery of the area along the Big Thompson and North Fork Big Thompson Rivers (approximate scales: 1:3,600–1:8,000 by Kucera and Associates, Denver, CO, and 1:6,000 by Hogan/O'Hausen, Loveland, CO) and infrared color transparencies of the mountainous part of the study area (approximate scale: 1:24,000 by Intracast, Denver, CO). Aerial-photograph interpretation was supplemented by field observations mostly along the main streams, in some of the major and minor tributary gulches, and in the Estes Park area.

GEOLOGIC AND GEOMORPHIC EFFECTS OF THE 1976 STORM AND FLOOD, BIG THOMPSON RIVER AREA, COLORADO

A. BIG THOMPSON RIVER FROM ESTES PARK TO DRAKE AND NORTH FORK BIG THOMPSON RIVER FROM GLEN HAVEN TO DRAKE



Base from U.S. Geological Survey:
Drake, 1962; Estes Park, 1967; revised 1961;
Glen Haven, 1967; Longs Peak, 1967; revised 1961;
Pinnacle Peak, 1962; and Plover Lake, 1967.

Flood effects mapped by P. W. Schmidt and R. R. Shamba, 1976.