2492, BEAVER BASIN FAULTS

Structure number: 2492.
Comments:
Structure name: Beaver Basin faults.
Comments:
Synopsis: Moderately to poorly understood late Pleistocene to Holocene faulting and folding in the Beaver Basin.
Date of compilation: 10/99.
Compiler and affiliation: Bill D. Black (Utah Geological Survey) and Suzanne Hecker (U.S. Geological Survey).
State: Utah
County: Beaver.
1° x 2° sheet: Richfield.
Province: Basin and Range.
Geologic setting: Complex zone of generally north-trending faulting and deformation in the Beaver Basin. Faults along the eastern margin of Beaver Basin are considered tectonic. Central basin faults appear to be related to development of a north-south trending horst and antiform.
Number of sections: 2.
Comments: Differences in fault ages generally reflect the distribution of different ages of faulted deposits and not necessarily recency of movement. Sterr (1980) divided scarps in Beaver Basin into age groups on the basis of the scarp morphology associated with different-age surfaces, and defined three “independent fault systems” associated with unique recurrence intervals. However, Machette (1985) revised surface-age estimates, which provided the basis for determining fault histories, and concluded that older scarps may not be suitable for morphologic age analysis due to the effects of stream erosion, calcic soil development (Anderson and Bucknam, 1979), and episodes of movement.
Length: End to end (km): 39
Cumulative trace (km): 414
Average strike (azimuth): N13°E

2492a, EASTERN MARGIN BEAVER BASIN FAULTS

Section number: 2492a.
Section name: Eastern margin Beaver Basin faults.
Comments: Hecker's (1993) fault number 9-3.
Reliability of location: Good.
Comments: Mapped by Anderson and Bucknam (1979), Machette and others (1984), Machette (1985), and Anderson and others (1990). Mapping from Machette (1985) and Anderson and others (1990).
Sense of movement: N.
Comments:
Dip: No data.
Comments:

Dip direction: W.
Geomorphic expression: Individual scarps in Pinedale-age (12-15 ka) alluvium are 1-3 meters high. Several faults cut the east end of the Last Chance Bench (north-northeast of Beaver) and Table Grounds surface (east of Beaver) and appear to be buried by middle to late Pleistocene or Pinedale-age alluvium. Sterr (1980) determined average displacements of about 1.5 meters per event. As a group, the basin-margin faults produced about 100 meters of net, down-to-the-west displacement in the 500 ka Last Chance Bench. Seismic reflection data suggest that the fault zone intersects a subhorizontal detachment at a depth of 10 kilometers (Smith and Bruhn, 1984).
Age of faulted deposits: Early Holocene.
Paleoseismology studies: None.
Timing of most recent paleoevent: (2) Latest Quaternary (<15 ka).
Comments: Scarps are only slightly less degraded than Bonneville shoreline scarps and more degraded than the Drum Mountains (2432) fault scarps, estimated to be 9 ka in age. However, morphometric scarp analyses by Sterr (1985) yielded an age estimate of about 18 ka for one of the faults (the Beaver fault, which trends through the town of Beaver).
Recurrence interval: 50 ky (<500 ka).
Comments: Based on an assumed displacement of 2 meters per event, and individual scarp heights of 11 meters on 250 ka deposits and 25 meters on 500 ka deposits.
Slip rate: (C) 0.2-1 mm/yr
Comments: Net displacement produced by basin-margin faults cutting Last Chance Bench (100 meters), and age of the displaced surface (500 ka), indicate a net slip rate of 0.2 millimeters/yr.
Length: End to end (km): 34
Cumulative trace (km): 144
Average strike (azimuth): N7°E

2492b, CENTRAL BEAVER BASIN FAULTS AND ANTICLINE

Section number: 2492b.
Section name: Central Beaver Basin faults.
Comments: Hecker's (1993) fault number 9-4.
Reliability of location: Good.
Comments: Mapped by Anderson and Bucknam (1979), Steven and Morris (1983), Machette and others (1984), Machette (1985), and Anderson and others (1990). Mapping from Steven and Morris (1983), Machette (1985), and Anderson and others (1990).
Sense of movement: N.
Comments:
Dip: No data.
Comments:
Dip direction: E.
Geomorphic expression: More than a hundred closely spaced faults cut the limbs and dip toward the axis of a broad, low-amplitude antiform on the Last Chance Bench, a

pediment estimated to be 500 ka in age. The axial trace of the antiform, which steps westward across several northeast-trending normal faults, is aligned with the Maple Flats horst to the north. The northeast-trending valley of Indian Creek is probably fault controlled, as suggested by a 30-100 meter altitude difference between Last Chance Bench gravels on either side of the creek. Individual faults on Last Chance Bench have displacements ranging from 1 to 25 meters (Anderson and Bucknam, 1979). Faults at the north end of the antiform, north of Indian Creek, displace the Last Chance Bench gravels up to 5 meters.

Age of faulted deposits: Late Pleistocene to Holocene.

Paleoseismology studies: None.

Timing of most recent paleoevent: (2) Latest Quaternary (<15 ka).

Comments: On the south end of the antiform, west of Greenville, 0.5- to 3.0-meter-high scarps are on 140-250 ka terraces. The 20 Ma Huckleberry Ridge ash bed has been rotated 10-15 degrees away from the Maple Flat horst, although its altitude records almost no structural relief across most of the Last Chance Bench antiform. Upper Pliocene lake beds are tilted as much as 20 degrees away from the axial trend of the horst-antiform structure. Faults antithetic to the west-bounding fault of the horst displace the 1.1 Ma basalt of Cunningham Hill at least 100 meters, but do not displace on-trend Pleistocene deposits. Faults associated with the eastern margin of the horst and those that cut Tertiary to Quaternary deposits are suspected of being Quaternary in age.

Recurrence interval: No data.

Comments:

Slip rate: Unknown, probably <0.2 mm/yr.

Comments: A low slip rate is indicated by the 0.5- to 3.0-meter-high scarps on 140-250 ka terraces.

Length: End to end (km): 39

Cumulative trace (km): 270

Average strike (azimuth): N16°E

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