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# Quaternary Fault and Fold Database of the United States

**As of January 12, 2017, the USGS maintains a limited number of metadata fields that characterize the Quaternary faults and folds of the United States. For the most up-to-date information, please refer to the interactive fault map.**

## Montana Mountains/Desert Valley fault zone, northern section (Class A) No. 1501a

**Last Review Date: 1998-07-19**

***citation for this record:*** **Sawyer, T.L., compiler, 1998, Fault number 1501a, Montana Mountains/Desert Valley fault zone, northern section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 12/14/2020 02:50 PM.**

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| **Synopsis** | **General:** This long, nearly continuous fault zone consists primarily of range-bounding normal faults along the western front of The Granites, Montana Mountains, Double H Mountains (which collectively form an eastward-tilted fault block), Slumbering Hills, and along the eastern front of the Coyote Hills. Valleyward piedmont and bolson faults extend from the Double H Mountains through southern Kings River Valley and through northern Desert Valley.<br><br>**Sections:** This fault has 2 sections. Although not studied in detail, the geometry and general movement history of the fault zone suggest two possible sections. The northern section [1501a] bounds The Granites, Montana Mountains and northern Double H Mountains and includes a few short piedmont faults, south of Moonlight Mine and north of Thacker Pass. The two |

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| | intermontane faults, one extending up Horse Creek canyon and the other extends from North Fork of Flat Creek north to the Trout Creek Mountains, are included in this section. The southern section [1501b] is principally delineated by a zone of subparallel faults on the floor of Kings River Valley and Desert Valley and includes range-bounding faults along the west front of the Double H Mountains and Slumbering Hills and along the eastern front of the Coyote Hills. The boundary between the sections approximately coincides with a 2-km-wide left step in the front of the Double H Mountains and with the intersection of unnamed faults [1502] that bound an intermontane graben(?) separating these mountains from the Montana Mountains to the north. |
| **Name comments** | **General:** Refers to faults mapped by Willden (1964 #3002), Slemmons (1966, unpublished Vya 1! X 2! sheet), Dufurrena and Rigby (1988 #3005) and Dohrenwend and Moring (1991 #281). North of the Quinn River, dePolo (1998 #2845) named it the Montana Mountains fault zone and south of the river named it the Desert Valley fault zone; both names are used herein to describe the entire fault zone. The zone bounds the west fronts of The Granites, Montana Mountains, Double H Mountains and Slumbering Hills, and the eastern front of the Coyote Hills. The fault zone extends southward along the bolson-like Kings River Valley, parallel to the Kings River, and into the Desert Valley, parallel to the northern part of Battle Creek Slough, to as far south as Lee Windmill, northwest of Blue Mountain. The northernmost part of the zone extends to the east flank of the Trout Creek Mountains.<br><br>**Section:** This section extends continuously from the Trout Creek Mountains south along the western front of The Granites, Montana Mountains and northern Double H Mountains to where the range front of the Double H Mountains steps about 2 km eastward. A few short piedmont faults (south of Moonlight Mine and north of Thacker Pass) and two intermontane faults (one extending up Horse Creek canyon and the other extending from North Fork of Flat Creek north to the Trout Creek Mountains) are included in this section. North of the Quinn River, dePolo (1998 #2845) used the name Montana Mountains fault zone.<br><br>**Fault ID:** Refers to fault and V15B and V17 of dePolo (1998 #2845). |
| **County(s) and State(s)** | HUMBOLDT COUNTY, NEVADA |

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| **Physiographic province(s)** | BASIN AND RANGE |
| **Reliability of location** | Good<br>Compiled at 1:100,000 scale.<br><br>*Comments:* Fault locations based on 1:250,000-scale maps of Dohrenwend and Moring (1991 #281) and Slemmons (1966, unpublished Vya 1:250,000-scale map); mapping by Dohrenwend and Moring (1991 #281) was produced by analysis of 1:58,000-nominal-scale color-infrared photography transferred directly to 1:100,000-scale topographic maps enlarged to scale of the photographs. Maps compiled for Slemmons (1966, unpublished Vya 1? X 2? sheet) is from analysis of 1:60,000-scale AMS photography transferred to mylar overlaid onto a 1:250,000-scale topographic map using proportional dividers. |
| **Geologic setting** | This long, nearly continuous fault zone is comprised primarily of range-bounding normal faults along western fronts of The Granites, Montana Mountains and Double H Mountains (which collectively form an eastward-tilted fault block; Stewart, 1978 #2866), and along the east front of the Coyote Hills, and valleyward piedmont and bolson faults from the Double H Mountains through southern Kings River Valley through northern Desert Valley (Slemmons, 1966, unpublished Vya 1:250,000-scale map; Dufurrena and Rigby, 1988 #3005; Dohrenwend and Moring, 1991 #281). The fault zone includes two intermontane faults in the northern Montana Mountains and in The Granites (Willden, 1964 #3002; Slemmons, 1966, unpublished Vya 1:250,000-scale map); the fault in The Granites displaces Tertiary basalt and andesite approximately 500 m down to the west on the south side of Flat Creek and displaces these same rocks approximately 370 m down to the west on the south side of Granite Creek, about 6.4 kilometers to the north. |
| **Length (km)** | This section is 39 km of a total fault length of 101 km. |
| **Average strike** | N16°W (for section) versus N2°W (for whole fault) |
| **Sense of movement** | Normal<br><br>*Comments:* Shown as normal or undesignated on maps (Willden, 1964 #3002; Slemmons, 1966, unpublished Vya 1:250,000-scale map; Dohrenwend and Moring, 1991 #281). |

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| **Dip Direction** | W |
| **Paleoseismology studies** | |
| **Geomorphic expression** | The northern section is chiefly defined by scarps on late Pleistocene piedmont-slope deposits along and near the front of The Granites and Montana Mountains (Dohrenwend and Moring, 1991 #281). A piedmont scarp south of Garden Creek in the Montana Mountains has been truncated by the highstand shoreline (~13 ka) of pluvial Lake Lahontan (Adams, 1997 #3003; Adams and others, 1999 #3006, Figure 9), indicating pre-latest Pleistocene faulting An intermontane fault extending up Horse Creek canyon is marked by a prominent west-facing bedrock escarpment suggesting but not proving young movement (Slemmons, 1966, unpublished Vya 1:250,000-scale map). A second intermontane fault within The Granites is marked by aligned ridge-crest saddles, a linear reach of the West Fork of Granite Creek and appears to be associated with a spring alignment along the east flank of the Trout Creek Mountains; the southern continuation of this fault appears to juxtapose Quaternary piedmont-slope deposits against bedrock along the northwestern front of Montana Mountains, providing evidence of Quaternary movement. |
| **Age of faulted surficial deposits** | Late Pleistocene; Pleistocene; Tertiary. Dohrenwend and Moring (1991 #281) and Dohrenwend and others (1996 #2846) mapped faults that bound the western front of the Montana Mountains and Double H Mountains as offsetting late Pleistocene and undifferentiated Pleistocene piedmont slope deposits. Willden (1964 #3002) mapped the intermontane faults as within Tertiary volcanic units in the northern Montana Mountains and The Granites and mapped other faults along the western front of the Montana Mountains as cutting older (Quaternary) alluvium. |
| **Historic earthquake** | |
| **Most recent prehistoric deformation** | late Quaternary (<130 ka)<br><br>*Comments:* Although timing of most recent event is not well constrained, Dohrenwend and Moring (1991 #281) and Dohrenwend and others (1996 #2846) reported a late Quaternary time based on reconnaissance photogeologic mapping. A pre-latest Quaternary time (i.e., pre ~13 ka) is indicated by relationships between the highstand shoreline of pluvial Lake |

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| | Lahontan and a piedmont fault scarp south of Garden Creek in the Montana Mountains (Adams, 1997 #3003; Adams and others, 1999 #3006). |
| **Recurrence interval** | |
| **Slip-rate category** | Less than 0.2 mm/yr<br><br>*Comments:* dePolo (1998 #2845) reported a maximum preferred vertical slip rate of 0.1 mm/yr for this part of the fault based on "known" data. However, that data is not presented or are they presented more recently by dePolo and Anderson (2000 #4471). The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) support a low slip rate during this period. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault. |
| **Date and Compiler(s)** | 1998<br>Thomas L. Sawyer, Piedmont Geosciences, Inc. |
| **References** | #3003 Adams, K.D., 1997, Late Quaternary pluvial history, isostatic rebound, and active faulting in the Lake Lahontan basin, Nevada and California: Reno, University of Nevada, unpublished Ph.D. dissertation, 169 p.<br><br>#3006 Adams, K.D., Wesnousky, S.G., and Bills, B.G., 1999, Isostatic rebound, active faulting, and potential geomorphic effects in the Lake Lahontan basin, Nevada and California: Geological Society of America Bulletin, v. 111, p. 1739-1756.<br><br>#2845 dePolo, C.M., 1998, A reconnaissance technique for estimating the slip rate of normal-slip faults in the Great Basin, and application to faults in Nevada, U.S.A.: Reno, University of Nevada, unpublished Ph.D. dissertation, 199 p.<br><br>#4471 dePolo, C.M., and Anderson, J.G., 2000, Estimating the slip rates of normal faults in the Great Basin, USA: Basin Research, v. 12, p. 227-240.<br><br>#281 Dohrenwend, J.C., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Vya 1° by 2° quadrangle, Nevada, Oregon, and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2174, 1 sheet, scale |

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| | 1:250,000.<br><br>#2846 Dohrenwend, J.C., Schell, B.A., Menges, C.M., Moring, B.C., and McKittrick, M.A., 1996, Reconnaissance photogeologic map of young (Quaternary and late Tertiary) faults in Nevada, *in* Singer, D.A., ed., Analysis of Nevada's metal-bearing mineral resources: Nevada Bureau of Mines and Geology Open-File Report 96-2, 1 pl., scale 1:1,000,000.<br><br>#3005 Dufurrena, C.K., and Rigby, J.G., 1988, Reconnaissance geologic map of the Slumbering Hills and surrounding area, Humboldt County, Nevada: Nevada Bureau of Mines and Geology Open File Report 88-6, 3 p., scale 1:100,000.<br><br>#2866 Stewart, J.H., 1978, Basin-range structure in western North America—A review, *in* Smith, R.B., and Eaton, G.P., eds., Cenozoic tectonics and regional geophysics of the western cordillera: Geological Society of America Memoir 152, p. 1-31, scale 1:2,500,000.<br><br>#3002 Willden, R., 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines and Geology Bulletin 59, 154 p., scale 1:250,000. |