FRTC Modernization EIS

Supporting Study
Faults and Fault Zones

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Proposed Withdrawal Area	Fault Zone Name	Fault Name	Description	Name Comments	Reliability of Location	Compiled at:	Geologic Setting	Length	Average Strike	Sense of Movement	Comments	Dip Direction	Paleoseismic Studies	Geomorphic Expression	Age of faulted surficial deposits	Historic Earthquake	Most recent prehistoric deformation	Comments	Compilers	References	Miscellaneous
B-16	Unnamed fault zone west of Carson Lake		This group of short, discontinuous intra basin faults in southwestern Lahontan Valley extends from northern piedmont slope of Desert Mountains near White Throne Mountains northwest to northeastern end of Dead Camel Mountains. Reconnaissance photogeologic mapping and regional geologic mapping are the sources of data. Trench investigations and detailed studies of scarp morphology have not been conducted. County(s) and State(s): CHURCHILL COUNTY, NEVADA	Refers to faults mapped by Morrison (1964 #3486), Slemmons (1968, unpublished Reno 1° X 2° sheet), Bell (1984 #105), and Greene and others (1991 #3487) west of Carson Lake and east of Dead Camel Mountains in southwestern Lahontan Valley.	Good	1:100,000 scale	This group of short, discontinuous intra basin faults in southwestern Lahontan Valley extends from northern piedmont slope of Desert Mountains near White Throne Mountains northwest to northeastern end of Dead Camel Mountains(Morrison, 1964 #3486, Slemmons 1968, unpublished Reno 1° X 2° sheet; Bell, 1984 #105; Greene and others, 1991 #3487).	27 km	N24°W	Normal	Fault locations are primarily based on 1:250,000-scale maps of Bell (1981 #2875; 1984 #105). Mapping is from photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale aerial photography of selected areas, several low-altitude aerial reconnaissance flights, and field reconnaissance of major structural and stratigraphic relationships. Northernmost fault trace is from 1:250,000-scale map of Slemmons (1968, unpublished Reno 1° X 2° sheet).	NE		Many faults are expressed as low east- and west-facing scarps on eroded late Pleistocene lacustrine sediments (Morrison, 1964 #3486). Other faults are expressed as short lineaments on late Pleistocene shore platforms or alluvial fans (Morrison, 1964 #3486, Slemmons 1968, unpublished Reno 1° X 2° sheet; Bell, 1984 #105); northernmost fault in zone, mapped by Slemmons (1968, unpublished Reno 1? X 2? sheet), may actually be a beach ridge (Morrison, 1964 #3486).	late Pleistocene. Faults displace deposits of late Pleistocene Lake Lahontan (Morrison, 1964 #3486).		latest Quaternary (<15 ka)	Although timing of most recent event is not well constrained, a latest Quaternary time is suggested based on reconnaissance photogeologic mapping of Bell (1984 #105) and Slemmons (1968, unpublished Reno 1° X 2° sheet), which is consistent with mapping by Morrison (1964 #3486) and Dohrenwend and others (1996 #2846).	Kenneth Adams, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1676&section_id= Bell, J.W., 1981, Quaternary fault map of the Reno 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-982, 62 p., http://pubs.er.usgs.gov/publication/ofr81982. Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. 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. Greene, R.C., Stewart, J.H., John, D.A., Hardyman, R.F., Silberling, N.J., and Sorensen, M.L., 1991, Geologic map of the Reno 1° by 2° quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2154-A, scale 1:250,000. Morrison, R.B., 1964, Lake Lahontan—Geology of the southern Carson Desert, Nevada: U.S. Geological Survey Professional Paper 401, 156 p.	Slip rate category: Less than 0.2 mm/yr. A low slip rate is inferred from a general knowledge of slip rates estimated for other faults in the region.
B-16	Unnamed fault zone in Dead Camel Mountains		This short distributed zone has predominately intermontane faults in western Dead Camel Mountains near Lahontan Reservoir and a few short intra basin faults south of Dead Camel Mountains in eastern Churchill Valley. Although the intermontane fault apparently only displace Tertiary bedrock, young movement is suggested by their expression as east-west trending lineaments on Tertiary volcanic bedrock. Reconnaissance photogeologic mapping and regional geologic mapping are the sources of data. Trench investigations and detailed studies of scarp morphology have not been conducted. County(s) and State(s): CHURCHILL COUNTY, NEVADA, LYON COUNTY, NEVADA	Refers to faults mapped by Slemmons (1968, unpublished Reno 1° X 2° sheet), Bell (1984 #105) and Greene and others (1991 #3487) in Dead Camel Mountains near Lahontan Reservoir.	Good	1:100,000 scale	This short distributed zone has predominately intermontane faults in western Dead Camel Mountains near Lahontan Reservoir and a few short intra basin faults south of Dead Camel Mountains in eastern Churchill Valley (Slemmons, 1968, unpublished Reno 1° X 2° sheet, Bell, 1984 #105; Greene and others, 1991 #3487).	18 km	N78°W	Normal		N		Although the intermontane fault apparently only displace Tertiary bedrock, young movement is suggested by their expression as east-west trending lineaments on Tertiary volcanic bedrock. Faults in Churchill Valley are expressed as short north- and east-facing scarps on Quaternary basin-fill deposits (Slemmons, 1968, unpublished Reno 1° X 2° sheet, Bell, 1984 #105).	latest Quaternary; Quaternary; Tertiary. Intrabasin faults displace Quaternary deposits (Bell, 1984 #105), apparently as young as latest Quaternary (Slemmons, 1968, unpublished Reno 1° X 2° sheet), and the intermontane faults displace Tertiary volcanic and sedimentary rocks (Greene and others, 1991 #3487).		undifferentiated Quaternary (<1.6 Ma)	Although timing of most recent event is not well-constrained, Slemmons (1968, unpublished Reno 1° X 2° sheet) reported a late and latest Quaternary time for a single scarp in this group; mapping by Bell (1984 #105) and Greene and others (1991 #3487) suggest an undifferentiated Quaternary time. Age assignment is based on the later two sources.	Kenneth Adams, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1674&section_id= Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. Greene, R.C., Stewart, J.H., John, D.A., Hardyman, R.F., Silberling, N.J., and Sorensen, M.L., 1991, Geologic map of the Reno 1° by 2° quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2154-A, scale 1:250,000.	Slip rate category: Less than 0.2 mm/yr. A low slip rate is inferred from general knowledge of slip rates estimated for other faults in the region.
B-17	Unnamed faults in Gabbs Valley Range		Group of generally short and discontinuous north-northwest striking range-front and intermontane faults which extend from the vicinity of Llama Mountain in the Pilot Mountains north and then northwest through the Gabbs Valley range past Mount Fergusen to a few kilometers north of Poinsettia Spring in southwest Gabbs Valley. The northwest-striking fault form a series of right echelon steps between Calavada Flat and Whisky Springs. At the southern end, short discontinuous faults appear to splay from the Benton Springs fault [1320], bound the northwestern front of the Pilot Mountains, and cut north across an alluvial embayment occupied by Dunlop and Bettles Well canyons. The faults continue northwest toward Calavada Flat through the intermontane valley of Volcano Canyon. Reconnaissance photogeologic mapping and bedrock mapping of the faults are the sources of data. Trench investigations and detailed studies of scarp morphology have not been completed.	Refers to group of faults extending from near Llama Mountain in the Pilot Mountains north and then northwest through the Gabbs Valley Range past Mount Fergusen to a few kilometers north of Poinsettia Spring in southwest Gabbs Valley. Faults have been mapped by Nielsen (1965 #2544), Slemmons (1966, unpublished Walker Lake 1° X 2° sheet), Dohrenwend(1982 #2481; 1982 #2870; 1982 #2900; 1982 #2909), Stewart and others (1982 #2873), Ekren and Byers (1984 #2902; 1985 #2905), and Bell (1995 #2422). dePolo (1998 #2845) referred to a short part of this fault as the Gabbs Valley Range fault. Includes fault number WL30 (Gabbs Valley Range fault) in dePolo (1998 #2845). County(s) and State(s) MINERAL COUNTY, NEVADA	Good	1:100,000 scale	This group of short discontinuous faults bound northwestern front of the Pilot Mountains, cross an alluvial embayment at Dunlop and Bettles Well canyons, continue northwest through the intermontane valley of Volcano Canyon to southwestern Gabbs Valley.	51 km	N24°W	Normal	Location based on 1:62,500-scale (Dohrenwend, 1982 #2870; 1982 #2900) and 1:250,000-scale maps (Dohrenwend, 1982 #2481; 1982 #2870); small-scale mapping by photogeologic analysis of 1:58,000-nominal-scale color-infrared photography transferred directly to 1:100,000-scale topographic quadrangle maps enlarged to scale of the photographs.	NW; SE		Along the northwest side of the Pilot Mountains and on the west side of Table Mountain, faults juxtapose Quaternary alluvium against bedrock. Elsewhere they are expressed as aligned drainages and saddles. At the north end, north-striking faults juxtapose Quaternary erosional surfaces against bedrock. dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 98 m (73-122 m).	Faults displace and juxtapose Holocene to late Pleistocene and older Pleistocene alluvium and erosional surfaces against bedrock (Dohrenwend, 1982 #2870; 1982 #2900; 1982 #2909). In the central part of the group, several faults only cut bedrock but Quaternary movement is suspected because of their proximity, continuity and similar orientation to faults with Quaternary offsets in the area.		undifferentiated Quaternary (<1.6 Ma)	The timing of the most recent paleoevent is not well constrained. Age-category assignment based on Dohrenwend and others (1996 #2846) even though Dohrenwend (1982 #2900) shows one scarp on upper Pleistocene alluvium.	Kenneth Adams, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1314&section_id= #2422 Bell, J.W., 1995, Quaternary map of the Mina quadrangle, Nevada: Nevada Bureau of Mines and Geology Field Studies Map 10, 1 sheet, scale 1:24,000. #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. #2481 Dohrenwend, J.C., 1982, Map showing late Cenozoic faults in the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-D, 1 sheet, scale 1:250,000. #2870 Dohrenwend, J.C., 1982, Surficial geologic map of the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-C, 1 sheet, scale 1:250,000. #2900 Dohrenwend, J.C., 1982, Preliminary surficial geologic map of the Excelsior Mountains area, west-central Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1372, scale 1:62,500. #2909 Dohrenwend, J.C., 1982, Reconnaissance surficial geologic map of the Gabbs-Luning area, west-central Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1374, scale 1:62,500. #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. #2902 Ekren, E.B., and Byers, F.M., Jr., 1984, The Gabbs Valley Range—A well exposed segment of the Walker Lane in west-central Nevada, in Lintz, J., Jr., ed., Western geological excursions: Geological Society of America, Annual Meeting, Reno, Nevada, Guidebook, v. 4, p. 203-215. #2905 Ekren, E.B., and Byers, F.M., Jr., 1985, Geologic map of the Gabbs Mountain, Mount Ferguson, Luning, and Sunrise Flat quadrangles, Mineral and Nye Counties, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1577, 1 sheet, scale 1:48,000. #2544 Nielsen, R.L., 1965, Right-lateral strike-slip faulting in the Walker Lane, west-central Nevada: Geological Society of America Bulletin, v. 76, no. 11, p. 1301-1308. #2873 Stewart, J.H., Carlson, J.E., and Johannesen, D.C., 1982, Geologic map of the Walker Lake 1° by 2° quadrangle, California and Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-A, scale 1:250,000.	Less than 0.2 mm/yr. No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.199 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived slip rate reflects a long-term average. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggests a low slip rate. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.

Faults and Fault Zones In and Near the Region of Influence

Proposed Withdrawal Area	Fault Zone Name	Fault Name	Description	Name Comments	Reliability of Location	Compiled at:	Geologic Setting	Length	Average Strike	Sense of Movement	Comments	Dip Direction	Paleoseismic Studies	Geomorphic Expression	Age of faulted surficial deposits	Historic Earthquake	Most recent prehistoric deformation	Comments	Compilers	References	Miscellaneous
B-17	Hot Springs faut zone		This moderately short nearly continuous zone has range-front faults bounding entire west front of the Monte Cristo Mountains and east front of Black Hills, and has piedmont and intrabasin faults in Gabbs Valley west of the Black Hills and of Fissure Ridge and on piedmont slope of the northern Monte Cristo Mountains; the 1954 Fairview Peak earthquake reportedly ruptured most of the short faults north of the border between Mineral and Nye counties. Some of the faults are expressed as northeast- and southwest-facing scarps on upper Quaternary alluvial and Holocene basin-fill deposits at Black Hills and to the west, and along the southern Monte Cristo Mountains. The fault bounding the east front of the Black Hills exhibits right-oblique-normal displacement of a Mesozoic granodiorite pluton. Reconnaissance photogeologic mapping and bedrock mapping of the faults are the sources of data. Trench investigations and detailed studies of scarp morphology have not been completed.	Refers to a group of faults mapped by Slemmons (1966, unpublished Walker Lake 1:250,000-scale map; 1968, unpublished Reno 1:250,000-scale map), Dohrenwend (1982 #2481; 1982 #2870), Stewart and others (1982 #2873), Ekren and Byers (1984 #2902; 1986 #2906; 1986 #2907), and Bell (1984 #105) along west side of the Monte Cristo Mountains, in Gabbs Valleys, and along both sides of the Black Hills; dePolo (1998 #2845) referred to it as the Hot Springs fault zone. Fault ID: Refers to WL31 (Hot Springs fault zone) of dePolo (1998 #2845). County(s) and State(s): NYE COUNTY, NEVADA, MINERAL COUNTY, NEVADA	Good	1:100,000 scale	This moderately short nearly continuous zone has range-front faults bounding entire west front of the Monte Cristo Mountains and east front of Black Hills, and has piedmont and intrabasin faults in Gabbs Valley west of the Black Hills and of Fissure Ridge and on piedmont slope of the northern Monte Cristo Mountains (Slemmons, 1966, unpublished Walker Lake 1:250,000-scale map; 1968, unpublished Reno 1:250,000-scale map; Dohrenwend, 1982 #2481; 1982 #2870; Stewart and others, 1982 #2873; Bell, 1984 #105; Ekren and Byers, 1984 #2902; 1986 #2906; 1986 #2907); the 1954 Fairview Peak earthquake reportedly ruptured most of the short faults north of the Mineral and Nye county line (Bell, 1984 #105). The fault bounding the east side of the Black Hills exhibits right-oblique-normal displacement of a Mesozoic granodiorite pluton (Ekren and Byers, 1986 #2907).	25 km	N26°E	Normal	Locations chiefly based on 1:250,000-scale maps by Dohrenwend (1982 #2481; 1982 #2870) from photogeologic analysis of 1:58,000-nominal-scale color-infrared photography and from mapping by Ekren and Byers (1986 #2906; 1986 #2907). Some faults on floor of Gabbs Valley are based on unpublished 1:250,000-scale Quaternary fault map of Slemmons (1966, unpublished Walker Lake 1:250,000-scale map; 1968, unpublished Reno 1:250,000-scale map); mapping from analysis of 1:60,000-scale AMS photography transferred to mylar overlay on a 1:250,000-scale topographic map using proportional dividers.	W; NW; SE		Some faults are expressed as northeast- and southwest-facing scarps on upper Quaternary alluvial and Holocene basin-fill deposits at Black Hills, west of the hills, and along the southern Monte Cristo Mountains (Slemmons, 1966, unpublished Walker Lake 1:250,000-scale map; 1968, unpublished Reno 1:250,000-scale map; Dohrenwend, 1982 #2481). Faults on the floor of Gabbs Valley may be associated with northwest- and southeast-facing scarps (Ekren and Byers, 1986 #2906). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 73 m (61–85 m).	Holocene; upper Pleistocene. Faults have been mapped in upper Quaternary alluvium along the west side of the Monte Cristo Mountains (Dohrenwend, 1982 #2481), in Holocene basin-fill deposits on the floor of Gabbs Valley, and juxtaposing Quaternary-Tertiary alluvium against Quaternary alluvium and (or) juxtapose Quaternary alluvium against Paleozoic bedrock at the north end of Fissure Ridge and on the east side of the Black Hills, respectively (Ekren and Byers, 1986 #2907).	Fairview Peak earthquake 1954	latest Quaternary (<15 ka)	Although timing of most recent paleoevent is not well constrained on the fault in this zone, a latest Quaternary time is suspected based on faults on the floor of Gabbs Valley that offset Holocene basin-fill deposits (Dohrenwend, 1982 #2870).	Kenneth Adams, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1312&section_id= Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. 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. Dohrenwend, J.C., 1982, Map showing late Cenozoic faults in the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-D, 1 sheet, scale 1:250,000. Dohrenwend, J.C., 1982, Surficial geologic map of the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-C, 1 sheet, scale 1:250,000. Ekren, E.B., and Byers, F.M., Jr., 1984, The Gabbs Valley Range—A well exposed segment of the Walker Lane in west-central Nevada, in Lintz, J., Jr., ed., Western geological excursions: Geological	Slitp-rate category: less than 0.2 mm/yr. No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical displacement rate of 0.171 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived rate reflects a long-term average. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggest the slip rate during this period is low. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
B-17 and DVTA		Western Fairview Peak Fault	This discontinuous zone primarily has distributed piedmont and intra basin faults in eastern Fairview Valley and southern Dixie Valley and has short range-front faults locally bounding west front of southern Fairview Peak range, in Slate Mountain and Bell Canyon areas. Fairview Peak range has been tilted about 20° westward post-Tertiary volcanism (post 18.5 Ma). This fault may be related to the Louderback Mountains fault [1689] and Dixie Valley fault [1687], but unlike these faults did not rupture in 1954. Reconnaissance and detailed photogeologic mapping of the faults are the sources of data. Trench investigations and detailed studies of scarp morphology have not been conducted.	Refers to faults mapped by Slemmons (1968, unpublished Reno 1°x 2° sheet), Bell (1984 #105), Greene and others (1991 #3487), Caskey (1996 #2437), Caskey and others (1996 #2439), and Henry (1996 #3710) along the west side of Fairview Peak and in eastern Fairview Valley and southern Dixie Valley. dePolo (1998 #2845) refers to part of this fault as the Western Fairview Peak fault; the name retained herein. Fault ID: Generally refers to fault number R33 (Western Fairview Peak fault) of dePolo (1998 #2845). County(s) and State(s) MINERAL COUNTY, NEVADA; CHURCHILL COUNTY, NEVADA	Good	1:100,000 scale	This discontinuous zone primarily consists of distributed piedmont and intra basin faults in eastern Fairview Valley and southern Dixie Valley and short range-front faults locally bounding west front of southern Fairview Peak range, in Slate Mountain and Bell Canyon areas (Slemmons, 1968, unpublished Reno 1°x2° sheet, Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439); Fairview Peak range has been tilted about 20° westward post-Tertiary volcanism (18.5 Ma, Henry, 1996 #3710). This fault may be related to the Louderback Mountains fault (1689) and Dixie Valley fault (1687), but it is unlike these faults did not rupture in 1954.	40 km	N16°E	Normal	Fault locations are based on 1:48,000-scale map of Caskey (1996 #2437; reproduced in Caskey and others, 1996 #2439) and 1:250,000-scale map of Bell (1984 #105). Mapping of Caskey (1996 #2437) is based on detailed photogeologic analysis of 1:10,000- to 1:12,000-scale vertical, low-sun-angle aerial photography, transferred by inspection to 1:24,000-scale mylar orthophotos and directly to 1:24,000-scale topographic maps, that were then reduced to 1:48,000-scale; mapping also based on detailed field mapping and numerous measurements of fault offsets along the fault. Mapping of Bell (1984 #105) is based on photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale aerial photography of selected areas, several low-altitude aerial reconnaissance flights, and field reconnaissance of major structural and stratigraphic relationships. Not studied in detail; sense of movement from Caskey (1996 #2437), Caskey and others (1996 #2439), and Henry (1996 #3710), and inferred from topography.	W; NW		Piedmont faults are expressed as short west-facing scarps on western and northern piedmont slope of Fairview Peak range from southeastern part of Little Bell Flat and continue beyond the north end of the range as intra basin faults in southern Dixie Valley, that are marked by lineaments and locally by west-facing scarps (Slemmons, 1968, unpublished Reno 1° X 2° sheet, Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439). Faults in southern part of zone also are expressed as topographic lineaments (Bell, 1984 #105), that commonly coincide with contacts between upper piedmont-slope deposits and Tertiary bedrock (Greene and others, 1991 #3487). dePolo (1998 #2845) reported that basal fault facets do not occur along west side of Fairview Peak range.	Quaternary; Tertiary. Quaternary alluvium on piedmont slope of Fairview Peak range and Quaternary basin-fill deposits in southern Dixie Valley are displaced along piedmont and intra basin faults, respectively. Quaternary alluvium appears to be locally juxtaposed against Tertiary bedrock along range-front faults (Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Henry, 1996 #3710). Henry (1996 #3710) shows one fault west of Fairview Peak that apparently juxtaposes younger (Holocene?) alluvial-fan deposits against older Pleistocene alluvial-fan deposits, but to be concealed by older deposits at either end.		undifferentiated Quaternary (<1.6 Ma)	Although timing of most recent event is not well constrained, a Quaternary time is suggested based on photogeologic mapping by Bell (1984 #105), Caskey (1996 #2437), Caskey and others (1996 #2439), and Dohrenwend and others (1996 #2846). However, a latest Quaternary is possible based on detailed geologic mapping of Henry (1996 #3710) and studies by Slemmons (1968, unpublished Reno 1° X 2° sheet).	Thomas L. Sawyer, Piedmont Geosciences, Inc.	#105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #2437 Caskey, S.J., 1996, Surface faulting, static stress changes, and earthquake triggering during the 1954 Fairview Peak (M (sub s) = 7.2) and Dixie Valley (M (sub s) = 6.8) earthquakes, central Nevada: Reno, University of Nevada, Mackay School of Mines, unpublished Ph.D. dissertation, 144 p. #2439 Caskey, S.J., Wesnousky, S.G., Zhang, P., and Slemmons, D.B., 1996, Surface faulting of the 1954 Fairview Peak (Ms 7.2) and Dixie Valley (Ms 6.8) earthquakes, central Nevada: Bulletin of the Seismological Society of America, v. 86, no. 3, p. 761-787. #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. #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-	
B-17 and DVTA		Sand Springs Range fault	This nearly continuous, moderately long zone primarily consists of: (1) prominent range-front faults bounding sinuous east front of Sand Springs Range and subdued east front of southernmost Stillwater Range, from south of Contact Canyon north to La Plata Canyon and (2) distributed piedmont and intra basin faults in northern Fairview Valley, that extend across valley floor in vicinity of Labou Flat and across pediment on apparently uplifted Quaternary-Tertiary alluvium. Reportedly the 1954 Fairview Peak-Dixie Valley earthquakes ruptured one short fault in western Labou Flat. Fault may be related to the Dixie Valley fault [1687b].	Refers to faults mapped by Slemmons (1968, unpublished Reno 1:250,000-scale map), Butler (1979 #3708), Bell (1984 #105), Greene and others (1991 #3487), and John and Silberling (1994 #3709) along east side of the Sand Springs Range and in northern Fairview Valley. dePolo (1998 #2845) referred to it as the Sand Springs Range fault. Fault ID: Refers to fault R30 (Sand Springs Range fault) of dePolo (1998 #2845). County(s) and State(s): MINERAL COUNTY, NEVADA, CHURCHILL COUNTY, NEVADA	Good	1:100,000 scale	This nearly continuous, moderately long zone primarily consists of prominent range-front faults bounding sinuous east front of Sand Springs Range and subdued east front of southernmost Stillwater Range, from south of Contact Canyon north to La Plata Canyon, and distributed piedmont and intra basin faults in northern Fairview Valley, that extend across valley floor in vicinity of Labou Flat and across pediment on apparently uplifted Quaternary-Tertiary alluvium (Slemmons, 1968, unpublished Reno 1°x 2° sheet; Bell, 1981 #105; Greene and others, 1991 #3487). Reportedly the 1954 Fairview Peak-Dixie Valley earthquakes ruptured one short fault in western Labou Flat (Slemmons, 1957 #154), but this feature is no longer visible (Bell, 1984 #105). Fault may be related to the Dixie Valley fault [1687b] (Bell and Ramelli, 1999 #4330).	40 km	N22°E	Normal	Fault locations are based on 1:250,000-scale maps of Bell (1984 #105) and Slemmons (1968, unpublished Reno 1:250,00-scale map). Mapping of Bell (1984 #105) is based on photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale aerial photography of selected areas, several low-altitude aerial reconnaissance flights, and field reconnaissance of major structural and stratigraphic relationships. Mapping by Slemmons (1968, unpublished Reno 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. Not studied in detail; sense of movement from Slemmons (1968, unpublished Reno 1°x 2° sheet) and Greene and others (1991 #3487), and inferred from topography.	E; NE; W		Range-front faults are morphologically young scarps on Holocene upper piedmont-slope deposits near mouth of La Plata Canyon and along east side of Sand Springs Range (Bell, 1981 #2875), that are up to 4 m high (Bell, 1984 #105). In some locations Quaternary piedmont-slope deposits are juxtaposed against bedrock (Greene and others, 1991 #3487), and locally the fault is expressed as topographic lineaments indicative of young faulting at alluvial-bedrock contact (Bell, 1984 #105). Piedmont faults are marked by short scarps adjacent and parallel to front of Sand Springs and Stillwater ranges, that near mouth of La Plata Canyon define a graben on apparently uplifted pediment. Intrabasin faults are marked by generally east-facing scarps near margins of Labou Flat and in northern Fairview Valley (Slemmons, 1957 #154, 1968, unpublished Reno 1°x 2° sheet; Bell, 1981 #2875; 1984 #105; Greene and others, 1991 #3487); southernmost intra basin fault in Labou Flat reportedly had 1954 breaks (Slemmons, 1957 #154) that are no longer visible (Bell, 1984 #105). dePolo, 1998 #2845) reports a maximun preferred basal fault facets height of 134 m (110-158 m).	Holocene; Quaternary; Quaternary-Tertiary; Tertiary. Quaternary alluvium on piedmont slope of Sand Springs Range and basin-fill deposits on floor of central Fairview Valley, as young as Holocene, are displaced by faults in this zone (Slemmons, 1957 #154, 1968, unpublished Reno 1°x 2° sheet; Bell, 1981 #2875; 1984 #105; Greene and others, 1991 #3487). Graben-bounding faults near mouth of La Plata Canyon are in Quaternary-Tertiary alluvial deposits and Quaternary deposits are juxtaposed against Tertiary and older bedrock along front of Sand Springs and Stillwater ranges (Butler, 1979 #3708; Greene and others, 1991 #3487; John and Silberling, 1994 #3709).		latest Quaternary (<15 ka)	Bell and others (2004 #7763) document evidence of two post 15-ka coseismic surface ruptures. A Holocene time is suggested based on photogeologic mapping by Bell (1984 #105; 1984 #108) and Dohrenwend and others (1996 #2846), which is consistent with a latest Quaternary time suggested by Slemmons (1967 #156).	Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1685&section_id= #105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #2875 Bell, J.W., 1981, Quaternary fault map of the Reno 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-982, 62 p., http://pubs.er.usgs.gov/publication/ofr81982. #108 Bell, J.W., 1984, Holocene faulting in western Nevada and recurrence of large-magnitude earthquakes, in Lintz, J., Jr., ed., Western geological excursions: Reno, Nevada, University of Nevada, Mackay School of Mines, 1984 Annual Meetings of the Geological Society of America, Guidebook, v. 4, p. 388-402. #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. #4330 Bell, J.W., and Ramelli, A.R., 1999, Paleoseismic studies in the Central Nevada Seismic	Slip-rate category: Between 0.2 and 1.0 mm/yr. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.248 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived slip rate reflects a long-term maximum. However, the late Quaternary characteristics of this fault (overall geomorphic expression, age of faulted deposits, and sinuous character of the range front, etc.) indicate young movement, there exists no data to indicate recurrent movement in the latest Quaternary. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault. The slip-rate assignment is based on 0.45± vertical displacement rate documented in Bell and others (2004 #7763).

Proposed Withdrawal Area	Fault Zone Name	Fault Name	Description	Name Comments	Reliability of Location	Compiled at:	Geologic Setting	Length	Average Strike	Sense of Movement	Comments	Dip Direction	Paleoseismic Studies	Geomorphic Expression	Age of faulted surficial deposits	Historic Earthquake	Most recent prehistoric deformation	Comments	Compilers	References	Miscellaneous
B-17 and DVTA	Fairview Fault zone		This well-defined, historical, normal-oblique fault zone has: (1) range-front faults bounding east front of Fairview Peak range from Bell Canyon north-northeast to north end of range, bounding entire length of less prominent east front of Slate Mountain, and locally bounding east and west flanks of Chalk Mountain; (2) piedmont faults crossing piedmont slope of Slate Mountain, in southwest part of Bell Flat, and crossing piedmont slopes of Chalk Mountain; (3) intra basin faults extending continuously along western margin of Stingaree Valley (a half graben) between Fairview Peak range and Chalk Mountain, and distributed throughout much of central and eastern Bell Flat; and (4) short intermontane faults bounding northwest shoulder of Fairview Peak, on range-front escarpment east-southeast of Dromedary Hump, and near crest of Chalk Mountain. The 1954 rupture pattern suggests that this fault is related the faults to the south [1313] and to the West Gate fault [1692], Louderback Mountains fault [1689], Gold King fault [1691], and Dixie Valley fault [1687] to the north. The 1954 Fairview Peak earthquake (Ms7.2) produced a complex pattern of surface ruptures along entire length of the fault including the intermontane faults. Virtually all faults in the zone are clearly marked by 1954 scarps, many have distinct free faces, that represent as much as approximately 2.9 m of right-lateral and 3.8 m of vertical separation. In addition to reconnaissance and detailed photogeologic mapping of the fault and detailed geologic mapping in the region, detailed	Refers to faults mapped by Slemmons (1957 #154, Slemmons, 1968, unpublished Reno 1:250,000-scale map), Larson (1957 #310), Slemmons and others (1979 #157), Bell (1984 #105), Greene and others (1991 #3487), Caskey (1996 #2437), Caskey and others (1996 #2439), Henry (1996 #3710), and Bell and Ramelli (1999 #4330) along east side of Fairview Peak range and Slate Mountain, east and west sides of Chalk Mountain, and in Stingaree Valley and Bell Flat. Slemmons (1957 #310) is an early reference to the "Fairview fault zone" name and subsequent investigators have referred to it as the Fairview fault. Extent of the zone described herein follows Caskey (1996 #2437) and Caskey and others (1996 #2439). Refers to fault numbers R34A, R34B, and R34C (Fairview Peak fault	Good	1:100,000 scale	This well-defined, historical, normal right-oblique fault zone has: (1) range-front faults bounding east front of Fairview Peak range from Bell Canyon north-northeast to north end of range, bounding entire length of less prominent east front of Slate Mountain, and locally bounding east and west flanks of Chalk Mountain; (2) piedmont faults crossing piedmont slope of Slate Mountain, in southwest part of Bell Flat, and crossing piedmont slopes of Chalk Mountain; (3) intra basin faults extending continuously along western margin of Stingaree Valley (a half graben, Caskey, 1996 #2437) between Fairview Peak range and Chalk Mountain and distributed throughout much of central and eastern Bell Flat; and (4) short intermontane faults bounding northwest shoulder of Fairview Peak, on range-front escarpment east-southeast of Dromedary Hump, and near crest of Chalk Mountain (Slemmons, 1957 #154, 1968, unpublished Reno 1:250,000-scale map; Larson, 1957 #310; Slemmons and others, 1979 #157; Bell, 1984	31 km	N23°E	Normal	Fault locations are predominantly based on 1:48,000-scale map of Caskey (1996 #2437), reproduced in Caskey and others (1996 #2439). Mapping based on detailed photogeologic analysis of 1:10,000- to 1:12,000-scale vertical, low-sun-angle aerial photography, transferred by inspection to 1:24,000-scale mylar orthophotos and directly to 1:24,000-scale topographic maps, that were then reduced to 1:48,000-scale; mapping also based on detailed field mapping and hundreds of measurements of fault offsets along the fault zone. Selected fault traces on west flank of Chalk Mountain, south of Slate Mountain, and in central and eastern Bell Flat are based on 1:250,000-scale map of Bell (1984 #105), which were check against fault locations on 1:250,000-scale maps of Slemmons (1957 #310) and Greene and others, (1991 #3487). Mapping of Bell (1984 #105) is from photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale aerial photography of selected areas, several low-altitude aerial reconnaissance flights, and field reconnaissance of major structural and stratigraphic relationships.	65–80° E.	Four backhoe trenches have been excavated across the Fairview fault, three in the Bell Canyon area and one on east flank of Fairview Peak by Caskey (1996 #2437) and Bell and Ramelli (1999 #4330). Tentative age control is provided by tephra-rich layers and pods exposed in the trenches and correlated to dated deposits, a radiocarbon date, and soil development. Site 1690-1. Mouth of north fork of Bell Canyon. Trench BCN of Caskey (1996 #2437) was excavated at mouth of north fork of Bell Canyon several meters south of the modern channel, a westward-flowing drainage, across a 0.8 m high east-facing scarp on late Holocene upper piedmont-slope deposits that represents approximately 1.2 m of vertical separation from the 1954 Fairview Peak earthquake. The trench exposed a stratified sequence of fluvial and alluvial deposits containing pods of volcanic ash (1.2 ka), a main fault associated with the 1954 scarp, and	The 1954 Fairview Peak earthquake (Ms 7.2) produced a complex pattern of surface ruptures along entire length of the fault including along the intermontane faults. Virtually all faults in zone are clearly marked by 1954 scarps, many have distinct free faces (Slemmons, 1957 #154; Caskey, 1996 #2437). About 2 km south of Fairview Peak maximum 1954 offset is represented by a scarp produced by approximately 2.9 m of right-lateral and 3.8 m of vertical separation (Caskey, 1996 #2437). In northern Bell Flat, there are 2- to 3-m-high 1954 scarps that locally are superimposed on a compound 5-m-high paleoscarp on mid to late Pleistocene alluvial-fan deposits; paleoscarp was produced during penultimate event (Bell and Ramelli, 1999 #4330). In addition to scarps, 1954 surface deformation is exhibited by left-stepping echelon fissures, a possible pressure ridge with 1 m of relief in a left (restraining ?) stepover east-northeast of Gold Coin Mine, right-lateral offsets and deflections of streams, and right-lateral offset of ridge lines (Caskey, 1996 #2437; Caskey and others, 1996 #2439). Faults are also expressed by paleoscarps and abrupt range-front escarpments along Fairview Peak range and Slate Mountain (Slemmons, 1957 #154; Caskey, 1996 #2437); paleoscarps of	Holocene; late Quaternary; Quaternary; Tertiary. There is general agreement that Holocene, late Quaternary, and Quaternary piedmont-slope and valley-fill deposits are faulted along the entire fault zone (Slemmons, 1957 #154, 1968; unpublished Reno 1:250,000-scale map; Larson, 1957 #310; Slemmons and others, 1979 #157; Bell, 1981 #2875; Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439; Henry, 1996 #3710). Slemmons (1957 #310) reported offset of U.S. Highway 50 and road in Bell Flat associated with the 1954 Fairview Peak earthquake. Along front of Fairview Peak range, Slate Mountains, and Chalk Mountain Quaternary piedmont-slope are juxtaposed against Tertiary bedrock (Bell, 1981 #2875; Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439; Henry, 1996 #3710).	Fairview Peak earthquake 1954	late Quaternary (<130 ka)	Although timing of most recent paleoevent is not well constrained, a late Quaternary time (>36 ka) is suspected based ongoing trench investigations by Bell and Ramelli (1999 #4330). Bell and Ramelli (1999 #4330) suggest that 35 k.y. or more may have elapsed between the 1954 event and the previous paleoearthquake, suggesting tens of thousands years between events. This is supported by map relationships in northern Bell Flat that bracket the penultimate event between 100 and 35 ka.	Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1690&section_id= #2875 Bell, J.W., 1981, Quaternary fault map of the Reno 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-982, 62 p., http://pubs.er.usgs.gov/publication/ofr81982. #105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #4330 Bell, J.W., and Ramelli, A.R., 1999, Paleoseismic studies in the Central Nevada Seismic Belt: Technical report to U.S. Geological Survey, Reston, Virginia, under Contract 1434-HQ-97-GR-03164, March 31, 1999, 16 p. #2437 Caskey, S.J., 1996, Surface faulting, static stress changes, and earthquake triggering during the 1954 Fairview Peak (M (sub s) = 7.2) and Dixie Valley (M (sub s) = 6.8) earthquakes, central Nevada: Reno, University of Nevada, Mackay School of Mines, unpublished Ph.D. dissertation, 144 p. #2439 Caskey, S.J., Wesnousky, S.G., Zhang, P., and Slemmons, D.B., 1996, Surface faulting of the 1954 Fairview Peak (Ms 7.2) and Dixie Valley (Ms 6.8)	Slip-rate category: Less than 0.2 mm/yr. Oblique rate suggested by data presented by Bell and others (2004 #7208) suggest slip rates that fall within the assigned category. Earlier estimates by Bell and Ramelli (1999 #4330) include<<0.1, but a higher rate is suggested by their mapping and profiling of a 5-m-high scarp on 100 and 35 ka alluvial-fan deposits in northern Bell Flat. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.312 mm/yr for most of the fault based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived slip rate reflects a long-term average. However, the lack of evidence for surface faulting younger than 35-100 ka except in 1954 suggests the slip rate during the late Quaternary is of a lesser magnitude. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
B-17 and DVTA	Unnamed Faults Northern Monte Cristo Mountains		This anastomosing to left-stepping down-to-the-west faults along southwest and northern margins of the Cedar Mountains has minor short surfaces rupture from the 1932 Cedar Mountain earthquake, that generally are along more continuous Quaternary fault scarps. Complex patterns of Quaternary faulting and 1932 surface ruptures suggests that this fault may be related to other faults in the Monte Cristo-Stewart Valley area [1323 and 1325]. The fault zone has a nearly continuous anastomosing to left-stepping faults that extends northwestward from west of Dicalite Summit along the front and upper piedmont slope of the Cedar Mountains. A second group of parallel faults trend northeast from the first at Stewart Spring in a horsetail-splay pattern and continues to Omco Wash in eastern Stewart Valley. Reconnaissance and locally detailed photogeologic mapping of the fault zone and studies of late Cenozoic faulting are the sources of data. Trenching has not been completed.	Refers to faults mapped along the southwest base of the Cedar Mountains by Gianella and Callaghan (1934 #1515), Molinari (1984 #1584), Dohrenwend and others (1996 #2846), and dePolo (1994 #2458). This fault extends northwestward from west of Dicalite Summit along southwest side of the Cedar Mountains to Stewart Spring where it continues northeastward to Omco Wash north of Simon Mountain. County(s) and State(s) MINERAL COUNTY, NEVADA	Good	1:100,000 scale	These anastomosing to left-stepping down-to-the-west faults along the Cedar Mountains appears to be related to the Monte Cristo Valley and Stewart Valley fault zones [1325 and 1323, respectively], which also ruptured during the 1932 Cedar Mountain earthquake. The nearly continuous group of faults that extends northwestward along the front and upper piedmont slope of the Cedar Mountains splays northeastward or intersects a second series of northeast-striking faults that continue across northwest end of the range (Gianella and Callaghan, 1934 #1515; Molinari, 1984 #1584; Dohrenwend and others, 1996 #2846).	24 km	N27°W	Normal	Location primarily based on digital data of Dohrenwend and others (1996 #2846) from photogeologic analysis of 1:58,000-nominal-scale color-infrared photography; 1932 rupture traces are from 1:48,000-scale map of dePolo (1994 #2458), which is a detailed compilation of 1932 rupture zone based on original mapping by Gianella and Callaghan (1934 #1515) and by Molinari (1984 #1584) supplemented by photogeologic analysis of 1:12,000-scale low-sun-angle aerial photography and field reconnaissance. Not studied in detail; normal sense of movement is inferred from topography and three 1932 ruptures; dextral sense is inferred from one short 1932 rupture near Stewart Spring that had possible right-lateral offset (Gianella and Callaghan, 1934 #1515; dePolo, 1994 #2458).			The fault zone is expressed by anastomosing to left-stepping faults along front and upper piedmont slope of the Cedar Mountains and northeast-striking faults at northwest end of range that juxtapose high-level piedmont-slope surfaces against bedrock and by subparallel eroded scarps on Quaternary deposits and Tertiary sedimentary and volcanic rocks (Gianella and Callaghan, 1934 #1515; Molinari, 1984 #1584). The 1932 surface ruptures were marked by scarps as much as 46 cm high and ground cracks with possible right-lateral displacement, however post-faulting erosion has considerably modified these original features (Yount and others, 1993 #621).	Quaternary; Tertiary. Scarps and lineaments have been mapped on Quaternary piedmont-slope deposits and on Tertiary lake beds and volcanic rocks (Gianella and Callaghan, 1934 #1515; Molinari, 1984 #1584, Yount and others, 1993 #621).		undifferentiated Quaternary (<1.6 Ma)	Although timing of the most recent event is not well constrained, a Quaternary time is suggested based on reconnaissance photogeologic mapping of Dohrenwend and others (1996 #2846).	Thomas L. Sawyer, Piedmont Geosciences, Inc.	#2458 dePolo, C.M., 1994, Surface faulting associated with the December 20, 1932 Cedar Mountain earthquake, central Nevada: Nevada Bureau of Mines and Geology Open-File Report OF-94-4, scale 1:24,000. #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. #1515 Gianella, V.P., and Callaghan, E., 1934, The Cedar Mountain, Nevada, earthquake of December 20, 1932: Bulletin of the Seismological Society of America, v. 24, p. 345- 377. #1584 Molinari, M.P., 1984, Late Cenozoic geology and tectonics of Stewart and Monte Cristo Valleys, west-central Nevada: Reno, University of Nevada, unpublished M.S. thesis, 124 p., 7 pls., scale 1:62,500. #621 Yount, J.C., Bell, J.W., dePolo, C.M., and Ramelli, A.R., 1993, Neotectonics of the Walker Lane, Pyramid Lake to Tonopah, Nevada—Part I, in Lahren, M.M., Trexler, J.H., Jr., and Spinosa, C.,	Slip-rate category Less than 0.2 mm/yr. A low slip rate is inferred from general knowledge of slip rates estimated for other faults in the region.
B-20	Rainbow Mountain Fault Zone		This long, widely distributed fault zone has numerous subparallel, oblique to left-stepping intra basin faults that occur throughout much of the Carson Sink and along eastern margin of Salt Wells Basin, and has very short range-front faults bounding both sides of Stillwater Point; fault zone bounds a buried horst beneath young basin-fill deposits north of Rainbow Mountain based on seismic reflection data. The 1954 rupture pattern of the Rainbow Mountain-Stillwater earthquakes suggests that these faults form a discrete fault zone, that may be related to the Eastern Carson Sink fault zone [1684] and to unnamed faults in Salt Wells Basin [1680]. Reconnaissance photogeologic and detailed mapping of the fault zone are the sources of data.	Many of minor 1954 breaks on floor of the Carson Sink and in eolian deposits along east side of Salt Wells Basin reported by Tocher (1956 #307) and Slemmons (1968, unpublished Reno 1:250,000-scale map) are poorly preserved as subdued lineaments and possible cracks or are no longer visible (Bell, 1981 #2875). Although many 1954 breaks in floor of the sink did not occur along pre-existing fault scarps, their continuity, linearity, preferential northerly strike and continuity with demonstrable Quaternary faults to the south, suggest that these surficial features closely reflect movement on an underlying fault zone (Tocher, 1956 #307). Numerous fresh-looking 1954 scarps, some with free faces, are preserved on coarse gravely deposits and discontinuously extend south											Holocene; latest Quaternary; Quaternary; Tertiary. Latest Quaternary lacustrine sediment (<13 ka) and Holocene basin-fill and piedmont-slope deposits are displaced by faults in this zone (Tocher, 1956 #307; Slemmons, 1968, unpublished Reno 1:250,000-scale map, Bell, 1981 #2875; 1984 #105; Greene and others, 1991 #3487). North of Rainbow Mountain, Caskey (1999, written commun.) reported offset lacustrine deposits containing a layer of Wilson Creek tephra (~27.6 ka). Locally faults bounding Rainbow Mountain displace probably Tertiary sedimentary rocks or juxtapose undifferentiated Quaternary deposits against Tertiary volcanic rocks (Greene and others, 1991 #3487; Tocher, 1956 #307).	Rainbow Mountain earthquake 1954 Stillwater earthquake: 1954	Quaternary (<15 ka)	Although timing of most recent paleoevent is not well constrained, a late to latest Quaternary time is suggested based on detailed field mapping by Caskey (1999, written commun.), which provides evidence that the most recent paleoevent postdates deposition of the Wilson Creek tephra (~27.6 ka) and probably predates formation of approximately 10 ka "dendritic terrace" of Morrison (1964 #3486). Photogeologic mapping by Bell (1981 #2875; 1984 #105), Slemmons (1968, unpublished Reno 1:250,000-scale map), and Dohrenwend and others (1996 #2846) support a latest Quaternary time.	Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1679&section_id= #2875 Bell, J.W., 1981, Quaternary fault map of the Reno 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-982, 62 p., http://pubs.er.usgs.gov/publication/ofr81982. #105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #7208 Bell, J.W., Caskey, S.J., Ramelli, A.R., and Guerrieri, L., 2004, Pattern and rates of faulting in the central Nevada seismic belt, and paleoseismic evidence for prior beltlike behavior: Bulletin of the Seismological Society of America, v. 94, p. 1229-1254. #7760 Caskey, J.S., Bell, J.W., Ramelli, A.R., and Wesnousky, S.G., 2004, Historic surface faulting and paleoseismicity in the area of the 1954 Rainbow Mountain–Stillwater earthquake sequence, central Nevada: Bulletin of the Seismological Society of America, v. 94, p. 1255–1275, doi: 10.1785/012003012 #2845 dePolo, C.M., 1998, A reconnaissance technique for estimating the slip rate of normal-	Slip-rate category: Less than 0.2 mm/yr

Faults and Fault Zones In and Near the Region of Influence

Proposed Withdrawal Area	Fault Zone Name	Fault Name	Description	Name Comments	Reliability of Location	Compiled at:	Geologic Setting	Length	Average Strike	Sense of Movement	Comments	Dip Direction	Paleoseismic Studies	Geomorphic Expression	Age of faulted surficial deposits	Historic Earthquake	Most recent prehistoric deformation	Comments	Compilers	References	Miscellaneous
B-20 and DVTA	Eastern Carson Sink Fault Zone		This fault zone, which generally separates the extremely broad and deep Carson Sink from prominent west front of Stillwater Range, consists of short faults near and at the linear range front from about the mouth of West Lee Canyon discontinuously north-northeast to mouth of Copper Kettle Canyon, and a few intra basin faults or secondary deformation structures in northeastern part of the sink west of Grimes Canyon. The Stillwater Range has been uplifted several kilometers relative to Carson Sink since basin-and-range faulting began (<13 Ma). In addition, the southern part of range was tilted 40? to 90? east during early Miocene extensional faulting. Fault may be related to an unnamed fault in southwestern Stillwater Range [1683] and to the Rainbow Mountain fault zone [1679] to west and southwest; one short fault near Desert Well may have ruptured during the 1954 Rainbow Mountain-Stillwater earthquakes. Reconnaissance and locally detailed photogeologic mapping of the fault zone are sources of data. Trench investigations and detailed studies of scarp morphology have not been conducted.	Refers to faults mapped by Russell (1885 #3549), Tocher (1956 #307), Slemmons (1968, unpublished Reno 1°x 2° sheet), Bell (1984 #105), Greene and others (1991 #3487), Caskey (1996 #2439), and Caskey and others (1996 #2439) along the west side of the Stillwater Range and near eastern margin of the Carson Sink. Russell (1885 #3549) originally named it the Pahute Mountain fault, but the same geographic feature is now called the Stillwater Range. dePolo (1998 #2845) originated the name of Eastern Carson Sink fault zone. Refers to fault R28A, R28B, and R28C (Eastern Carson Sink fault zone) of dePolo (1998 #2845). County(s) and State(s): CHURCHILL COUNTY, NEVADA	Good		This fault zone, which generally separates the extremely broad and deep Carson Sink from prominent west front of Stillwater Range, consists of short faults near and at linear range front from about mouth of West Lee Canyon discontinuously north-northeast to mouth of Copper Kettle Canyon and a few intra basin faults or secondary deformation structures in northeastern part of the sink west of Grimes Canyon (Tocher, 1956 #307; Bonham and Slemmons, 1968 #2430; Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439). The Stillwater Range has been uplifted several kilometers relative to the Carson Sink since basin-and-range faulting began (<13 Ma). In addition, the southern part of range was tilted 40? to 90? to the east during early Miocene extensional faulting (John, 1995 #3713). Several kilometers of late Cenozoic vertical movement is indicated by more than one kilometer of steep range-front relief and from borehole data and seismic reflection profiles that	41 km	N4°E	Normal	Fault locations are generally based on 1:250,000-scale maps of Bell (1984 #105) and Slemmons (1968, unpublished Reno 1° X 2° sheet). Location of faults between Shanghai Canyon and Grimes Canyon, are based on 1:48,000-scale map of Caskey (1996 #2437; reproduced in Caskey and others, 1996 #2439). Mapping by Bell (1984 #105) is based on photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale aerial photography of selected areas, several low-altitude aerial reconnaissance flights, and field reconnaissance of major structural and stratigraphic relationships. Mapping by Slemmons (1968, unpublished Reno 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. Mapping by Caskey (1996 #2437) and Caskey and others (1996 #2439) is based on detailed photogeologic analysis of 1:10,000- to 1:12,000-scale vertical, low-sun-angle aerial photography, transferred by inspection to 1:24,000-scale mylar orthophotos and directly to 1:24,000-scale topographic maps, that were then reduced to 1:48,000-scale. Normal sense of	W		Although a fault has been inferred along entire west front of Stillwater Range, only scattered geomorphic evidence of late Quaternary faulting is apparent (e.g., Bell, 1981 #2875). The range front is steep, linear, has wineglass canyons (Adams and Wesnousky, 1996 #3705). However, faulting is not the only process that has influenced the western front of the Stillwater Range. Pluvial Lake Lahontan, which had a very long fetch in the Carson sink area, produced many shoreline scarps and eroded the range front. Faults are expressed as scarps on deposits of latest Pleistocene Lake Lahontan, between Cox and Shanghi Canyons, that locally cannot be traced along trend because they are parallel to latest Pleistocene shoreline scarps. Moderately, well defined scarps on pre-Lake Lahontan piedmont-slope deposits south of White Cloud Canyon extend discontinuously northward across Lake Lahontan deposits (Bell, 1981 #2875; Adams and Wesnousky, 1996 #3705) and merge with a possibly wave-modified compound scarp on piedmont slope north of Grimes Canyon. North of Kent Canyon, a piedmont fault is expressed by a prominent scarp that crosses a post-highstand spit (~13 ka Adams, 1997 #3003) and represents 3.0+0.2 m of vertical separation (Adams and others, 1996	Holocene; latest Quaternary; Quaternary. Latest Quaternary lacustrine sediment (~13 ka, Adams, 1997 #3003), and Holocene and undifferentiated Quaternary piedmont-slope deposits are displaced by faults in this zone (Tocher, 1956 #307, Slemmons, 1968, unpublished Reno 1°x 2° sheet, Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439; Adams and Wesnousky, 1996 #3705; Adams and others, 1996 #3706).		Quaternary (<15 ka)	Although timing of most recent event is not well constrained, offset of a post-Lake Lahontan highstand (~13 ka , Adams, 1997 #3003) deposits is suggested based on photogeologic mapping and field studies by Bell (1984 #105), Adams and Wesnousky (1996 #3705), and Caskey (1996 #2437). Slemmons (1968, unpublished Reno 1°x 2° sheet) assigned a latest Quaternary time to northern faults on floor of the Carson Sink and a late Quaternary time to faults at front of Stillwater Range.	Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1684&section_id= #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. #3705 Adams, K.D., and Wesnousky, S.G., 1996, Stop 1-2, Grimes Canyon, in 1996 Quaternary history, isostatic rebound and active faulting in the Lake Lahontan Basin, Nevada and California: Friends of the Pleistocene Pacific Cell Field Trip guidebook, p. 20-21. #3706 Adams, K.D., Wesnousky, S.G., and Bills, B., 1996, Stop 2-4B, isostatic rebound and active faulting, in 1996, Quaternary history, isostatic rebound and active faulting in the Lake Lahontan Basin, Nevada and California: Friends of the Pleistocene Cell Field Trip guidebook, p. 28-30. #2875 Bell, J.W., 1981, Quaternary fault map of the Reno 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-982, 62 p., http://pubs.er.usgs.gov/publication/ofr81982. #105 Bell, J.W., 1984, Quaternary fault map of	Slip-rate category: Less than 0.2 mm/yr. No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.300 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived slip rate reflects a long-term average. The less than 0.2 mm/yr slip-rate category has been assigned to this fault; in support of this assignment Adams (1997 #3003) reported 3.0 + 0.2 m vertical separation on deposits 13 k.y. old North of Kent Canyon. These data can only constrain the maximum possible value for a slip rate, which is only slightly higher that the slip-rate category permits.
DVTA	Dixie Valley Fault Zone		The Dixie Valley fault is a range-front structure that bounds the east side of the Stillwater Range. The Stillwater Range has been uplifted several kilometers relative to the bounding basins since basin-and-range faulting began (<13 Ma), and the southern part of range was tilted 40° to 90° east during early Miocene extensional faulting. This long, continuous, well-defined to spectacularly expressed fault zone is divided into two sections. The southern section ruptured in the 1954 earthquake, and the northern one did not. The 1954 Dixie Valley earthquake produced spectacular surface ruptures (up to 2.8 m high) along the southern part of the fault zone. The northern part of the fault zone has been referred to as the "Stillwater seismic gap" because it is located between coseismic surface ruptures of the 1915 Pleasant Valley earthquake to the north and 1954 Dixie Valley earthquake to the south. In addition to geophysical studies, including seismic refraction, aeromagnetics and gravity surveys, and reconnaissance and detailed photogeologic mapping of the fault zone, detailed mapping and measurement of the 1954 ruptures, scarp morphology, and 5 trench at 4 sites are the sources of data. This fault has 2 sections. The pattern of 1954 surface faulting and general movement history provide a basis for subdividing the Dixie Valley fault zone into a southern section (1954 section), which ruptured in the 1954 earthquake and a northern section (Stillwater	Refers to faults mapped by Slemmons (1968, unpublished Reno 1:250,000-scale map), Willden and Speed (1974 #3645), Bell (1984 #105), Wallace and Whitney (1984 #167), Bell and Katzer (1987 #205), Greene and others (1991 #3487), Caskey (1996 #2437), Caskey and others (1996 #2439), Dohrenwend and Moring, (1991 #282), and Dohrenwend and others (1992 #283). The fault extends along east side of Stillwater Range and in western Dixie Valley from La Plata Canyon, in northern part of Fairview Valley, northward to The Bend and continues northeastward across mouth of White Rock Canyon, to about 2 km north of the mouth of Man Canyon where one trace bends sharply east and separates into echelon northeast-striking traces and another steps west, where it forms	Good	1:100,000 scale	This long, continuous, well-defined to spectacularly expressed fault zone has: (1) range-front faults bounding east front of Stillwater Range from near Elevenmile Canyon north to The Bend, east for several kilometers along northern margin of The Bend, and continues nearly continuously from about Hare Canyon northeastward to mouth of White Rock Canyon; (2) subparallel piedmont faults are widely distributed in western Dixie Valley, particularly in The Bend as much as 5 to 6 km east of range front, on piedmont slope between East Lee Canyon and about Cain Spring Canyon, on alluvial fan of Elevenmile Wash, and bounding and in uplifted pediment on Quaternary-Tertiary alluvium at westward step in range front at about La Plata Canyon; and (3) short intermontane faults on range-front escarpment between about Rough Creek Canyon north to James Canyon (Slemmons, 1968, unpublished Reno 11:48,000-scale map of Caskey (1996 #243t; Bell, 1984 #105; Bell and Katzer, 1987 #205; Greene and others, 1991	This section is 57 km of a total fault length of 105 km.	N18°E (for section) versus N21°E (for whole fault)	Normal	Fault locations are generally based on 1:48,000-scale map of Caskey (1996 #243, reproduced in Caskey, 1996 #2439). Mapping based on detailed photogeologic analysis of 1:10,000- to 1:12,000-scale vertical, low-sun-angle aerial photography, transferred by inspection to 1:24,000-scale mylar orthophotos and directly to 1:24,000-scale topographic maps, that were then reduced to 1:48,000-scale; mapping also based on detailed field mapping and hundreds of measurements of fault offsets along fault zone. Selected fault locations are based on 1:250,000-scale map of Bell (1981 #2875; 1984 #105); mapping is from photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale aerial photography of selected areas, several low-altitude aerial reconnaissance flights, and field reconnaissance of major structural and stratigraphic relationships. The fault zone is predominantly normal (Slemmons, 1957 #154; Meister, 1967 #3715; Bell, 1981 #2875; Schaefer, 1983 #3716; Wallace and Whitney, 1984 #167; Bell and Katzer, 1987 #205; John, 1995 #3713; Caskey, 1996 #2437; Caskey and others, 1996 #2439), even though the faults locally exhibit evidence of either	<30° to 80° E.	Bell and Katzer (1987 #205) excavated five backhoe trenches at four location across the more continuous faults in the piedmont zone of The Bend area; faults at all four sites were ruptured in 1954. Soil-profile development, tephrachronology, and surficial geology were used to infer a sequence of three surface-faulting events; a pre-Holocene event, a middle to late Holocene event, and the 1954 event; the pre-1954 event is not recognized along the range-front zone (Bell and Katzer, 1987 #205). Site 1687-1 in northern piedmont zone: Bell and Katzer (1987 #205) excavated a backhoe trench (their trench 3) across a 3-m-high scarp marking main piedmont fault that continues north and bounds east front of Stillwater Range. Trench exposed late Quaternary alluvial fan and beach gravel, form below highstand of pluvial Lake Dixie (<12 ka), displaced by two shear zones, one of which had 1954 movement that added about 60 cm to height	Section consists predominately of historical scarps that prominently mark range-front faults bounding eastern front of Stillwater Range and distributed scarps on subparallel to left-stepping echelon piedmont and intra basin faults in western Dixie Valley (Slemmons, 1957 #154; Bell, 1981 #2875; 1984 #105; Wallace and Whitney, 1984 #167; Bell and Katzer, 1987 #205; John, 1995 #3713; Caskey, 1996 #2437; Caskey and others, 1996 #2439). Bell and Katzer (1987 #205) referred to these as the "range-front" and "piedmont" fault zone, respectively. The 1954 scarps are nearly continuous, and commonly ruptured preexisting scarps, along range-front fault zone from east of mouth of Mississippi Canyon southeast to east of Wood Canyon, where fault continues into western part of Dixie Valley as an intra basin fault along east margin of the piedmont fault zone. The 1954 scarps commonly bound extensive narrow graben in upper piedmont-slope deposits adjacent to sinuous range front in The Bend area, nearly continuously from near mouth of Silver Hill Canyon southward to near mouth of East Lee Canyon, and along a short section of range front at Slaughter Canyon to north of Elevenmile Canyon Valley (Slemmons, 1957 #154; Bell, 1981 #2875; 1984 #105; Wallace	Holocene; late Pleistocene; middle to late Quaternary. There is general agreement that Holocene, as young as post-Mazama (6845±50 yr), and late Pleistocene piedmont-slope deposits are faulted in this section, primarily along piedmont and intra basin faults in The Bend area (e.g., Slemmons, 1957 #154; Bell and Katzer, 1987 #205; 1990 #111; Caskey, 1996 #2437). Bell and Katzer (1987 #205) reported that older colluvial deposits are commonly faulted at range front, and that middle to late Quaternary alluvial-fan deposits (about 200 ka to 400500 ka) are apparently offset 15–18 m at range front, with about 3 m of offset occurring in 1954, and are offset 21 to 23 m in piedmont fault zone, with less than a meter occurred in 1954. Wallace and Whitney (1984 #167) reported Holocene scarps on piedmont faults and much older scarps at range front in The Bend area.	Dixie Valley earthquake 1954	latest Quaternary (<15 ka)	Bell and Katzer (1987 #205) reported generally steep dips (60–70° E.) for the range-front faults. Caskey (1996 #2437) and Caskey and others (1996 #2439) reported several dip measurements made along range-front faults: north of mouth of Hare Canyon, fault exposed in excavation dips of 55°E and steepens to 80° E. near the surface (presumably in alluvial deposits) and, to the north, an exhumed bedrock fault surface dips 38° E.; south of the mouth of James Canyon, relation of fault trace to range-front topography suggests that the fault may dip <30° E.; at mouth of East Job Canyon, fault in alluvium is well exposed in channel bank dipping 45°–50° E.; at mouth of Little Box Canyon, 1954 rupture	Thomas L. Sawyer, Piedmont Geosciences, Inc. R. Ernest Anderson, U.S. Geological Survey, Emeritus	#2852 Anderson, R.E., Zoback, M.L., and Thompson, G.A., 1983, Implications of selected subsurface data on the structural form and evolution of some basins in the northern Basin and Range province, Nevada and Utah: Geological Society of America Bulletin, v. 94, p. 1055-1072. #2875 Bell, J.W., 1981, Quaternary fault map of the Reno 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-982, 62 p., http://pubs.er.usgs.gov/publication/ofr81982. #105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #205 Bell, J.W., and Katzer, T., 1987, Surficial geology, hydrology, and late Quarternary tectonics of the IXL Canyon area, Nevada as related to the 1954 Dixie Valley earthquake: Nevada Bureau of Mines and Geology Bulletin 102, 52 p., 2 pls. #111 Bell, J.W., and Katzer, T., 1990, Timing of late Quaternary faulting in the 1954 Dixie Valley earthquake area, central Nevada: Geology, v. 18, p. 622-625. #4330 Bell, J.W., and Ramelli, A.R., 1999, Paleoseismic studies in the Central Nevada Seismic Belt: Technical report to U.S. Geological Survey,	Recurrence interval: >3.4 ka (<12 ka); 15–50 ka (<200 ka). Bell and Katzer (1987 #205) reported a Holocene recurrence interval for the piedmont zone may be as short as 3.4 ka based on two events post-Mazama ash (6845±50 yr) at site 1687b-2 (Bell and Katzer, 1987 #205). However, the mid to late Quaternary recurrence intervals may be as much as an order of magnitude longer; 15–50 ka based on analysis of displaced surficial deposits and deposits encountered in exploratory boreholes and trenches. Slip-rate category: Between 0.2 and 1.0 mm/yr. A variety of vertical displacement rates have been calculated or estimated for locations along this fault, all of which suggest that the vertical displacement rate that best characterizes the fault is less than 0.5 mm/yr. Bell and Katzer (1990 #111) reported a Holocene vertical slip rate of 0.2–0.5 mm/yr, with the higher rate based on 6 m of total offset of shoreline deposits (12 ka). Bell and Katzer (1987 #205) estimated a mid to late Quaternary vertical slip rate of 0.02 mm/yr for both the range-front and piedmont zones. The Holocene rate for piedmont zone alone is 0.1 mm/yr (Bell and Katzer,
DVTA	Eastern Dixie Valley Fault Zone		This discontinuous, northeast-striking fault zone consists of faults that place bedrock against Pleistocene piedmont-slope deposits and faults that form scarps on piedmont-slope deposits as young as late Quaternary age. Although there appears to be abundant evidence for Quaternary movement along the fault zone, estimates of offsets along individual fault strands or along the entire zone have not been reported. Basal fault facets are absent along the range-front adjacent to this fault zone and the absence of basal fault facets suggests relatively low Quaternary slip rates. The fault zone has not been studied in detail. The principal sources of data include geologic mapping, reconnaissance photogeologic mapping, and reconnaissance geomorphic study of fault scarps.	The unnamed northern section refers to faults mapped by Willden and Speed (1968 #4370; 1974 #3645) and Dohrenwend and others (1992 #283) along parts of the western flanks of the southern Augusta and northern Clan Alpine Mountains, and refers to the northern part of the Eastern Dixie Valley fault zone as shown by dePolo (1998 #2845). Section extends from just south of 40? 00' latitude, along the Augusta Mountains, southwest to about Shoshone Creek, along the Clan Alpine Mountains. Fault ID: Refers to fault MI1 of dePolo (1998 #2845).	Good	1:100,000 scale	This northeast-striking zone of faults consists of two groups of faults along the western flanks of the Augusta and Clan Alpine Mountains. These mountain ranges expose bedrock that consists mainly of Tertiary volcanic and volcaniclastic rocks (Willden and Speed, 1968 #4370; 1974 #3645). Some faults of the zone place Tertiary bedrock of the mountain ranges against Pleistocene surficial deposits of the adjacent Dixie Valley, but apparently do not have the geomorphic expression of range-front faults (Dohrenwend and others, 1992 #283). Those faults that involve bedrock, as well as several west-facing scarps on Pleistocene, piedmont-slope deposits, consistently indicate down-to-the-west offsets that probably reflect continued Quaternary uplift of the mountain ranges relative to the adjacent northern part of the Dixie Valley. Although there appears to be abundant evidence for Quaternary movement along the fault zone, estimates of offsets along individual faults or along the	38 km	N24°E	Normal	Not specifically reported, however, west-facing scarps on piedmont deposits, as well as down-to-the-west bedrock faults, consistently indicate down-to-the-west fault offsets, which in this extensional regime probably reflects principally normal, dip-slip movement along west-dipping faults.	NE		Faults define a zone of deformation along parts of the western flanks of the Augusta and Clan Alpine Mountains and the adjacent eastern piedmont slope of the Dixie Valley. Locally the fault juxtaposes Pleistocene piedmont-slope deposits against Tertiary bedrock and by scarps and some linear features developed on Pleistocene piedmont-slope deposits (Willden and Speed, 1968 #4370; 1974 #3645; Dohrenwend and others, 1992 #283). The range-fronts show a gentle topographic transition with the piedmont-slope of the Dixie Valley and, according to mapping by Dohrenwend and others (1992 #283), none of the faults show the topographic expression typical of range-front faults. dePolo (1998 #2845) reported that basal fault facets are absent along the range-front adjacent to this fault zone, and he related the absence of basal fault facets to relatively low Quaternary slip rates.	Dohrenwend and others (1992 #283) assigned a late Quaternary age to faulted surficial deposits along this section of the fault zone.		late Quaternary (<130 ka)	Although the timing of the most recent prehistoric faulting event is not well constrained, Dohrenwend and others (1992 #283) suggest a late Pleistocene (10-130 ka) time, based on faulted surficial deposits along this section of the fault zone.	David J. Lidke, U.S. Geological Survey	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1171&section_id= #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. #283 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Millett 1° by 2° quadrangle, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2176, 1 sheet, scale 1:250,000. #4370 Willden, R., and Speed, R.C., 1968, Geology and mineral deposits of Churchill County, Nevada: U.S. Geological Survey Open-File Report 68-329, 3 sheets, scale 1:200,000. #3645 Willden, R., and Speed, R.C., 1974, Geology and mineral deposits of Churchill County, Nevada: Nevada Bureau of Mines and Geology Bulletin 83, 95 p.	Slip-rate category: Less than 0.2 mm/yr. No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.01 mm/yr for the fault based on the presence of scarps on alluvium and the absence of basal facets. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) support a low slip rate. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.

Proposed Withdrawal Area	Fault Zone Name	Fault Name	Description	Name Comments	Reliability of Location	Compiled at:	Geologic Setting	Length	Average Strike	Sense of Movement	Comments	Dip Direction	Paleoseismic Studies	Geomorphic Expression	Age of faulted surficial deposits	Historic Earthquake	Most recent prehistoric deformation	Comments	Compilers	References	Miscellaneous
DVTA		Unnamed fault in eastern Dixie Valley	This distributed group has short range-front faults bounding east front of Clan Alpine Mountains and piedmont faults extending from north end of Louderback Mountains into eastern Dixie Valley; southwestern piedmont fault had as much as 0.2 m vertical displacement in 1954 Fairview Peak-Dixie Valley earthquakes. Reconnaissance and detailed photogeologic mapping of the faults and a few scarp measurements are the sources of data. Trench investigations and detailed studies of scarp morphology have not been conducted.	Refers to faults mapped by Bell (1984 #105), Greene and others (1991 #3487), Caskey (1996 #2437), and Caskey and others (1996 #2439) extending from north end of the Louderback Mountains into eastern Dixie Valley and along west side of Clan Alpine Mountains.	Good	1:100,000 scale	This distributed group has short range-front faults bounding east front Clan Alpine Mountains and piedmont faults extending from north end of Louderback Mountains into eastern Dixie Valley (Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439); southwestern piedmont fault had as much as 0.2 m vertical displacement in 1954 Fairview Peak-Dixie Valley earthquakes (e.g., Caskey, 1996 #2437). The 1954 rupture pattern suggests that this fault is related to the Gold King fault [1691], Louderback Mountains fault [1689], the West Gate fault [1692], and southern part of the Dixie Valley fault zone [1687b].	12 km	N19°E	Normal	Fault locations are based on 1:250,000-scale map of Bell (1984 #105). Mapping is from photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale aerial photography of selected areas, several low-altitude aerial reconnaissance flights, and field reconnaissance of major structural and stratigraphic relationships. Southwestern piedmont fault trace is from 1:48,000-scale map of Caskey (1996 #2437; reproduced in Caskey and others, 1996 #2439). Mapping based on detailed photogeologic analysis of 1:10,000- to 1:12,000-scale vertical, low-sun-angle aerial photography, transferred by inspection to 1:24,000-scale mylar orthophotos and directly to 1:24,000-scale topographic maps, that were then reduced to 1:48,000-scale; mapping also based on detailed field mapping and numerous measurements of fault offsets along fault. Not studied in detail; sense of movement from displacement measurements of Caskey (1996 #2437) and inferred from topography.	W		Piedmont faults are expressed as scarps; one west-facing scarp extends for about 2 km and its southern part was uplifted 0.2 m or less in 1954. Range-front faults are expressed as topographic lineaments coinciding with Quaternary alluvium-bedrock contacts that, at least locally, are mapped as fault contacts (Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439).	Quaternary; Tertiary. Undifferentiated Quaternary piedmont-slope deposits are faulted along piedmont faults and are locally juxtaposed against Tertiary bedrock along range-front faults (Bell, 1984 #105; Greene and others, 1991 #3487).	Fairview Peak earthquake 1954 Dixie Valley earthquake 1954	undifferentiated Quaternary (<1.6 Ma)	Although timing of most recent paleoevent is not well constrained, a Quaternary time is suggested based on mapping of Bell (1984 #105), Caskey (1996 #2437), Caskey and others (1996 #2439), Greene and others (1991 #3487), and Dohrenwend and others (1996 #2846).	Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1688&section_id= #105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #2437 Caskey, S.J., 1996, Surface faulting, static stress changes, and earthquake triggering during the 1954 Fairview Peak (M (sub s) = 7.2) and Dixie Valley (M (sub s) = 6.8) earthquakes, central Nevada: Reno, University of Nevada, Mackay School of Mines, unpublished Ph.D. dissertation, 144 p. #2439 Caskey, S.J., Wesnousky, S.G., Zhang, P., and Slemmons, D.B., 1996, Surface faulting of the 1954 Fairview Peak (Ms 7.2) and Dixie Valley (Ms 6.8) earthquakes, central Nevada: Bulletin of the Seismological Society of America, v. 86, no. 3, p. 761-787. #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.,	Slip-rate category: Less than 0.2 mm/yr. A low slip rate is inferred from general knowledge of slip rates estimated for other faults in the region and low height of topographic lineaments on Tertiary rocks.
DVTA	Middlegate fault zone		This north-striking, narrow zone of faults is mainly characterized by a relatively continuous fault that places bedrock of the Clan Alpine Mountains against Quaternary piedmont deposits of the Bench Creek Valley. Scarps are locally present along the range front fault, but they are sparse, generally poorly preserved, and discontinuous. The few scarps that are present are west-facing features that imply down-to-the-west offset along the fault zone. The fault zone is mapped as a relatively continuous major, down-to-the-west, range front fault. There is evidence for at least one Quaternary faulting event that is no older than late Pleistocene and the most recent faulting event might be as young as Holocene. However, the fault zone has not been studied in detail and little is actually known with certainty about its nature, character, and movement history. The principal sources of data consist of geologic mapping, reconnaissance photogeologic mapping, morphologic dating of fault scarps, and reconnaissance geomorphic study of fault scarps and basal fault facets.	Refers to faults mapped by Willden and Speed (1968 #4370; 1974 #3645) and Dohrenwend and others (1992 #283) along the western side of a north-trending, spur-like ridge that extends south from the southeastern end of the Clan Alpine Mountains. Pearthree (1990 #148) portrayed and referred to these faults as the Middlegate fault zone. dePolo (1998 #2845) later called this fault Clan Alpine Mountains fault. The earlier name is used herein. The fault zone extends from about 6 km north of the head of Bench Creek (nearly at the crest of the Clan Alpine Mountains) south along the east side of Bench Creek to a point about 7 km south of the town of Middlegate. Fault ID: Refers to fault that dePolo (1998 #2845) portrayed and labeled MI2 (Clan Alpine Mountains fault).	Good	1:250,000 scale	This north-striking, relatively narrow fault zone is principally a range front fault that occupies the shared eastern flank of the valley of Bench Creek and the western flank of a prominent south-trending spur (ridge) of the Clan Alpine Mountains. The range front fault shows down-to-the-west stratigraphic relations and places Tertiary bedrock of the Clan Alpine Mountains against Quaternary piedmont-slope deposits along the east margin of the Bench Creek valley (Willden and Speed, 1968 #4370; 1974 #3645; Dohrenwend and others, 1992 #283). Scarps are sparse and poorly preserved but consistently face west (Pearthree, 1990 #148; Dohrenwend and others, 1992 #283). Stratigraphic relations across the range front fault as well as the west-facing direction of the scarps imply mostly down-to-the-west Quaternary offset along the fault zone that probably reflects some continued Quaternary uplift of the Clan Alpine Mountains relative to adjacent valley areas. These faults are subparallel to, but west	37 km	N34°E	Normal	Location is from 1:250,000-scale map of Dohrenwend and others (1992 #283) that shows mapping based on photogeologic analysis of 1:58,000-nominal-scale, color-infrared photography which was transferred directly to 1:100,000-scale topographic maps enlarged to the scale of the photographs. The 1:100,000-scale fault maps were reduced and compiled at 1:250,000-scale for final publication. Not specifically reported; however, the down-to-west range front fault and the west-facing scarps consistently indicate down-to-the-west offsets, which in this extensional regime probably reflect principally normal, dip-slip movement along west-dipping faults.	W		Fault zone is expressed mostly by a relatively continuous, down-to-the-west, range-front fault and by a few poorly expressed, preserved, and west-facing scarps (Pearthree, 1990 #148; Dohrenwend and others, 1992 #283). dePolo (1998 #2845) reported basal fault facets with a preferred maximum height of 207 m (183–232 m).	Based on reconnaissance photogeologic mapping, Dohrenwend and others (1992 #283) assigned ages as young as late Pleistocene to faulted Quaternary deposits at a few localities along the fault zone.		late Quaternary (<130 ka)	The timing of the most recent prehistoric faulting event appears to be relatively well constrained by relative dating methods. Reconnaissance photogeologic mapping by Dohrenwend and others (1992 #283) indicates that the most recent prehistoric faulting event is no older than late Pleistocene (<130 ka) in age. Pearthree (1990 #148) reported Holocene to late Pleistocene scarp age estimates (3–22 ka) based on morphologic dating analysis of a few scarp profiles that were measured across a scarp on alluvium north of the town of Middlegate.	David J. Lidke, U.S. Geological Survey	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1187&section_id= #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. #283 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Millett 1° by 2° quadrangle, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2176, 1 sheet, scale 1:250,000. #148 Pearthree, P.A., 1990, Geomorphic analysis of young faulting and fault behavior in central Nevada: Tucson, University of Arizona, unpublished Ph.D. dissertation, 212 p. #4370 Willden, R., and Speed, R.C., 1968, Geology and mineral deposits of Churchill County, Nevada: U.S. Geological Survey Open-File Report 68-329, 3 sheets, scale 1:200,000. #3645 Willden, R., and Speed, R.C., 1974, Geology and mineral deposits of Churchill County, Nevada: Nevada Bureau of Mines and Geology Bulletin 83, 95 p.	Slip-rate category: Less than 0.2 mm/yr. No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.389 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived slip rate reflects a long-term average. However, late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggest the slip rate during this period is of a lesser magnitude. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
DVTA		West Gate Fault	This curvilinear range-front fault is nearly continuous along western escarpment of Clan Alpine Mountains from east of about Queen Peak south beyond end of range and continues along eastern margin of Stingaree Valley, to about 4 km south of U.S. Highway 50. Stingaree Valley appears to be a half-graben related to apparent eastward tilting and downfaulting of Louderback Mountains along the West Gate fault. The rupture pattern produced by the 1954 Fairview Peak-Dixie Valley earthquakes suggests that this fault is related to other faults in the area. The southern part of the fault ruptured in 1954 from south of the highway north to north-northeast of Chalk Mountain and ruptured along west flank of Twin Peaks. Scarps produced in 1954 generally are west-facing, follow the alluvial-bedrock contact, and represent as much as 1.1 m and 0.5 m of vertical separation along the southern and northern rupture zones, respectively. Along the southern part of the 1954 rupture, scarps form a left-stepping echelon pattern and stream channels are right-laterally offset up to 1.2 m. The pre-1954 range-front fault is expressed as a topographic lineament coinciding with abrupt alluvial-bedrock contact that may represent a fault-line scarp. Reconnaissance and detailed photogeologic mapping of the fault and detailed studies of fault offsets are the sources of data. Trench investigations and detailed studies of scarp morphology have not been completed.	Refers to faults mapped by Slemmons (1957 #154; 1968, unpublished Reno 1:250,000-scale map), Slemmons and others (1959 #155), Bell (1984 #105), Greene and others (1991 #3487), Caskey (1996 #2437), and Caskey and others (1996 #2439) along west side of Clan Alpine Mountains. Slemmons and others (1957 #154) referred to it as the Westgate (sic) fault zone evidently named after the settlement of West Gate; Doser (1986 #125), Caskey and Wesnousky (1993 #2442), Caskey (1996 #2437), Caskey and others (1996 #2439), and Hodgkinson and others (1996 #2493) referred to it as the West Gate fault. dePolo (1998 #2845) referred to it as the Stingaree Valley fault. The West Gate name appears in several recent publications, thus, it is used herein. Refers to fault number R35 (Stingaree	Good	1:100,000 scale	This curvilinear range-front fault is nearly continuous along western escarpment of Clan Alpine Mountains from east of about Queen Peak south beyond end of range and continues along eastern margin of Stingaree Valley, to about 4 km south of U.S. Highway 50 (Slemmons, 1957 #154, 1968, unpublished Reno 1:250,000-scale map; Slemmons and others, 1959 #155; Bell, 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439). Stingaree Valley appears to be a half-graben related to apparent eastward tilting and downfaulting of Louderback Mountains along the West Gate fault (Caskey, 1996 #2437). The rupture pattern produced by the 1954 Fairview Peak-Dixie Valley earthquakes suggests that this fault is related the Louderback Mountains fault [1689], Gold King fault [1691], Dixie Valley fault zone [1687], and Fairview fault zone [1690].	23 km	N8°E	Normal	Fault locations are primarily based on 1:48,000-scale map of Caskey (1996 #2437) (reproduced in Caskey and others, 1996 #2439). Mapping based on detailed photogeologic analysis of 1:10,000- to 1:12,000-scale vertical, low-sun-angle aerial photography, transferred by inspection to 1:24,000-scale mylar orthophotos and directly to 1:24,000-scale topographic maps, that were then reduced to 1:48,000-scale. Additional mapping based on detailed field mapping and numerous measurements of fault offsets along the fault. Southernmost fault is from 1:250,000-scale map of Bell (1984 #105). dePolo (1998 #2845) reports that the primary long-term sense of movement is normal. However, Caskey (1996 #2437) and Caskey and others, (1996 #2439) report numerous measurements of offsets associated with the 1954 Fairview Peak earthquake. From these measurements they determined that right-lateral movement with a normal component predominated along the southern 1954 rupture zone and that normal movement was exhibited along the northern rupture. Slemmons (1957 #154) also reported dextral and normal offsets associated with the 1954 event.	>15°NW		Scarps produced in 1954 generally are west facing, follow the alluvial-bedrock contact at west front of Clan Alpine Mountains, and represent as much as 1.1 m and 0.5 m of vertical separation along the southern and northern rupture zones, respectively. Along the southern part of the 1954 rupture , scarps form a left-stepping echelon pattern and stream channels are right-laterally offset up to 1.2 m. (Slemmons, 1957 #154; Bell, 1981 #2875; Caskey, 1996 #2437; Caskey and others, 1996 #2439). According to Caskey (1996 #2437), the 1954 ruptures documented by Slemmons (1957 #154) near Highway 50 are no longer visible. Northernmost part of fault is expressed by topographic lineament coinciding with abrupt alluvial-bedrock contact (Bell, 1981 #2875; 1984 #105), which may be fault-line scarp (Caskey, 1996 #2437). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 110 m (85–134 m).	Quaternary. Bell (1984 #105) and Greene and others (1991 #3487) mapped faults that displace undifferentiated Quaternary piedmont-slope deposits along west front of Clan Alpine Mountains and in eastern Stingaree Valley.	Fairview Peak earthquake 1954	undifferentiated Quaternary (<1.6 Ma)	Caskey (1996 #2437) and Caskey and others (1996 #2439) reported that one of the 1954 ruptures may dies out near south end of Clan Alpine Mountains in a fault dipping >15° NW. presumably at the alluvial-bedrock contact. Although timing of most recent paleoevent is not well constrained, a Quaternary time is suggested based on mapping of Bell (1984 #105), Greene and others (1991 #3487).	Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1692&section_id= #2875 Bell, J.W., 1981, Quaternary fault map of the Reno 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-982, 62 p., http://pubs.er.usgs.gov/publication/ofr81982. #105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #2437 Caskey, S.J., 1996, Surface faulting, static stress changes, and earthquake triggering during the 1954 Fairview Peak (M (sub s) = 7.2) and Dixie Valley (M (sub s) = 6.8) earthquakes, central Nevada: Reno, University of Nevada, Mackay School of Mines, unpublished Ph.D. dissertation, 144 p. #2442 Caskey, S.J., Wesnousky, S.G., Zhang, P., and Slemmons, D.B., 1993, Reinvestigation of fault trace complexity and slip distribution for the 16 December 1954 Fairview Peak (Ms = 7.2) and Dixie Valley (Ms = 6.8) earthquakes, central Nevada: Geological Society of America Abstracts with Programs, v. 25, no. 5, p. 19. #2439 Caskey, S.J., Wesnousky, S.G., Zhang, P., and	Slip-rate category: Less than 0.2 mm/yr. No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical displacement rate of 0.214 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived slip rate reflects a long-term maximum. However, little evidence suggests that the fault ruptured in the latest Quaternary prior to 1954. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.

Proposed Withdrawal Area	Fault Zone Name	Fault Name	Description	Name Comments	Reliability of Location	Compiled at:	Geologic Setting	Length	Average Strike	Sense of Movement	Comments	Dip Direction	Paleoseismic Studies	Geomorphic Expression	Age of faulted surficial deposits	Historic Earthquake	Most recent prehistoric deformation	Comments	Compilers	References	Miscellaneous
DVTA		Gold King fault	This short, continuous fault primarily coincides with a preexisting fault in Tertiary bedrock in Louderback Mountains from west of Crown Peak northward to northwest of Geiger Gap, near north end of range. This fault is suspected to have ruptured during the 1903(?) Wonder, Nevada, earthquake and much of fault clearly ruptured during the 1954 Dixie Valley-Fairview Peak earthquakes; hence, this is one of only a few examples of a fault that has ruptured more than once during the historical period on a worldwide basis. The 1903(?) surface ruptures were marked in 1911 by fissures 0.9 to 1.5 m wide, particularly in alluvium, and open to depths of 1.5 m. The 1954 ruptures are expressed as graben 1.2 m wide bounded by 0.3- to 0.6-m-high scarps that locally exhibited free faces and as gentle furrows. Reconnaissance and detailed photogeologic mapping of the fault and detailed studies of fault offsets are the sources of data. Trench investigations and detailed studies of scarp morphology have not been completed.	Refers to faults mapped by Schrader (1911, as cited by Slemmons, 1959 #157), Schrader (circa 1930, as cited by Slemmons, 1957 #154, p. 356), Slemmons (1957 #154, 1968, unpublished Reno 1° x 2° sheet; 1959 #155), Bell (1984 #105), Greene and others (1991 #3487), Caskey (1996 #2437), and Caskey and others (1996 #2439) within the Louderback Mountains from west of Crown Peak northward to northwest of Geiger Gap, near north end of range. Known as the Gold King fault (Bell, 1981 #2875; 1984 #105; Caskey and others, 1996 #2439); Schrader (1911, as cited by Slemmons, 1959 #157) named it "the 1903 Gold King fault" and "the 1954 Gold King fault" in reference to the Gold King group of mining claims (in Slemmons and others, 1959 #155, p 252, footnote 4) and reasonably in reference to	Good	1:100,000 scale	This short continuous fault primarily coincides with a preexisting fault in Tertiary bedrock in Louderback Mountains from west of Crown Peak northward to northwest of Geiger Gap, near north end of range. This fault is suspected to have ruptured during the 1903(?) Wonder, Nevada, earthquake and much of fault clearly ruptured during the 1954 Fairview Peak-Dixie Valley earthquakes. The 1954 rupture pattern suggests that this fault is related to the West Gate fault [1692], Dixie Valley fault [1687], and Fairview fault [1690] (Caskey, 1996 #2437).	9 km	N12°E	Right lateral	Caskey (1996 #2437) and Caskey and others, (1996 #2439) report numerous measurements of offsets associated with the 1954 Fairview Peak earthquake. From these measurements they determined that right-lateral motion with a normal component predominated and along two sections of the fault the normal component reverses, suggesting primarily strike-slip motion. Lateral offset could not be confidently identified along northern two faults. Slemmons (1957 #154) generally reported normal displacement with little or no lateral movement related to the 1954 earthquake. Slemmons and others (1959 #155) reported a 60?NW-dipping fault apparently near Camelback Peak on bedrock. Caskey (1996 #2437) and Caskey and others (1996 #2439) infer an approximately 60?W-dipping fault southwest of Driscoll Peak based on the relation of 1954-fault trace to topography.	60°NW; 60°W		Bell (1981 #2875), Caskey (1996 #2437) and Caskey and others (1996 #2439) reported that most faults are spectacularly well-defined as west-facing scarps averaging 0.5 to 2.0 km in length on piedmont-slope deposits, that were produced or locally enhanced during the 1954 Fairview Peak earthquake (Ms 7.2). The 1954 ruptures extend the entire length of the fault and in many places produced a distinct left-stepping echelon pattern; westernmost faults from south end of zone to near north end did not ruptured in 1954. The 1954 scarps and other geomorphic features exhibit predominantly right-lateral offset with a normal component that, along two fault reaches, reverses along strike, suggests dominantly lateral slip in 1954. In addition, faults are expressed as abrupt contacts between bedrock and piedmont-slope deposits, right-laterally offset channels and ridge lines, minor graben, and compound paleoscarps (Bell, 1981 #2875; Caskey, 1996 #2437; Caskey and others, 1996 #2439), and asymmetric scarps indicating right-lateral offset in 1954 (Caskey, 1996 #2437, fig. 8).	Quaternary. Bell (1984 #105) and Greene and others (1991 #3487) mapped faults that displace undifferentiated Quaternary piedmont-slope deposits	Wonder earthquake 1903 Fairview Peak earthquake 1954 Dixie Valley earthquake 1954	undifferentiated Quaternary (<1.6 Ma)	Although timing of most recent paleoevent is not well constrained, a Quaternary time is suggested based on the mapping of Bell (1984 #105) and Greene and others (1991 #3487).	Thomas L. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1691&section_id= #2875 Bell, J.W., 1981, Quaternary fault map of the Reno 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-982, 62 p., http://pubs.er.usgs.gov/publication/ofr81982. #105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #2437 Caskey, S.J., 1996, Surface faulting, static stress changes, and earthquake triggering during the 1954 Fairview Peak (M (sub s) = 7.2) and Dixie Valley (M (sub s) = 6.8) earthquakes, central Nevada: Reno, University of Nevada, Mackay School of Mines, unpublished Ph.D. dissertation, 144 p. #2439 Caskey, S.J., Wesnousky, S.G., Zhang, P., and Slemmons, D.B., 1996, Surface faulting of the 1954 Fairview Peak (Ms 7.2) and Dixie Valley (Ms 6.8) earthquakes, central Nevada: Bulletin of the Seismological Society of America, v. 86, no. 3, p. 761-787. #3487 Greene, R.C., Stewart, J.H., John, D.A., Hardyman, R.F., Silberling, N.J., and Sorensen,	Slip-rate category: Less than 0.2 mm/yr. Not studied in detail. A low slip rate is inferred from general knowledge of slip rates estimated for other faults in the region.
DVTA		Louderback Mountains fault	This short, nearly continuous zone has piedmont faults bordering southeast side of southern Dixie Valley from near north end of Chalk Mountain across western piedmont slope of Louderback Mountains to northwest of Pirouette Mountain, and has range-front fault locally bounding southwest front of mountains; Louderback Mountains appear to be tilted eastward and down faulted against Clan Alpine Mountains forming a half-graben (Stingaree Valley). The 1954 Fairview Peak-Dixie Valley earthquakes rupture pattern suggests that this fault is related to the West Gate fault [1692], Gold King fault [1691], Dixie Valley fault [1687], and Fairview fault [1690], which it's south end is separated from by a 100-m-wide right stepover. Most faults are marked by well defined scarps on piedmont-slope deposits, locally exhibiting distinct left-stepping echelon patterns, that were produced or enhanced during the 1954 earthquakes. Near Chalk Mountain some of the lowest 1954 scarps are no longer obvious due to scarp degradation. These ruptures extended the entire length of this fault and exhibited predominantly right-lateral motion with a normal component that, along two faults, reverses along strike suggesting dominantly lateral slip. Westernmost faults from south end of zone to near north end did not ruptured in 1954. In addition, faults are expressed as abrupt contacts between bedrock and piedmont-slope deposits, right-laterally offset channels and ridge lines, asymmetric scarps indicating right-lateral offset in 1954, minor graben, and	Refers to faults mapped by Slemmons (1968, unpublished Reno 1? X 2? sheet), Bell (1984 #105), Greene and others (1991 #3487), John (1995 #3713), Caskey (1996 #2437), and Caskey and others (1996 #2439) along southeast side of southern Dixie Valley and locally along southwest sides of Louderback Mountains; commonly referred to as the Louderback Mountains fault (e.g., Caskey and others, 1996 #2439). County(s) and State(s) CHURCHILL COUNTY, NEVADA	Good	1:100,000 scale	This short nearly continuous zone consists of piedmont bordering southeast side of southern Dixie Valley from near north end of Chalk Mountain across western piedmont slope of Louderback Mountains to northwest of Pirouette Mountain and range-front fault locally bounding southwest front of mountains (Slemmons, 1968, unpublished Reno 1?x2? sheet, Bell, 1981 #2875; 1984 #105; Greene and others, 1991 #3487; Caskey, 1996 #2437; Caskey and others, 1996 #2439); Louderback Mountains appear to be tilted eastward and down faulted against Clan Alpine Mountains forming a half-graben (Stingaree Valley) (Caskey, 1996 #2437). The 1954 Fairview Peak-Dixie Valley earthquakes rupture pattern suggests that this fault related to the West Gate fault [1692], Gold King fault [1691], Dixie Valley fault [1687], and Fairview fault [1690], which it's south end is separated from by a 100-m-wide right stepover (Caskey, 1996 #2437).	14 km	N2°W	Right lateral	Fault locations are predominantly based on 1:48,000-scale map of Caskey (1996 #2437; reproduced in Caskey and others, 1996 #2439). Mapping based on detailed photogeologic analysis of 1:10,000- to 1:12,000-scale vertical, low-sun-angle aerial photography, transferred by inspection to 1:24,000-scale mylar orthophotos and directly to 1:24,000-scale topographic maps, that were then reduced to 1:48,000-scale; mapping also based on detailed field mapping and numerous measurements of fault offsets along the fault. One fault trace north of Chalk Mountain is based on 1:250,000-scale map of Bell (1984 #105). Caskey (1996 #2437) and Caskey and others, (1996 #2439) make numerous measurements of offsets associated with the 1954 Fairview Peak earthquake. From these measurements they determined that right-lateral motion with a normal component predominated and along two sections of the fault the normal component reverses, suggesting primarily strike-slip motion. Lateral offset could not be confidently identified along northern two faults.	70° W		Bell (1981 #2875), Caskey (1996 #2437) and Caskey and others (1996 #2439) reported that most faults are spectacularly well defined as west-facing scarps averaging 0.5 to 2.0 km in length on piedmont-slope deposits, that were produced or locally enhanced during the 1954 Fairview Peak-Dixie Valley earthquakes. The 1954 ruptures extend the entire length of the fault and in many places produced a distinct left-stepping echelon pattern; westernmost faults from south end of zone to near north end did not ruptured in 1954. The 1954 scarps and other geomorphic features exhibit predominantly right-lateral offset with a normal component that, along two sections, reverses along strike, suggests dominantly lateral slip in 1954. Some of the lowest 1954 scarps near Chalk Mountain are no longer visible due to scarp degradation (Bell, 1981 #2875). In addition, faults are expressed as abrupt contacts between bedrock and piedmont-slope deposits, right-laterally offset channels and ridge lines, minor graben, and compound paleoscarps (Bell, 1981 #2875; Caskey, 1996 #2437; Caskey and others, 1996 #2439), and asymmetric scarps indicating right-lateral offset in 1954 (Caskey, 1996 #2437, e.g., fig. 8).	Quaternary. Bell (1984 #105), Greene and others (1991 #3487), and John (1995 #3713) mapped faults that displace undifferentiated Quaternary piedmont-slope deposits.	Fairview Peak earthquake 1954 Dixie Valley earthquake 1954	undifferentiated Quaternary (<1.6 Ma)	Caskey (1996 #2437) and Caskey and others (1996 #2439) reported one of the most continuous faults in the zone dips 70? W at alluvial-bedrock contact near south end of Louderback Mountains. Although timing of most recent paleoevent is not well-constrained, a Quaternary time is suggested based on mapping of Bell (1984 #105), Greene and others (1991 #3487), and John (1995 #3713).		https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1689&section_id= #2875 Bell, J.W., 1981, Quaternary fault map of the Reno 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-982, 62 p., http://pubs.er.usgs.gov/publication/ofr81982. #105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #2437 Caskey, S.J., 1996, Surface faulting, static stress changes, and earthquake triggering during the 1954 Fairview Peak (M (sub s) = 7.2) and Dixie Valley (M (sub s) = 6.8) earthquakes, central Nevada: Reno, University of Nevada, Mackay School of Mines, unpublished Ph.D. dissertation, 144 p. #2439 Caskey, S.J., Wesnousky, S.G., Zhang, P., and Slemmons, D.B., 1996, Surface faulting of the 1954 Fairview Peak (Ms 7.2) and Dixie Valley (Ms 6.8) earthquakes, central Nevada: Bulletin of the Seismological Society of America, v. 86, no. 3, p. 761-787. #3487 Greene, R.C., Stewart, J.H., John, D.A., Hardyman, R.F., Silberling, N.J., and Sorensen,	Slip-rate category Less than 0.2 mm/yr. Not studied in detail. A low slip rate is inferred from general knowledge of slip rates estimated for other faults in the region.
DVTA		Western Sand Springs Range faults	This relatively short zone has range-front faults discontinuously bounding west front of Sand Springs Range and piedmont faults extending from west of Big Kasock Mountain north to southeast end of Cocoon Mountains. Reconnaissance photogeologic mapping of the fault zone and regional geologic mapping are the sources of data. Trench investigations and detailed studies of scarp morphology have not been conducted.	Refers to faults mapped by Slemmons (1968, unpublished Reno 1? X 2? sheet), Bell (1984 #105), and Greene and others (1991 #3487) on west of Sand Springs Range and on north side of Black Eagle Hill. dePolo (1998 #2845) referred to them as the Western Sand Springs Range faults. Refers to fault numbers R31A and R31B (Western Sand Springs Range faults) of dePolo (1998 #2845). County(s) and State(s) CHURCHILL COUNTY, NEVADA, MINERAL COUNTY, NEVADA	Good	1:100,000 scale	This relatively short zone has range-front faults discontinuously bounding west front of Sand Springs Range and piedmont faults extending from west of Big Kasock Mountain north to southeast end of Cocoon Mountains (Slemmons, 1969, unpublished Reno 1? X 2? sheet; Bell, 1984 #105; Greene and others, 1991 #3487).	22 km	N3°E	Normal	Fault locations are based on 1:250,000-scale maps of Bell (1984 #105) and Slemmons (1968, unpublished Reno 1? X 2? sheet). Mapping by Bell (1984 #105) is from photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale aerial photography of selected areas, several low-altitude aerial reconnaissance flights, and field reconnaissance of major structural and stratigraphic relationships. Mapping by Slemmons (1968, unpublished Reno 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. Not studied in detail; sense of movement is inferred from topography.	W; SE		Range-front faults juxtapose Quaternary piedmont-slope deposits against bedrock and are expressed as abrupt front of Sand Springs Range. dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 183 m (158-207 m). Piedmont faults appear to be expressed as minor west-facing scarps on piedmont-slope deposits (Bell, 1984 #105; Greene and others, 1991 #3487).	Quaternary. Range-front faults juxtapose Quaternary piedmont-slope deposits against bedrock and piedmont faults displace Quaternary deposits (Bell, 1984 #105; Greene and others, 1991 #3487).		undifferentiated Quaternary (<1.6 Ma)	Although timing of most recent event is not well constrained, a Quaternary time is suggested based on mapping by Bell (1984 #105) and Greene and others (1991 #3487), which is consistent with Dohrenwend and others (1996 #2846).	Janet E. Sawyer, Piedmont Geosciences, Inc.	https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1682&section_id= #105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 1 sheet, scale 1:250,000. #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. #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. #3487 Greene, R.C., Stewart, J.H., John, D.A., Hardyman, R.F., Silberling, N.J., and Sorensen, M.L., 1991, Geologic map of the Reno 1° by 2° quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2154-	Slip-rate category Less than 0.2 mm/yr. No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.335 mm/yr for the northern part of the fault and 0.288 for the southern part based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived slip rate reflects a long-term average. However, the late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggest the slip rate during this period is of a lesser magnitude. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.