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Hunter Mountain- Saline Valley fault zone, Hunter Mountain section (Class A) No. 66b

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Synopsis	**General:** Major Holocene active oblique-slip fault zone predominantly characterized by both Holocene dextral strike-slip and normal dip-slip offset (Zellmer, 1980 #1705; Burchfiel and others, 1987 #1454). The fault zone is divided into 2 sections in this compilation: the Saline Valley section [66a] which consists of the Western Frontal, East Side, and Central Valley fault zones of Zellmer (1980 #1705); and the Hunter Mountain section [66b]. Fault zone is delineated by well-defined geomorphic evidence of latest Pleistocene and Holocene dextral strike-slip and normal dip-slip displacement (Zellmer, 1980 #1705). There are no detailed studies for the Hunter Mountain-Saline Valley fault zone. Zellmer (1980 #1705) measured fault scarp profiles along normal dip-slip faults in and bordering the Saline Valley and concluded that these faults exhibited evidence of multiple Holocene surface fault rupturing earthquakes. Burchfiel and others (1987 #1454)

	calculated a minimum average dextral slip rate of 2 mm/yr to 3.2 mm/yr for the Hunter Mountain section [66b]. Zhang and others (1990 #199) calculated a dextral slip rate of 2 mm/yr to 2.7 mm/yr for the Hunter Mountain fault [66b] using a displacement of 9.3 km ? 1.4 km for a 4 Ma basalt (Burchfiel and others, 1987 #1454). Using this same amount of displacement, but assuming that displacement began about 6.1 Ma as suggested by Schweig (1989 #1636), Zhang and others (1990 #199) calculated a minimum dextral slip rate of 1.3 mm/yr to 1.75 mm/yr. **Sections:** This fault has 2 sections.
Name comments	**General:** **Section:** Section name proposed in this compilation. Hunter Mountain section is delineated by the Hunter Mountain fault, a N60? striking fault zone extending west-northwest to near San Lucas Canyon. McAllister (1956 #1571) first mapped, but did not name, the Hunter Mountain fault along the south side of Hunter Mountain. Zellmer (1980 #1705) called this west-northwest zone the Grapevine Canyon fault zone and considered it the northern extension of the Panamint Valley fault zone [67]. Burchfiel and others (1987 #1454) named this zone of faults the Hunter Mountain fault zone. This name has been used most recently by Reheis (1991 #1602), Piety (1995 #915), and Petersen and others (1996 #4860). The Hunter Mountain section extends from its intersection with the Western Frontal fault zone [66a] near Daisy Canyon in Saline Valley east-southeast to the northern Panamint Valley. Reheis (1991 #1602) proposed that the Hunter Mountain-Saline Valley fault extended into northern Panamint Valley and terminated just north of the Wildrose graben [67b]. **Fault ID:** Refers to number 244 (Hunter Mountain fault) of Jennings (1994 #2878) and faults SAL/WF, SAL/CEN, SAL/ES and HM of Piety (1995 #915).
County(s) and State(s)	INYO COUNTY, CALIFORNIA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Locations based on digital revisions to Jennings (1994

	#2878) using original mapping by Zellmer (1980 #1705) at 1:50,000, mapping by Smith (1976 #1646) at 1:24,000, and mapping based on aerial photographic interpretation by Reheis (1991 #1602) at 1:100,000.
Geologic setting	The Hunter Mountain-Saline Valley fault zone is a major Holocene active, complex zone of dextral strike-slip, thrust, dextral-normal, and normal dip-slip faults in the Death Valley Extension Region of southeastern California (Burchfiel and others, 1987 #1454; Zhang and others, 1990 #199). The Panamint Valley-Hunter Mountain-Saline Valley fault system is one of three major fault systems that distribute approximately 8 mm/yr of dextral slip from the Mojave Desert northward to the Walker Lane Belt. The Hunter Mountain fault connects with the Panamint Valley fault zone [67] to the southeast along a complex compressional left step delineated by northeast-dipping Quaternary active thrust faults (Smith, 1976 #1646). Reheis (1991 #1602) suggested that the southern end of the Hunter Mountain fault zone extended into northern Panamint Valley and ended just north of Wildrose graben [67b]. Smith (1976 #1646) and Zellmer (1980 #1705) considered the junction between the Hunter Mountain and Panamint Valley faults [67] to be at the northern end of Panamint Valley south of Hunter Mountain. In this compilation the southern end of the Hunter Mountain fault zone is considered to be delineated by the shallow northeast-dipping thrust fault along the south side of Hunter Mountain mapped by Smith (1976 #1646). South of this point the dextral strike-slip faults in northern Panamint Valley exhibit fault strike and slip partitioning more similar to the Panamint Valley fault zone [67] south of Wildrose Canyon. Dextral slip on the Hunter Mountain fault zone accommodated the opening of Saline Valley and northern Panamint Valley, forming rhombochasms (Oswald and Wesnousky, 1996 #6450). Dixon and others (1995 #3187) suggest that dextral slip is transferred from the Hunter Mountain-Saline Valley fault zone to the Fish Lake Valley fault zone [49] along unnamed north to northeast-striking normal faults north of Saline Valley. Burchfiel and others (1987 #1454) estimated 8 km to 10 km of post-4 Ma dextral displacement and a down to the south dip-slip component of 0-2 km along the Hunter Mountain fault zone, based on an offset contact of the Cretaceous Hunter Mountain batholith. Zellmer (1980 #1705) reported a cumulative vertical displacement (down-to-north) of at least 6 km along the western Hunter Mountain section [66b] near Daisy Canyon.

Length (km)	This section is 42 km of a total fault length of 60 km.
Average strike	N58°W (for section) versus N46°W (for whole fault)
Sense of movement	Right lateral *Comments:* The Hunter Mountain section consists of primarily dextral strike-slip strands along the central part of this section. Dextral-normal and normal displacement characterizes the westernmost part of the section at the west end of Saline Valley near Daisy Canyon (Zellmer, 1980 #1705). The southeastern-most extent of the Hunter Mountain section is delineated by late Quaternary dextral reverse-oblique and thrust faults along the compressional left step delineating the junction between the Hunter Mountain-Saline Valley and northern Panamint Valley [67] fault zones (Smith, 1976 #1646). Reheis (1991 #1602) reported dextral, dextral-normal, and normal slip south and southeast of Hunter Mountain.
Dip	20° *Comments:* The dextral strike-slip faults of the Hunter Mountain fault zone are delineated by linear geomorphic features that indicate predominantly vertical dips. The southern part of the Hunter Mountain section is delineated by a compressional left step where dextral slip is transferred to the northern Panamint Valley fault zone [67a]. Smith (1976 #1646) mapped an east-southeast striking thrust fault that offsets Cretaceous crystalline basement rocks of the Hunter Mountain pluton over Quaternary alluvium. Smith (1976 #1646) reported northeast dips ranging from 11? to 33?NE. Smith (1976 #1646) reported shallow northeast dipping thrust faults along the south side of Hunter Mountain. Slip changes to predominantly dextral strike-slip delineated by linear features and is indicative of near vertical dips.
Paleoseismology studies	
Geomorphic expression	Hunter Mountain section is delineated by moderately to well-defined geomorphic features indicative of latest Pleistocene to Holocene dextral strike-slip displacement, including well-defined scarps in alluvium of probable latest Pleistocene to Holocene age, dextrally deflected drainages in lacustrine deposits, ponded alluvium linear ridges, and linear troughs (Zellmer, 1980 #1705;

	Reheis, 1991 #1602). Traces of the Hunter Mountain section are less well-defined at its southern end where dextral slip continues southeast to the northern Panamint Valley fault zone [67a] across a compressional left step. Here the fault zone is characterized by reverse and thrust faulting and normal faulting delineated by dissected scarps in late Quaternary talus and Cretaceous bedrock (Bryant, 1989 #1459; Reheis, 1991 #1602).
Age of faulted surficial deposits	Strands of the southern-most part of the Hunter Mountain section offset crystalline basement rocks of the Cretaceous Hunter Mountain batholith thrust over Quaternary alluvium at the northern end of Panamint Valley, although more recent (Holocene?) alluvium conceals portions of the fault (Smith, 1976 #1646; Bryant, 1989 #1459). Strands of the Hunter Mountain fault offset all but the youngest alluvium in the southeastern part of Saline Valley west-northwest of Grapevine Canyon (Zellmer, 1980 #1705).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* The geomorphic expression of traces of the Hunter Mountain section along the south side of Saline Valley indicates Holocene dextral and dextral-normal displacement (Zellmer, 1980 #1705; Oswald and Wesnousky, 1996 #6450). Scarp profiles of faults that offset young alluvium indicate multiple Holocene rupture events (Zellmer, 1980 #1705). Youthful scarps of the Central Valley fault zone developed on playa deposits indicate late Holocene displacement (Zellmer, 1980 #1705).
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* Burchfiel and others (1987 #1454) calculated a minimum average dextral slip rate of 2 mm/yr to 3.2 mm/yr for the Hunter Mountain fault zone. This was based on the assumption that a maximum age of 3 Ma for the formation of Saline Valley reflects the age of inception of the Hunter Mountain fault at the northern end of Panamint Valley and that net slip on the Hunter Mountain fault is reflected by 8 km to 10 km of dextral slip and 0-2 km of vertical slip. Zhang and others (1990 #199)

	calculated a dextral slip rate of 2 mm/yr to 2.7 mm/yr for the Hunter Mountain fault zone using a displacement of 9.3?1.4 km for a 4 Ma basalt (Burchfiel and others, 1987 #1454). Using this same amount of displacement but assuming that displacement began about 6.1 Ma as suggested by Schweig (1989 #1636), Zhang and others (1990 #199) calculated a minimum dextral slip rate of 1.3 mm/yr to 1.75 mm/yr. Slip rate assigned to the entire Hunter Mountain-Saline Valley fault by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of California was 2.5 mm/yr (with minimum and maximum assigned slip rates of 1.5 mm/yr and 3.54 mm/yr, respectively.
Date and Compiler(s)	2000 William A. Bryant, California Geological Survey
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Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of California: California Department of Conservation, Division of Mines and Geology Open-File Report 96-08 (also U.S. Geological Open-File Report 96-706), 33 p.

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#1705 Zellmer, J.T., 1980, Recent deformation in the Saline Valley region, Inyo County, California: Reno, University of Nevada, unpublished Ph.D. dissertation, 168 p., 7 pls., scale 1:50,000.

#199 Zhang, P., Ellis, M., Slemmons, D.B., and Mao, F., 1990, Right-lateral displacements and the Holocene slip rate associated with prehistoric earthquakes along the southern Panamint Valley fault zone—Implications for southern Basin and Range tectonics and coastal California deformation: Journal of Geophysical Research, v. 95, no. B4, p. 4857—4872.