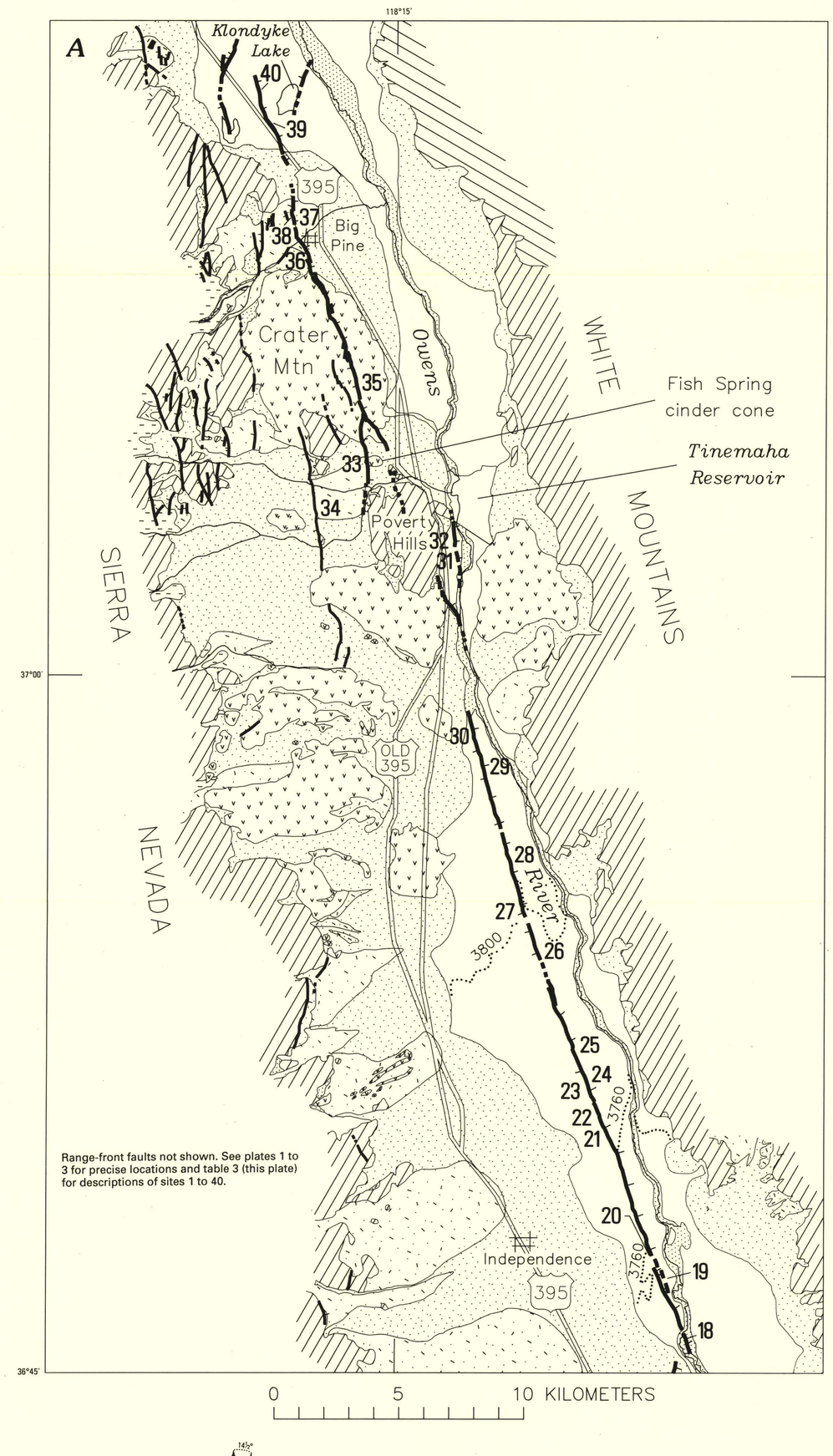

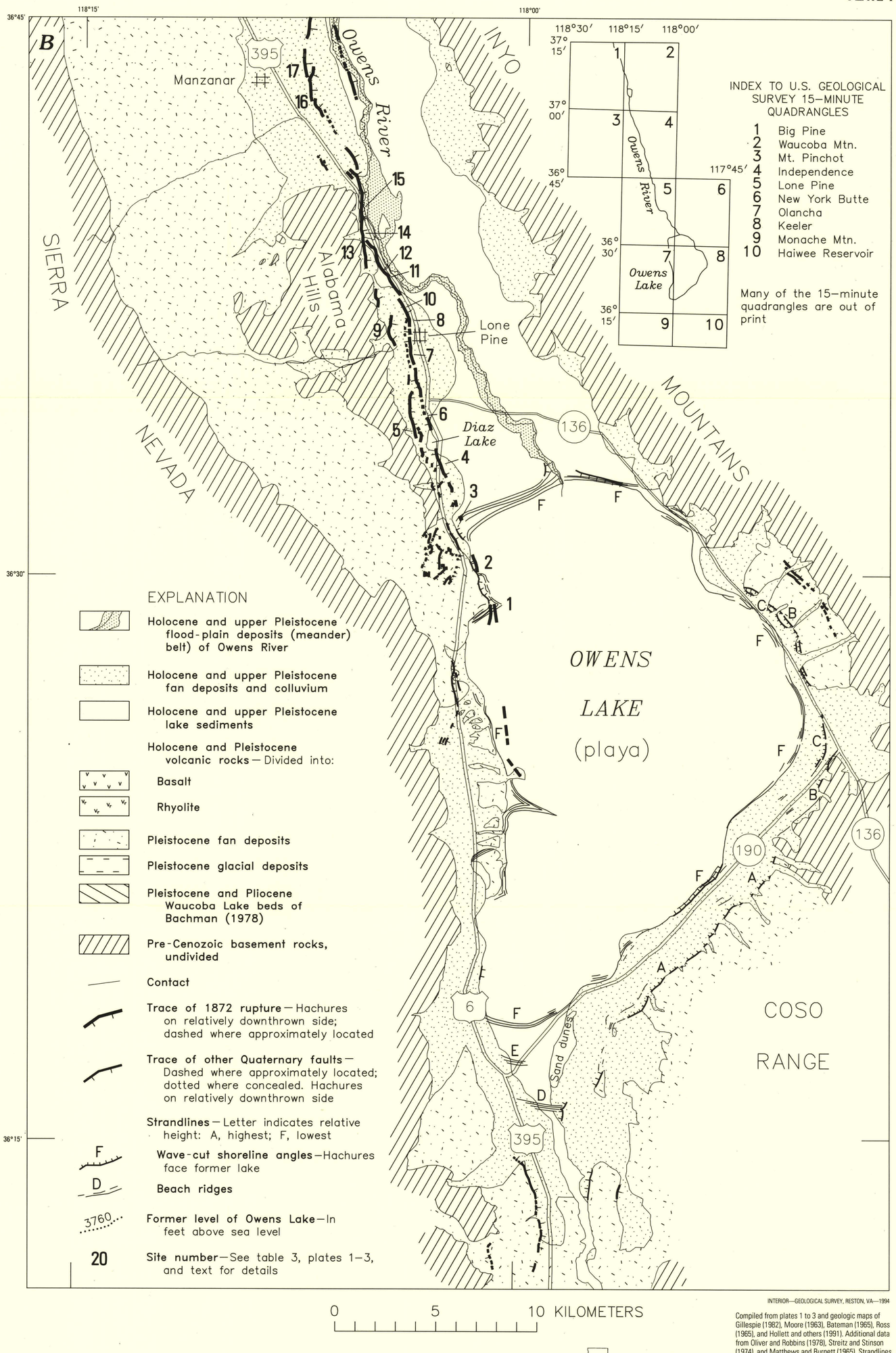

Table 3. *Site data for the Owens Valley fault zone, eastern California*

[Details of some sites shown in text figures. RL, right-lateral; V, vertical; USGS, U.S. Geological Survey; ~, approximately; —, no evidence; OVFZ, Owens Valley fault zone; ka, thousand years ago]

Site No.: Location (1 to 17, pl. 1; 18 to 30, pl. 2; 31 to 40, pl. 3)	Feature	Text figure	Displacement (m) 1872 RL	1872 V	Total RL	Total V	Fault strike; dip	Comments, interpretations	Sources of additional data
1: Point Bartlett.....	Deformed lake sediments.	10	—	—	—	—	—	Lake sediments exposed in playa form anticline between left-stepping fault traces: right-lateral deformation. Fan deposit dips 20° southwest, consistent with anticline, and is overlain by tufa mat and nearly flat shell bed (dated 16–31 ka).	^{14}C dates: USGS Nos. 2337, 2338, 2340
2: Owens Lake playa, ~2 km north-northwest of Point Bartlett.	Fault trace across playa.	10	—	0.3–0.5	—	—	N. 20° W.; near vertical.	Scarp faces west despite large down-to-east basement offset. Steep fault plane and lateral deformation. Playa surface very young: scarp formed in 1872.	Basement offset: Hollett and others (1989).
3: Northwest shore of Owens Lake.	Displaced beach ridges.	10	—	0.3	—	2.2	—	Younger beach ridge (a few hundred years old) is vertically displaced less than older ridges of late Holocene age (based on Indian artifact): progresssive deformation; number of events unknown. Fault trace is a warp ~30 m wide, up to east.	Age and progressive deformation of older beach ridges: Carver (1970).
4: Southeast of Diaz Lake.	Tectonic depressions.	8	—	—	—	—	N. 20° W.; near vertical.	Fault trace changes upthrown side and steps right ~30 m across double depression: consistent with right-lateral deformation on steep fault plane.	—
5: Diaz Creek.....	Offset fans and channel.	18	13?	1.0	—	~5	N. 10° W.	Original and younger fan surfaces vertically displaced by different amounts: progressive deformation. South channel margin apparently offset 13 m right laterally (in 1872?), although this offset could be partly erosional. All deformation Holocene. Site is extensively modified by man.	—
6: North of Diaz Lake.	Offset topograpy....	—	—	—	~50	—	N. 18° W.	Remnant of fan boundary within graben apparently right-laterally offset; fault trace is irregular. Age of fan surface late Pleistocene to Holocene.	—
7: Lone Pine.....	Offset road.....	15	4.9	0	—	—	—	W.D. Johnson's 1907 map shows 16-ft right-lateral offset of road west from Lone Pine, assumed to be at location of "old" Whitney Portal Road. Road was straightened soon afterward.	W.D. Johnson's map: Bateman (1961). Offset: Hobbs (1910).
8: North of Lone Pine.	Offset row of trees.	15	2.7	0	—	—	—	W.D. Johnson photographed a row of trees that was right-laterally offset by 9 ft in 1872. Site is on east margin of graben.	Bonilla (1968). Photo: Hobbs (1910, pl. XIX).
9: Lone Pine fault.....	Stream channel deposits across fault trace: oldest channel (south) younger channel (north).	4, 5, 15–17	6 6	2 1	12–16 12	6 2	—	Oldest (south) channel deposits and original fan surface records 1872 and two earlier Holocene displacements, indicating a recurrence interval of 5 to 10 thousand years. Younger (north) channel deposits record 1872 and one earlier displacement. 1872 displacements appear characteristic. Average Holocene slip rate is about 2 mm/yr. Right-lateral offsets well constrained.	Younger (north) channel detail: Lubetkin (1980), Lubetkin and Clark (1988).
10: 1872 victims' cemetery.	Tectonic bulge.....	15	—	—	—	—	—	Bulge occurs at left step where strike changes from N. 10° W. to N. 30° W. Consistent with right-lateral deformation.	—
11: North end of Pangborn Lane.	Fans across fault traces.	—	—	0.6	—	3.6	N. 34° W.	Two small younger fans that cross fault trace have less vertical displacement than do older deposits along strike: progressive deformation; several Holocene events.	—
12: 1.5 km north-west of Pangborn Lane.	Fault trace locally eroded by distal-fan channels.	—	—	~1	—	~4	—	Stream channels incised into surface at scarp have less vertical displacement than does adjacent surface along scarp: progressive deformation.	—
13: Base of Alabama Hills.	Scarp across young colluvial slope.	11	—	4.4	—	4.4	N. 11° W.	Probable 1872 scarp across upper Holocene colluvium. If scarp formed entirely in 1872, this is maximum vertical offset known for 1872 break.	—
14: Northernmost stream from Alabama Hills.	Trench exposure of fault.	—	—	—	—	4	N. 05° W.; 66° E.	Reason for trench excavation unknown. Exposes coarse fan alluvium offset by fault. Relatively shallower dip consistent with more northerly strike.	—
15: Roadcut on U.S. Highway 395.	Exposure of hanging-wall deformation within 5 m of fault.	—	—	—	—	—	N. 10° E.; 66° SW.	Stratigraphy (from base): > 0.3 m pale-gray fine sand, firm, massive; 0.15 m black organic layer, 10.19 ± 0.07 ka; 1.1 m well-bedded clay, sand, fine-gravel horizons as thick as 0.6 m, some organic matter; >1 m colluvial gravel from Alabama Hills. Sediments beneath colluvium represent near-shore beach and back-bar environment at ~1,137 m elev.; age constrains late Pleistocene high stand of Owens Lake. Structure: sediments strike 111°, dip 16° S.W.; cut by small faults that strike ~010°, dip 66° NW.; normal displacement ~0.5 m. Oblique exposure of hanging-wall deformation.	^{14}C date: USGS No. 2339.
16: 3 km south of Manzanar-Reward Road.	Fault exposed in stream channel.	—	—	—	—	~1	N. 15° W., 74° E.	Exposure of fault in distal-fan gravels shows both vertical fault separation of strata (~0.4 m) and total vertical separation of surface (~1 m, including tectonic warping). Deformation includes infilled graben 1.1 m wide at top, 0.4 m at 2-m depth. Sediments dip ~10° E. on downthrown side. Number of events unknown.	—
17: 2 km south of Manzanar-Reward Road.	Stream channels across fault trace.	19	—	0.8	—	2.7	N. 13° W.	Stream channels in distal-fan surface have less vertical displacement than does adjacent fan surface: progressive deformation. 1872 displacement is generally less than 1 m. One channel apparently displaced by two events (total displacement 1.35 m); fan probably displaced by three events during Holocene time.	—
18: 2.5 km north of Manzanar-Reward Road.	Fault trace across meander belt; 2 trench excavations.	12	3–4	0.5–1	—	—	N. 15° W.; 85° W.	Trenches expose faulted and folded upper Holocene deposits of Owens River meander belt, but no multiple offsets, indicating all deformation is from 1872. Meander channels show both right-lateral and vertical displacement; ground surfaces show vertical displacement.	—
19: 2 km south of Mazourka Canyon Road.	Tectonic depressions.	—	—	—	—	—	N. 20° W.	Fault trace steps right ~200 m across depressions: consistent with right-lateral deformation.	—
20: 1 km south of Mazourka Canyon Road.	Mound of loose sand.	—	—	—	—	—	—	Fault trace obscured for ~100 m by mound of very loose sand: suggests sandblow origin.	—
21: 4.5 km north of Mazourka Canyon Road.	Offset channel.....	13	~7	~1	—	~4	N. 15° W.	Stream channel incised into surface has less vertical displacement than does adjacent progressive deformation. I-m vertical displacement suggests 7 m of right-lateral offset of channel in 1872. Site partially modified by dirt road.	—
22: 5 km north of Mazourka Canyon Road.	Mound of loose sand.	—	—	—	—	—	—	Fault trace obscured by conical sand mound; crater-like depression in mound: suggests sandblow origin.	—
23: 6 km north of Mazourka Canyon Road.	Crater-like depression.	—	—	—	—	—	—	Depression ~200 m west of fault trace: possible sandblow source.	—
24: 6.5 km north of Mazourka Canyon Road.	Irregular fault trace across mound of sand.	—	—	~1	—	—	—	Irregular ~1-m-high scarp partly obscured by sand for ~0.7 km along trace: suggests sandblow origin. ~1-m scarp and sandblow may have formed in 1872. Scarp >2 m high beyond sandblow; progressive deformation.	—
25: 8 km north of Mazourka Canyon Road.	Tectonic depression.	9	—	—	—	1.8	N. 24° W.	Trace steps right ~55 m across depression: consistent with right-lateral deformation.	—
26: 1 km south of Twin Lakes.	Eroded fault trace..	—	—	~1	—	~3	—	Eroded parts of surface have less vertical displacement at scarp than does adjacent surface along scarp: progressive deformation.	—
27: South end Twin Lakes.	West-facing scarp..	—	—	—	—	—	N. 20° W.	Change in upthrown side: steep fault, lateral deformation.	—
28: 0.5 km north of Twin Lakes.	Echelon scarps.....	6	—	—	—	—	N. 15° W.	Low (~1-m) scarps in left-stepping echelon pattern: right-lateral deformation.	—
29: 1 km south of Los Angeles Aqueduct intake.	Offset topographic depression.	—	—	—	80	—	N. 15° W.	Depression formed in deflated beds of Pleistocene Lake Owens. 80-m right-lateral separation of margin of depression appears too large for Holocene deformation; may be nontectonic. Upthrown side changes: steep fault, lateral displacement.	—
30: 150 m north of road to L.A. Aqueduct intake.	Offset and disconnected stream channel.	—	—	—	40	—	N. 20° W.	Probably a tectonic offset; cumulative right-lateral deformation. Age of deformation uncertain but may be Holocene.	—
31: 1.5 km south of Tinemaha Reservoir.	Eroded fault trace..	—	—	~1	—	~5	N. 10° W.	Eroded parts of surface have less vertical displacement at scarp than do surfaces along scarp: progressive deformation.	—
32: 1 km south of Tinemaha Reservoir.	Tectonic bulge.....	—	—	—	—	~10	—	Bulge occurs at left step in fault trace: consistent with right-lateral deformation.	—
33: Fish Springs cinder cone.	Vertically displaced cinder cone and fans.	7	0	~1	0	78	N. 05° W.	On secondary Fish Springs fault (dip slip only), fan deposits of four ages are vertically displaced by different amounts: progressive deformation. Vertical slip rate is ~0.25 mm/yr for past 280 to 350 thousand years. Fan ages uncertain; if youngest age is correct, slip rate is irregular. Apparent lateral deformation on main fault ~1 km to east. See text.	Martel (1984), Martel and others (1987).
34: Red Mountain.....	West-facing fault scarp >2.5 km west of main trace.	—	—	—	—	—	N. 08° W.	10-km-long scarp; broad, degraded. This fault trace probably did not move in 1872; fault possibly more closely related to other west-facing scarps of the Coyote warp than to Owens Valley fault zone.	—
35: Crater Mountain..	Offset lava ridge.	7	—	—	~30	—	N. 15° W.	Offset is right lateral and cumulative. Upthrown side of scarp changes along strike: steep fault plane, lateral offset. Small stream terrace on downthrown side is displaced ~1 m vertically, ~10 m right laterally: progressive deformation. Two other ridges show possible right-lateral offset. One age of 290±40 ka.	Lava age: B.D. Turrin (written commun., 1988).
	Offset terrace.	—	—	—	~10	~1			
36: About 1 km south of Big Pine Creek.	Offset stream channel.	—	~4	~1	—	—	N. 30° W.	Stream channel incised into surface has less vertical displacement than does adjacent surface: progressive deformation. Fan Holocene: possibly three Holocene earthquakes. 1-m vertical displacement suggests about 4 m of right-lateral offset in 1872.	—
	Adjacent surface...	—	—	—	—	~3	N. 30° W.		
37: Southwest of Big Pine.	Channels across fault trace.	—	—	~1	—	~3	N. 28° W.	Stream channels incised into surface have less vertical displacement than does adjacent surface: progressive deformation. Fan surface probably Holocene.	—
38: West of Big Pine; 0.25 km west of main fault trace.	West-facing scarp. Offset row of tree stumps.	14	3?	1?	—	~8	N. 21° W.	Row of planted trees (now stumps) having right-lateral offset. Row is within wash that has smaller vertical displacement than adjacent parts of scarp: progressive deformation. Scarp appears degraded and not fresh enough for slip in 1872. Row of trees may have been either offset in 1872 or planted in an offset line.	—
39: West-southwest of Klondyke Lake.	Offset channel.....	—	4–9.5?	—	—	—	N. 24° W.	Right-lateral offset of channel probably tectonic. No scarp across channel floor. Right channel edge offset the larger amount. Possible 1872 offset.	—
40: West-northwest of Klondyke Lake.	Eroded fault trace..	—	—	—	—	—	N. 23° W.	Eroded parts of surface have less vertical displacement at scarp than do adjacent surfaces along scarp: progressive deformation, probably Holocene.	—

GENERALIZED GEOLOGIC MAP OF OWENS VALLEY, CALIFORNIA, SHOWING THE 1872 RUPTURE, OTHER QUATERNARY FAULTS, SHORELINE FEATURES OF OWENS LAKE, AND TABLE 3

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