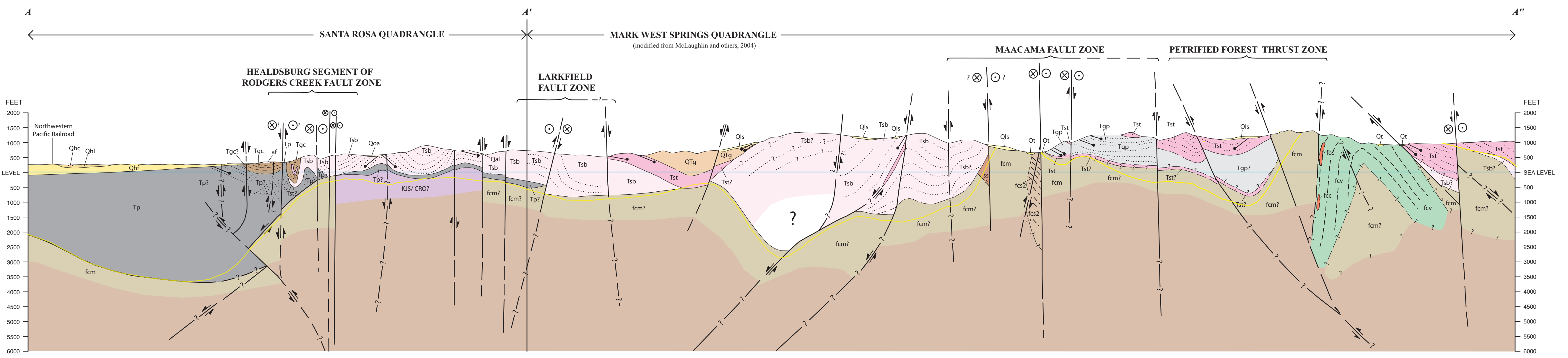
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Open-File Report 2008-1009
Sheet 2 of 3
Pamphlet accompanies map


A
A'
A''
SANTA ROSA QUADRANGLE
MARK WEST SPRINGS QUADRANGLE
(modified from McLaughlin and others, 2004)
HEALDSBURG SEGMENT OF RODGERS CREEK FAULT ZONE
LARKFIELD FAULT ZONE
MAACAMA FAULT ZONE
PETRIFIED FOREST THRUST ZONE
Northwestern Pacific Railroad
FEET
SEA LEVEL

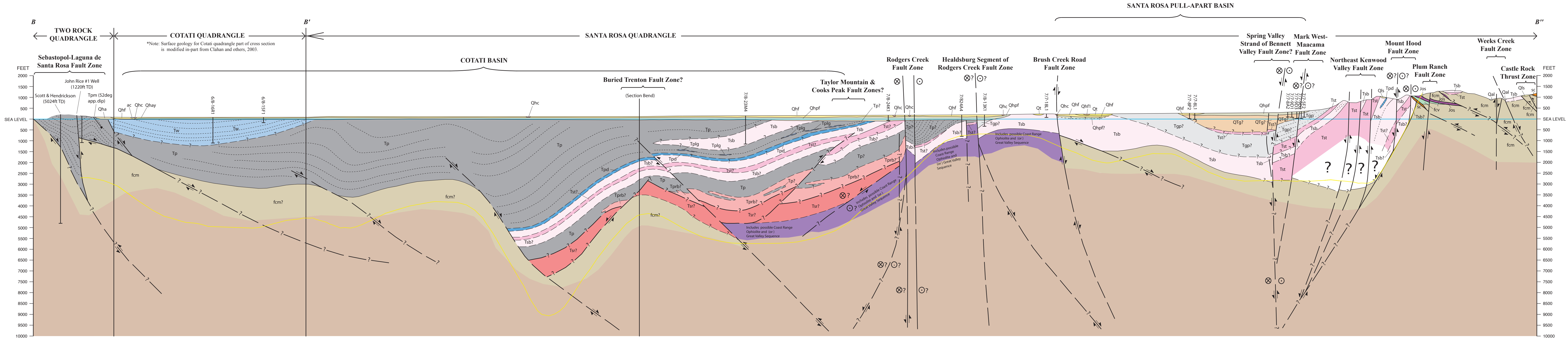
EXPLANATION

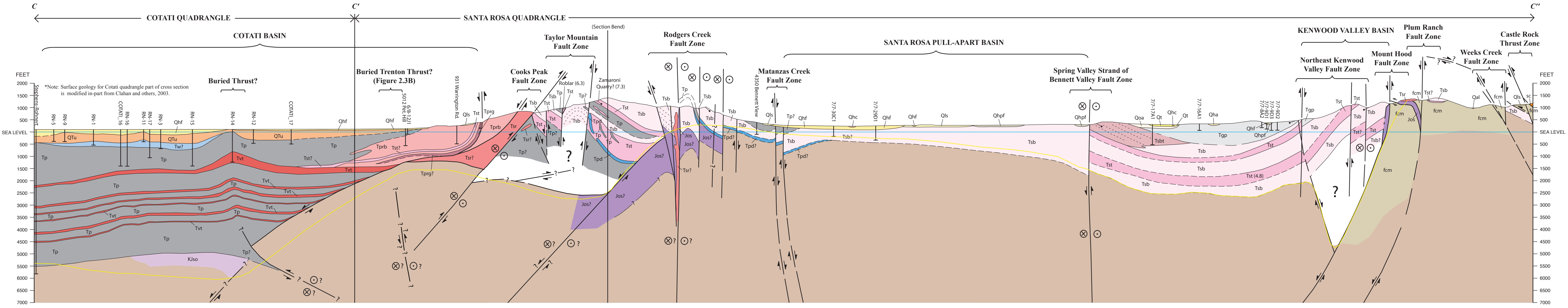
Faults in cross-sections–Arrows indicate relative vertical motion of faults:

⊗ Symbol denotes movement away from viewer

⊙ Symbol denotes movement toward viewer

Interpreted depth to basement from gravity inversion data (Chapter B)


B
B'
B''
TWO ROCK QUADRANGLE
COTATI QUADRANGLE
*Note: Surface geology for Cotati quadrangle part of cross section is modified in part from Clahan and others, 2003.
SANTA ROSA QUADRANGLE
SANTA ROSA PULL-APART BASIN
Sebastopol-Laguna de Santa Rosa Fault Zone
COTATI BASIN
Buried Trenton Fault Zone?
(Section Bend)
Taylor Mountain & Cooks Peak Fault Zones?
Rodgers Creek Fault Zone
Healdsburg Segment of Rodgers Creek Fault Zone
Brush Creek Road Fault Zone
Spring Valley Strand of Bennett Valley Fault Zone?
Mark West-Maacama Fault Zone
Northeast Kenwood Valley Fault Zone
Mount Hood Fault Zone
Plum Ranch Fault Zone
Weeks Creek Fault Zone
Castle Rock Thrust Zone
FEET
SEA LEVEL


C
C'
C''
COTATI QUADRANGLE
SANTA ROSA QUADRANGLE
COTATI BASIN
*Note: Surface geology for Cotati quadrangle part of cross section is modified in part from Clahan and others, 2003.
Buried Thrust?
Buried Trenton Thrust? (Figure 2.3B)
Cooks Peak Fault Zone
Taylor Mountain Fault Zone
(Section Bend)
Rodgers Creek Fault Zone
Matanzas Creek Fault Zone
SANTA ROSA PULL-APART BASIN
Spring Valley Strand of Bennett Valley Fault Zone
KENWOOD VALLEY BASIN
Northeast Kenwood Valley Fault Zone
Mount Hood Fault Zone
Plum Ranch Fault Zone
Weeks Creek Fault Zone
Castle Rock Thrust Zone
FEET
SEA LEVEL

COMPARATIVE STRATIGRAPHY

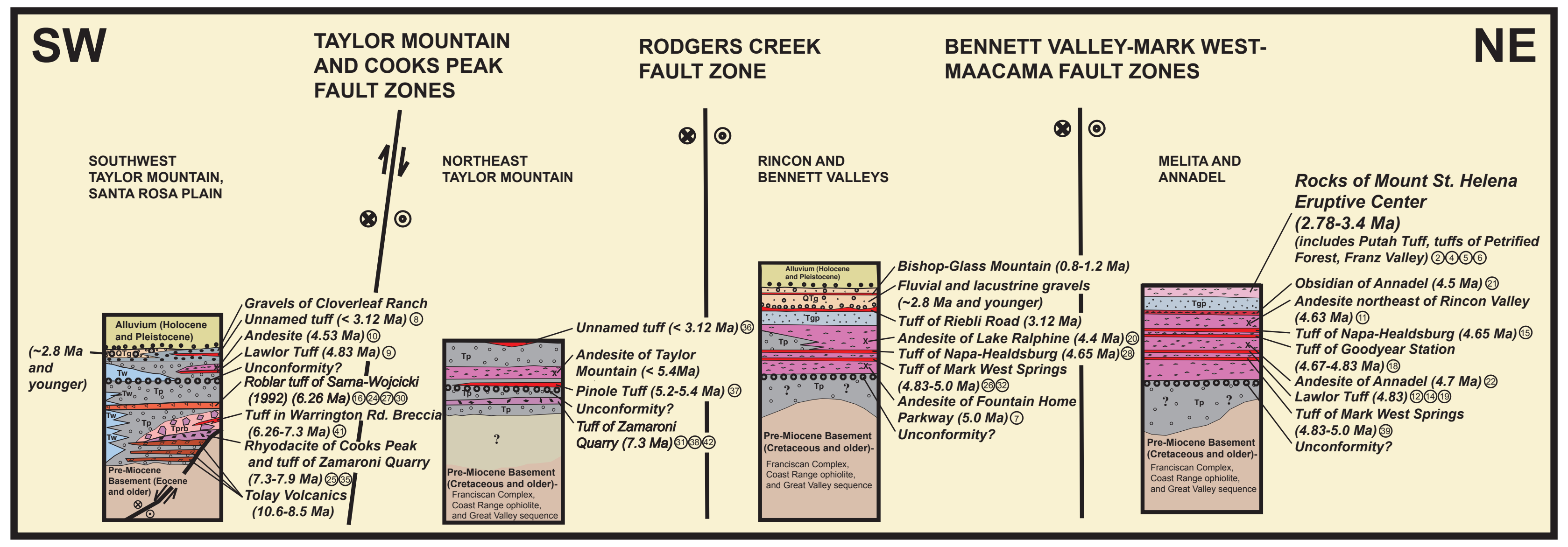

SW
TAYLOR MOUNTAIN AND COOKS PEAK FAULT ZONES
RODGERS CREEK FAULT ZONE
BENNETT VALLEY-MARK WEST-MAACAMA FAULT ZONES
NE
SOUTHWEST TAYLOR MOUNTAIN, SANTA ROSA PLAIN
NORTHEAST TAYLOR MOUNTAIN
RINCON AND BENNETT VALLEYS
MELITA AND ANNADEL
(~2.8 Ma and younger)
Alluvium (Holocene and Pleistocene)
Gravels of Cloverleaf Ranch
Unnamed tuff (< 3.12 Ma) ⑧
Andesite (4.53 Ma) ⑩
Lawlor Tuff (4.83 Ma) ⑨
Unconformity?
Roblar tuff of Sarna-Wojcicki (1992) (6.26 Ma) ⑯㉔㉗㉚
Tuff in Warrington Rd. Breccia (6.26-7.3 Ma) ㊶
Rhyodacite of Cooks Peak and tuff of Zamaroni Quarry (7.3-7.9 Ma) ㉕㉟
Tolay Volcanics (10.6-8.5 Ma)
Pre-Miocene Basement (Eocene and older)
Unnamed tuff (< 3.12 Ma) ㊱
Andesite of Taylor Mountain (< 5.4Ma)
Pinole Tuff (5.2-5.4 Ma) ㊲
Unconformity?
Tuff of Zamaroni Quarry (7.3 Ma) ㉛㊳㊷
Pre-Miocene Basement (Cretaceous and older)- Franciscan Complex, Coast Range ophiolite, and Great Valley sequence
Bishop-Glass Mountain (0.8-1.2 Ma)
Fluvial and lacustrine gravels (~2.8 Ma and younger)
Tuff of Riebli Road (3.12 Ma)
Andesite of Lake Ralphine (4.4 Ma) ⑳
Tuff of Napa-Healdsburg (4.65 Ma) ㉘
Tuff of Mark West Springs (4.83-5.0 Ma) ㉖㉜
Andesite of Fountain Home Parkway (5.0 Ma) ⑦
Unconformity?
Rocks of Mount St. Helena Eruptive Center (2.78-3.4 Ma) (includes Putah Tuff, tuffs of Petrified Forest, Franz Valley) ②④⑤⑥
Obsidian of Annadel (4.5 Ma) ㉑
Andesite northeast of Rincon Valley (4.63 Ma) ⑪
Tuff of Napa-Healdsburg (4.65 Ma) ⑮
Tuff of Goodyear Station (4.67-4.83 Ma) ⑱
Andesite of Annadel (4.7 Ma) ㉒
Lawlor Tuff (4.83) ⑫⑭⑲
Tuff of Mark West Springs (4.83-5.0 Ma) ㊴
Unconformity?

Figure 3. Schematic stratigraphic sections for major structural blocks of Santa Rosa 7.5' quadrangle, showing stratigraphic positions of dated and correlated tephra and other volcanic units of Sonoma and Tolay Volcanics. Circled numbers refer to map locality numbers in tables 1, 2 and figure 4. See these tables and figure 4 for map locations and analytical data.

Table 2. *Tephrochronologic data for the Santa Rosa and Kenwood 7.5' quadrangles.*

[All tephra unit names listed are informal names, with the exception of the Putah, the Roblar, and the Lawlor Tuff (Sarna-Wojcicki, 1976). Localities are arranged according to their latitudinal distribution from north to south (fig. 4).]

Map Locality No.	Field No.	West Longitude (°)	North Latitude (°)	Tephra Unit	Interpolated age from correlation with dated locations (Ma±1σ)	Source of Age Data	Comments	Tephra locality (fig. 4)
1	MRM10-03 MRM10-03	122.654	38.4978	Tuff below Napa-Healdsburg	4.64-4.65±0.03	This report		●
2	MRM11-03	122.65415	38.49745	Calistoga Road tuff 1	3.22±0.02 (?)	McLaughlin et al., 2004 McLaughlin et al., 2005	Matches MRM24-03 (Map Loc. #5); similar to Putah Tuff	●
3	MRM21-03	122.63087	38.49628	Northeast Santa Rosa tuff 1	undetermined			●
4	MRM15-03	122.65547	38.49395	Calistoga Road tuff 2	2.78-3.22 (?)	This report; McLaughlin et al., 2005	Smiliarities to Putah Tuff, tuff of Pepperwood Ranch and Franz Valley suite	●
5	MRM24-03	122.64757	38.49252	Calistoga Road tuff 1	3.22±0.02 (?)	McLaughlin et al., 2004; McLaughlin et al., 2005	CaO is low for good Putah Tuff match	●
6	MRM16-03	122.6562	38.49247	Putah Tuff	3.22±0.02	McLaughlin et al., 2004	Good match to Putah Tuff	●
8	MRM12-02	122.729	38.486	Tuff of Cloverleaf Ranch	□3.12	McLaughlin et al., 2004; this report	Similar to unnamed tuff (MRM10-97) which overlies tuff of Riebli Road in Mark West Springs quadrangle	●
9	MRM9-02	122.72766	38.486	Lawlor Tuff	4.83	Sarna-Wojcicki, 1976; McLaughlin et al., 2004; McLaughlin et al., 2005	Overlain (?) by basaltic andesite (Map Loc. #10)	●
12	MRM43-03	122.64707	38.48168	Lawlor Tuff	4.83	Sarna-Wojcicki, 1976; McLaughlin et al., 2004; McLaughlin et al., 2005	Good match to Lawlor Tuff	●
13	MRM29-03	122.62735	38.48045	Calistoga Road tuff 1	3.22±0.02 (?)	McLaughlin et al., 2004; McLaughlin et al., 2005	CaO is low for Putah Tuff; matches to Map Locs. #2, #5	●
14	MRM45-03	122.64095	38.47795	Lawlor Tuff	4.83	Sarna-Wojcicki, 1976; McLaughlin et al., 2004; McLaughlin et al., 2005	Good match to Lawlor Tuff	●
15	MRM40-03	122.64358	38.47763	Tuff of Napa-Healdsburg	4.65	this report; Sarna-Wojcicki, 1976; McLaughlin et al., 2005		●
16	ASW-020102-C	122.71996	38.4765	Roblar Tuff	6.26±0.03	Sarna-Wojcicki, 1976; McLaughlin et al., 2005	Collected with J. Allen	●
17	MRM33-03	122.62827	38.476	Northeast Santa Rosa tuff 2	undetermined			●
18	MRM32-03	122.6281	38.47593	Tuff of Goodyear Station	>4.67 <4.83	This report; McLaughlin et al., 2005		●
19	MRM35-03	122.62253	38.47223	Lawlor Tuff	4.83	This report; McLaughlin et al., 2005	Collected in quarry northwest of Los Alamos Road	●
23	MRM68-04	122.68035	38.42315	Taylor Mountain tuff 1	undetermined		Present along northeast side of Rodgers Creek Fault	●
24	MRM25-04	122.69162	38.41288	Roblar Tuff	6.26±0.03	Sarna-Wojcicki, 1976; McLaughlin et al., 2005	Southwest of Rodgers Creek Fault near Kawana Springs	●
25	MRM6-97	122.69791	38.40746	Tuff of Zamaroni Quarry	7.26±0.04	This report; McLaughlin et al., 2005	Collected in Zamaroni Quarry; associated with flow or neck	●
26	MRM29-05	122.64746	38.40658	Tuff of Mark West Springs	<~5.02 >4.8	McLaughlin et al., 2004	Collected northeast of Matanzas Creek Reservoir	●
27	MRM12-04	122.69095	38.40338	Roblar Tuff	6.26±0.03	Sarna-Wojcicki, 1976; McLaughlin et al., 2005	Good match to Roblar Tuff. Located southwest side, Rodgers Creek Fault near Kawana Springs	●
28	MRM31-05	122.64661	38.40288	Tuff of Napa-Healdsburg	4.65	McLaughlin et al., 2005	Collected northeast of Matanzas Creek Reservoir, Bennett Valley	●
29	MRM16-04	122.67583	38.40083	Taylor Mountain tuff 2	~6.26-7.26	This report	Similar to Roblar Tuff. Collected on Taylor Mountain, southwest of Rodgers Creek Fault	●
30	MRM15A-04 MRM15B-04	122.67798	38.40046	Roblar Tuff	6.26±0.03 6.26±0.03	Sarna-Wojcicki, 1976; McLaughlin et al., 2005	Collected on Taylor Mountain, southwest of Rodgers Creek Fault	●
31	MRM18-04A	122.67205	38.39896	Tuff of Zamaroni Quarry?	~7.26 (?)	This report; McLaughlin et al., 2005	Similar to tuff of Zamaroni Quarry; collected southwest of Rodgers Creek Fault	●
32	MRM33-04	122.65718	38.39858	Tuff of Mark West Springs	<~5.02 >4.83	McLaughlin et al., 2004	Collected northeast of Rodgers Creek Fault, Taylor Mountain	●
33	MRM36-04	122.66755	38.39436	Taylor Mountain tuff 3	undetermined	This report; McLaughlin et al., 2004	No good matches; similarities to tuff of Pepperwood Ranch and Pinole Tuff	●
34	MRM20-04A MRM20-04B	122.67116	38.39392	Unnamed, younger than Pinole Tuff?	undetermined □5.2-5.4 (?)	This report; McLaughlin et al., 2005; Sarna-Wojcicki, unpublished data	Collected southwest of Rodgers Creek Fault, Taylor Mountain; mixed populations, but with composition like a tuff that overlies Pinole Tuff	●
36	MRM32-05	122.65322	38.38910	Unnamed tuff north of Guenza Road	□3.12	This report; McLaughlin et al., 2004	Mixed population tuff; similar to MRM10-97 which overlies tuff of Riebli Road in Mark West Springs quadrangle	●
37	MRM40-04	122.65977	38.38928	Pinole Tuff	5.2-5.4	McLaughlin et al., 2005	Collected southwest of Rodgers Creek Fault, Taylor Mountain area	●
38	MRM42-04	122.66456	38.38863	Tuff of Zamaroni Quarry	7.26±0.04	This report; McLaughlin et al., 2005	Collected southwest of Rodgers Creek Fault, Taylor Mountain area	●
39	ASW-020102-D	122.59320	38.38671	Tuff of Mark West Springs	<~5.02 >4.83	McLaughlin et al., 2004	Along northeast side of Bennett Valley Fault Zone	●
40	MRM49-04 MRM49-04	122.66243	38.38438	Taylor Mountain tuff 4	~6.26-7.26 (?)	This report	Composition similar to Roblar tuff; high and low Fe populations; collected southwest of Rodgers Creek Fault, Taylor Mountain area	○
41	MRM50-04	122.66855	38.38268	Tuff in Warrington Road Breccia	<7.26>6.26	This report	Mapped as part of breccia overlying rhyolite and dacite of Cooks Peak	●
42	MRM38-04	122.65270	38.38250	Tuff of Zamaroni Quarry	7.26±0.04	This report	Collected southwest of Rodgers Creek Fault on Taylor Mountain	●

Table 1. *$^{40}Ar/^{39}Ar$ ages of volcanic rocks in the Santa Rosa and Kenwood 7.5' quadrangles.*

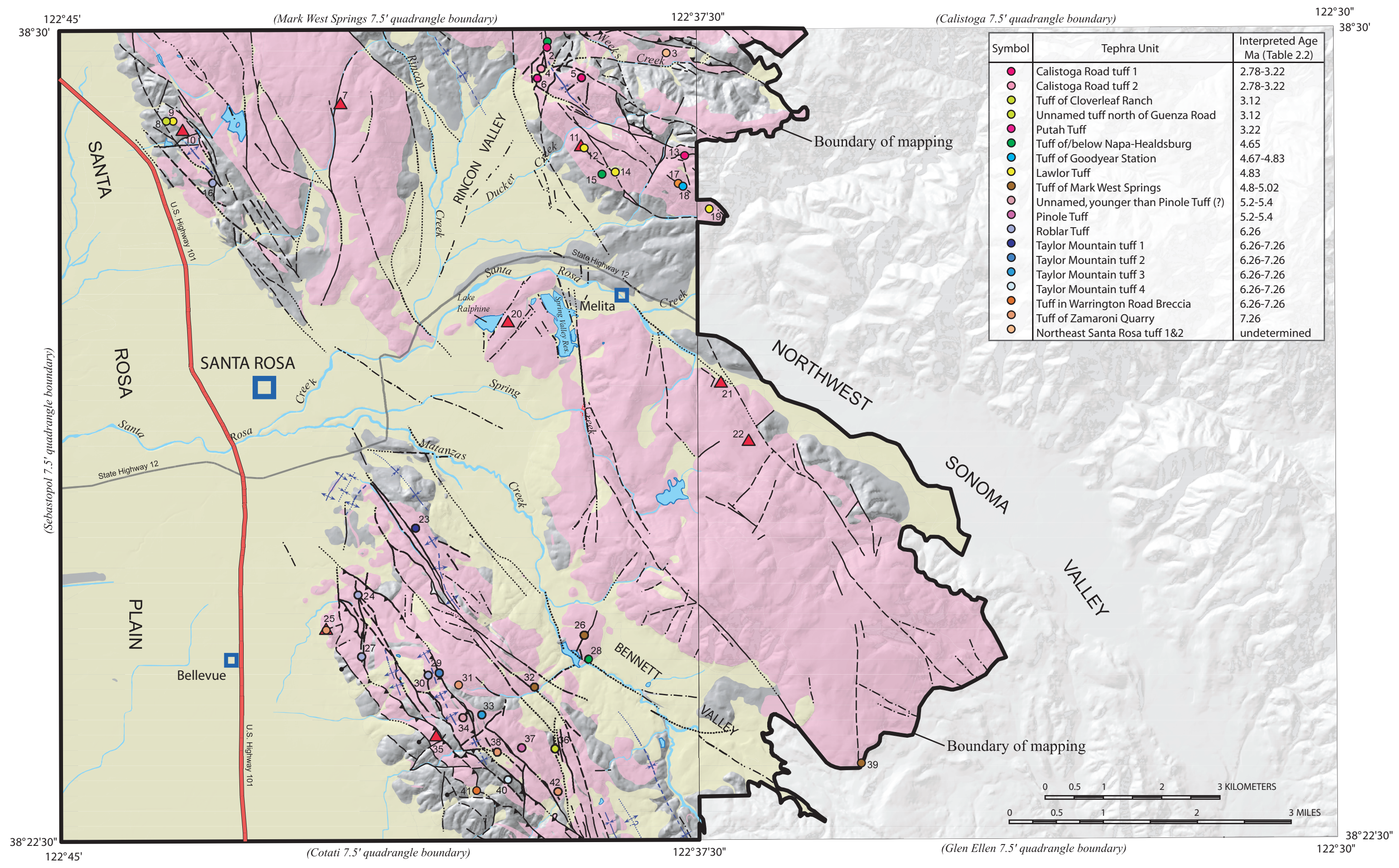
[Localities arranged in numerical order, from north to south (Fig. 2). All ages were determined in the U.S. Geological Survey radiometric dating laboratory, Menlo Park, California by Robert J. Fleck. Samples were irradiated in the U.S. Geological Survey TRIGA Reactor Facility in Denver, Colo.]

Map Locality No.	Field No.	Map Unit	Locality Description	Rock Type	Material Analyzed	West Longitude (°)	North Latitude (°)	Best Estimate Age $^{40}Ar/^{39}Ar$ (Ma±1σ)	Total-Fusion Age (Ma±1σ)	Plateau Age (Ma±1σ)	Isochron Age (Ma±1σ)
7	MRM1-97	Tsb	Andesite along Fountain Grove Parkway	Andesite	Plagioclase	122.69483	38.48850	5.0±0.4	3.618±0.876	no plateau	4.996±0.390
10	MRM8-02	Tsb	Andesite of Cloverleaf Ranch	Andesite	groundmass	122.72583	38.48450	4.53±0.04	4.753±0.037	4.531±0.041	4.456±0.116
11	047-14B	Tsb	Porphyritic andesite, NE Santa Rosa quadrangle	Andesite	groundmass	122.64756	38.48188	4.77±0.03 (run 1) 4.63±0.02 (run 2)	4.77±0.03 4.625±0.016	no plateau no plateau	4.93±0.34 5.01±0.39
20	047-13C	Tsb	Hard, fine-grained flaggy Andesite, SE of Lake Ralphine	Andesite	groundmass	122.66211	38.45478	4.37±0.03	4.195±0.035	4.368±0.025	4.39±0.26
21	MRM82-99	Tsr	Obsidian of Annadel State Park	Obsidian	whole rock	122.62030	38.44534	4.51±0.01 (run 1) 4.54±0.01 (run 2)	4.51±0.30 4.54±0.20	4.51±0.01 4.54±0.01	4.51±0.05 4.55±0.06
22	047-14C	Tsb	Andesite, Annadel State Park, plagioclase-rich, olivine-bearing	Andesite	groundmass	122.61490	38.43635	4.7±0.03	4.687±0.027	no plateau	4.7±0.6
25	MRM6-97 (HRC-5C)	Tst	Silicic flow or neck in Zamaroni Quarry	Rhyodacite	Plagioclase	122.69791	38.40746	7.26±0.04	7.311±0.038	7.261±0.039	7.269±0.064
35	047-13B	Tsr	Cooks Peak, hard, gray, coarse porphyritic Rhyodacite	Rhyodacite	Plagioclase	122.67632	38.39097	7.94±0.02 (run 1) 7.98±0.03 (run 2)	8.057±0.020 8.077±0.014	7.94±0.02 7.98±0.03	7.93±0.08 8.00±0.14

Table 3. *Chemical compositions of volcanic glass in pyroclastic units in the Santa Rosa and Kenwood 7.5' quadrangles.*

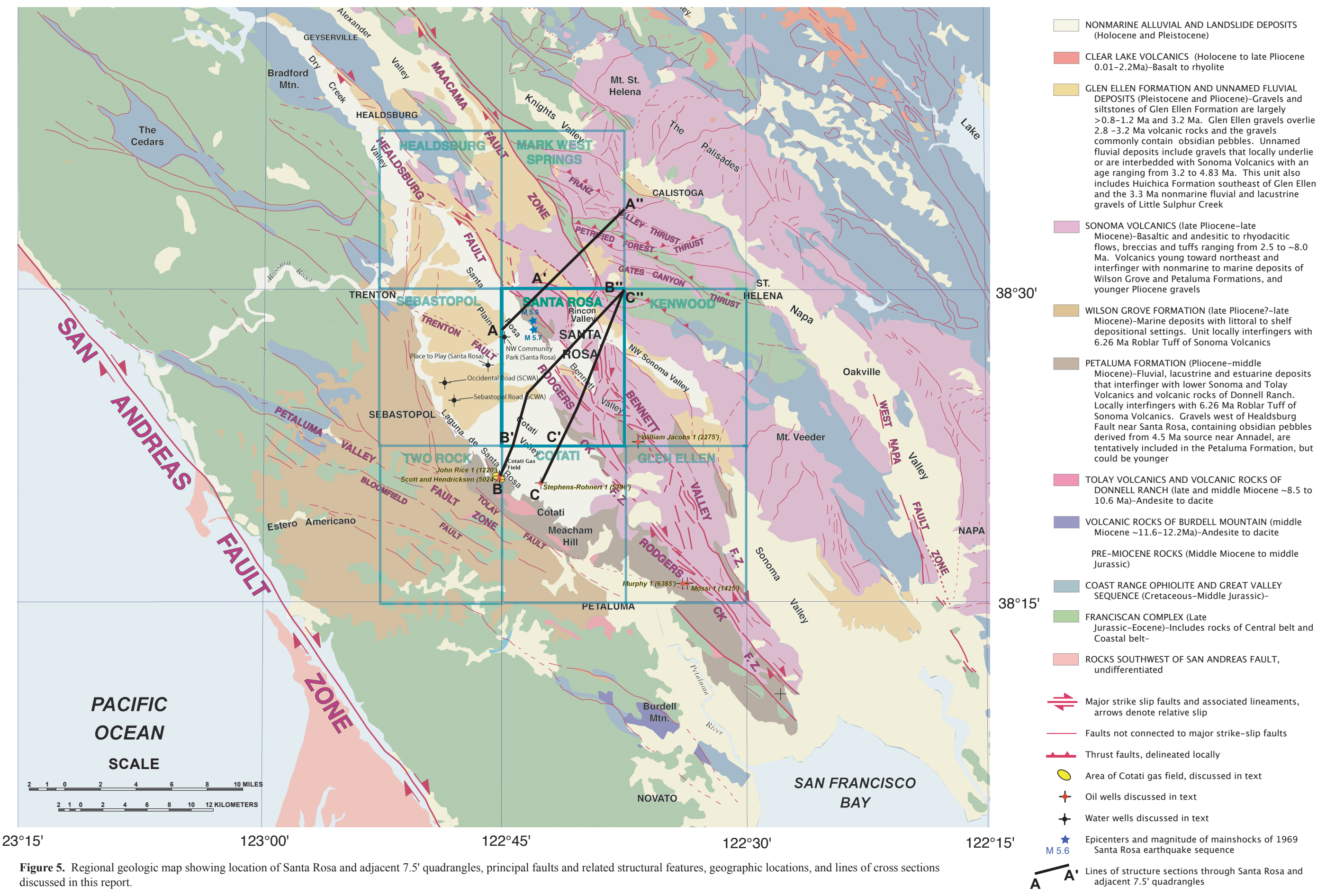
[Values given are weight percent oxide normalized to 100 percent to correct for variations in water content of the glasses. Values reported here as Fe_2O_3 are converted from analyses originally reported as FeO and recalculated to 100 percent. The values for a homogenous obsidian used as an internal standard, RLS-132, are given below to provide an approximate analytical error in the electron-microprobe analyses. All tephra unit names listed are informal names, with the exception of the Putah, the Roblar, and the Lawlor Tuff. Localities are arranged according to their latitudinal distribution from north to south.]

Map No.	Tephra Unit	Sample Field No., Lab No.	Interpolated age from correlation to dated locations (Ma±1σ)	Weight Percent Oxide								
				SiO_2	Al_2O_3	Fe_2O_3	MgO	MnO	CaO	TiO_2	Na_2O	K_2O
1	Tuff below Napa-Healdsburg	MRM10-03, T513-3 MRM10-03, T512-2	4.64-4.65±0.03	75.96 73.6	12.97 13.81	1.79 2.58	0.01 0.03	0.03 0.07	0.34 0.64	0.12 0.18	3.74 4.86	5.04 4.22
2	Calistoga Road tuff 1	MRM11-03, T513-6	3.22±0.02 (?)	74.27	13.89	1.93	0.1	0.04	0.57	0.17	3.46	5.57
3	Northeast Santa Rosa tuff 1	MRM21-03, T513-4	undetermined	75.41	13.35	1.73	0.03	0.03	0.63	0.13	3.72	4.97
4	Calistoga Road tuff 2	MRM15-03, T512-8	2.78-3.22 (?)	74.79	13.28	1.94	0.02	0.03	0.44	0.14	4.02	5.35
5	Calistoga Road tuff 1	MRM24-03, T513-5	3.22±0.02 (?)	74.25	13.83	1.96	0.09	0.03	0.56	0.17	3.91	5.2
6	Putah Tuff	MRM16-03, T512-4	3.22±0.02	74.85	13.53	1.95	0.05	0.04	0.78	0.14	3.83	4.82
8	Tuff of Cloverleaf Ranch	MRM12-02, T499-9	□3.12	78.2	12.48	0.91	0.04	0.03	0.44	0.08	2.57	5.24
9	Lawlor Tuff	MRM9-02, T497-2	4.83	73.73	14.15	2.18	0.1	0.05	0.86	0.16	4.59	4.18
12	Lawlor Tuff	MRM43-03, T513-1	4.83	73.68	14.27	2.21	0.1	0.05	0.92	0.16	4.35	4.26
13	Calistoga Road tuff 1	MRM29-03, T512-1	3.22±0.02 (?)	74.8	13.89	1.78	0.09	0.03	0.5	0.16	3.53	5.23
14	Lawlor Tuff	MRM45-03, T513-2	4.83	73.87	14.22	2.16	0.09	0.04	0.89	0.17	4.52	4.03
15	Tuff of Napa-Healdsburg	MRM40-03, T512-10	4.65	72.44	14.53	2.98	0.09	0.08	0.94	0.21	5.53	3.19
16	Roblar Tuff	ASW-020102-C, T488-9	6.26±0.03	75.26	13.82	1.52	0.07	0.03	0.61	0.1	3.2	5.38
17	Northeast Santa Rosa tuff 2	MRM33-03 (Low Ca Pop), T512-6	undetermined	74.86	13.35	1.75	0.03	0.03	0.11	0.14	3.2	6.53
18	Tuff of Goodyear Station	MRM32-03, T512-5	>4.67 <4.83	75.23	13.46	1.84	0.04	0.04	0.69	0.15	4.11	4.45
19	Lawlor Tuff	MRM35-03, T512-7	4.83	73.84	14.26	2.04	0.1	0.05	0.92	0.17	4.27	4.33
23	Taylor Mountain tuff 1	MRM68-04, T527-3	undetermined	74.9	13.63	1.64	0.07	0.04	0.48	0.15	3.35	5.75
24	Roblar Tuff	MRM25-04, T523-4	6.26±0.03	75	13.6	1.45	0.06	0.01	0.58	0.11	4.65	4.53
25	Tuff of Zamaroni Quarry	MRM6-97, T395-7	7.26±0.04	76.01	12.98	1.39	0.04	0.02	0.47	0.09	3.86	5.13
26	Tuff of Mark West Springs	MRM29-05, T533-2	<~5.02 >4.8	74.81	13.83	1.68	0.05	0.04	0.79	0.1	3.87	4.83
27	Roblar Tuff	MRM12-04, T520-10	6.26±0.03	75.57	13.51	1.46	0.06	0.03	0.57	0.11	3.97	4.73
28	Tuff of Napa-Healdsburg	MRM31-05, T533-3	4.65	72.35	14.4	3.16	0.09	0.08	0.97	0.2	5.52	3.22
29	Taylor Mountain tuff 2	MRM16-04, T520-3	~6.26-7.26	76.61	13.59	1.53	0.07	0.03	0.53	0.14	2.23	5.28
30	Roblar Tuff	MRM15A-04, T517-3 MRM15B-04, T517-2	6.26±0.03 6.26±0.03	75.1 75.24	13.66 13.59	1.43 1.43	0.07 0.07	0.03 0.02	0.58 0.58	0.12 0.12	4.15 4.31	4.86 4.63
31	Tuff of Zamaroni Quarry?	MRM18-04A, T520-4	~7.26 (?)	76.58	13.02	1.3	0.09	0.02	0.56	0.12	3.69	4.61
32	Tuff of Mark West Springs	MRM33-04, T523-5	<~5.02 >4.83	75.05	13.86	1.68	0.04	0.02	0.78	0.12	3.41	5.02
33	Taylor Mountain tuff 3	MRM36-04, T517-4	undetermined	72.53	14.57	3.01	0.22	0.06	1.17	0.27	3.2	4.96
34	Unnamed, younger than Pinole Tuff?	MRM20-04A, T520-2 MRM20-04B, T523-3	undetermined undetermined	75.15 72.02	12.37 13.86	3.21 3.3	0.01 0.06	0.05 0.04	0.28 0.47	0.19 0.21	2.71 3.52	6.04 6.52
36	Unnamed, tuff north of Guenza Road	MRM32-05 (pop. 3), T533-4	□3.12	73.14	14.27	2.74	0.13	0.05	1.09	0.23	4.81	3.54
37	Pinole Tuff	MRM40-04, T517-6	5.2-5.4	71.45	14.43	3.47	0.05	0.1	1.1	0.25	5.82	3.34
38	Tuff of Zamaroni Quarry	MRM42-04, T517-7	7.26±0.04	75.9	13.13	1.36	0.04	0.04	0.45	0.09	4.01	4.99
39	Tuff of Mark West Springs	ASW-020102-D, T488-10	<~5.02 >4.83	74.78	14.02	1.7	0.05	0.04	0.78	0.11	3.21	5.31
40	Taylor Mountain tuff 4	MRM49-04 (Low Fe pop.), T527-1 MRM49-04 (High Fe pop.), T527-1	~6.26-7.26 (?)	77.67 76.39	13.08 13.59	0.63 1.51	0.02 0.09	0.03 0.03	0.35 0.6	0.06 0.1	3.12 3.06	5.04 4.63
41	Tuff in Warrington Road Breccia	MRM50-04 OBS, T528	<7.26>6.26	76.84	13.33	0.71	0.02	0.03	0.39	0.06	4.2	4.43
42	Tuff of Zamaroni Quarry	MRM38-04, T517-5	7.26±0.04	75.77	13.12	1.33	0.05	0.02	0.51	0.1	3.82	5.28
			RLS-132, obsidian standard	74.05	11.36	4.66	0.05	0.15	0.10	0.19	5.09	4.37
			Standard Deviation	0.65	0.10	9.04	0.01	0.01	0.01	0.01	0.16	0.05
			No. of runs (~20 shards/run)	83	83	83	83	83	83	83	83	83


122°45'
38°30'
(Mark West Springs 7.5' quadrangle boundary)
122°37'30"
(Calistoga 7.5' quadrangle boundary)
122°30"
SANTA ROSA
SANTA ROSA PLAIN
NORTHWEST
SONOMA
VALLEY
BENNETT
RINCON VALLEY
Melita
Bellevue
Boundary of mapping
(Sebastopol 7.5' quadrangle boundary)
U.S. Highway 101
3 KILOMETERS
3 MILES
38°22'30"
(Cotati 7.5' quadrangle boundary)
(Glen Ellen 7.5' quadrangle boundary)

Symbol	Tephra Unit	Interpreted Age Ma (Table 2.2)
●	Calistoga Road tuff 1	2.78-3.22
●	Calistoga Road tuff 2	2.78-3.22
●	Tuff of Cloverleaf Ranch	3.12
●	Unnamed tuff north of Guenza Road	3.12
●	Putah Tuff	3.22
●	Tuff of/below Napa-Healdsburg	4.65
●	Tuff of Goodyear Station	4.67-4.83
●	Lawlor Tuff	4.83
●	Tuff of Mark West Springs	4.8-5.02
●	Unnamed, younger than Pinole Tuff (?)	5.2-5.4
●	Pinole Tuff	5.2-5.4
●	Roblar Tuff	6.26
●	Taylor Mountain tuff 1	6.26-7.26
●	Taylor Mountain tuff 2	6.26-7.26
●	Taylor Mountain tuff 3	6.26-7.26
○	Taylor Mountain tuff 4	6.26-7.26
●	Tuff in Warrington Road Breccia	6.26-7.26
●	Tuff of Zamaroni Quarry	7.26
●	Northeast Santa Rosa tuff 1&2	undetermined

Figure 4. Index map showing locations of analyzed tephra and radiometrically dated samples from the Sonoma Volcanics in Santa Rosa and western Kenwood 7.5' quadrangles. Sonoma Volcanics are shown in pink, Quaternary sediments in beige. Tephra sample localities are shown as colored circles and correlate to data in tables 2 and 3. $^{40}Ar/^{39}Ar$ sample locations are shown as red triangles, and correlate to data in table 1.



▭ NONMARINE ALLUVIAL AND LANDSLIDE DEPOSITS (Holocene and Pleistocene)

▭ CLEAR LAKE VOLCANICS (Holocene to late Pliocene 0.01–2.2Ma)–Basalt to rhyolite

▭ GLEN ELLEN FORMATION AND UNNAMED FLUVIAL DEPOSITS (Pleistocene and Pliocene)–Gravels and siltstones of Glen Ellen Formation are largely >0.8–1.2 Ma and 3.2 Ma. Glen Ellen gravels overlie 2.8 –3.2 Ma volcanic rocks and the gravels commonly contain obsidian pebbles. Unnamed fluvial deposits include gravels that locally underlie or are interbedded with Sonoma Volcanics with an age ranging from 3.2 to 4.83 Ma. This unit also includes Huichica Formation southeast of Glen Ellen and the 3.3 Ma nonmarine fluvial and lacustrine gravels of Little Sulphur Creek

▭ SONOMA VOLCANICS (late Pliocene–late Miocene)–Basaltic and andesitic to rhyodacitic flows, breccias and tuffs ranging from 2.5 to ~8.0 Ma. Volcanics young toward northeast and interfinger with nonmarine to marine deposits of Wilson Grove and Petaluma Formations, and younger Pliocene gravels

▭ WILSON GROVE FORMATION (late Pliocene?–late Miocene)–Marine deposits with littoral to shelf depositional settings. Unit locally interfingers with 6.26 Ma Roblar Tuff of Sonoma Volcanics

▭ PETALUMA FORMATION (Pliocene–middle Miocene)–Fluvial, lacustrine and estuarine deposits that interfinger with lower Sonoma and Tolay Volcanics and volcanic rocks of Donnell Ranch. Locally interfingers with 6.26 Ma Roblar Tuff of Sonoma Volcanics. Gravels west of Healdsburg Fault near Santa Rosa, containing obsidian pebbles derived from 4.5 Ma source near Annadel, are tentatively included in the Petaluma Formation, but could be younger

▭ TOLAY VOLCANICS AND VOLCANIC ROCKS OF DONNELL RANCH (late and middle Miocene ~8.5 to 10.6 Ma)–Andesite to dacite

▭ VOLCANIC ROCKS OF BURDELL MOUNTAIN (middle Miocene ~11.6–12.2Ma)–Andesite to dacite

PRE–MIOCENE ROCKS (Middle Miocene to middle Jurassic)

▭ COAST RANGE OPHIOLITE AND GREAT VALLEY SEQUENCE (Cretaceous–Middle Jurassic)–

▭ FRANCISCAN COMPLEX (Late Jurassic–Eocene)–Includes rocks of Central belt and Coastal belt–

▭ ROCKS SOUTHWEST OF SAN ANDREAS FAULT, undifferentiated

⇄ Major strike slip faults and associated lineaments, arrows denote relative slip

— Faults not connected to major strike–slip faults

▲ Thrust faults, delineated locally

⬭ Area of Cotati gas field, discussed in text

✛ Oil wells discussed in text

✛ Water wells discussed in text

★ M 5.6 Epicenters and magnitude of mainshocks of 1969 Santa Rosa earthquake sequence

A — A' Lines of structure sections through Santa Rosa and adjacent 7.5' quadrangles

Figure 5. Regional geologic map showing location of Santa Rosa and adjacent 7.5' quadrangles, principal faults and related structural features, geographic locations, and lines of cross sections discussed in this report.

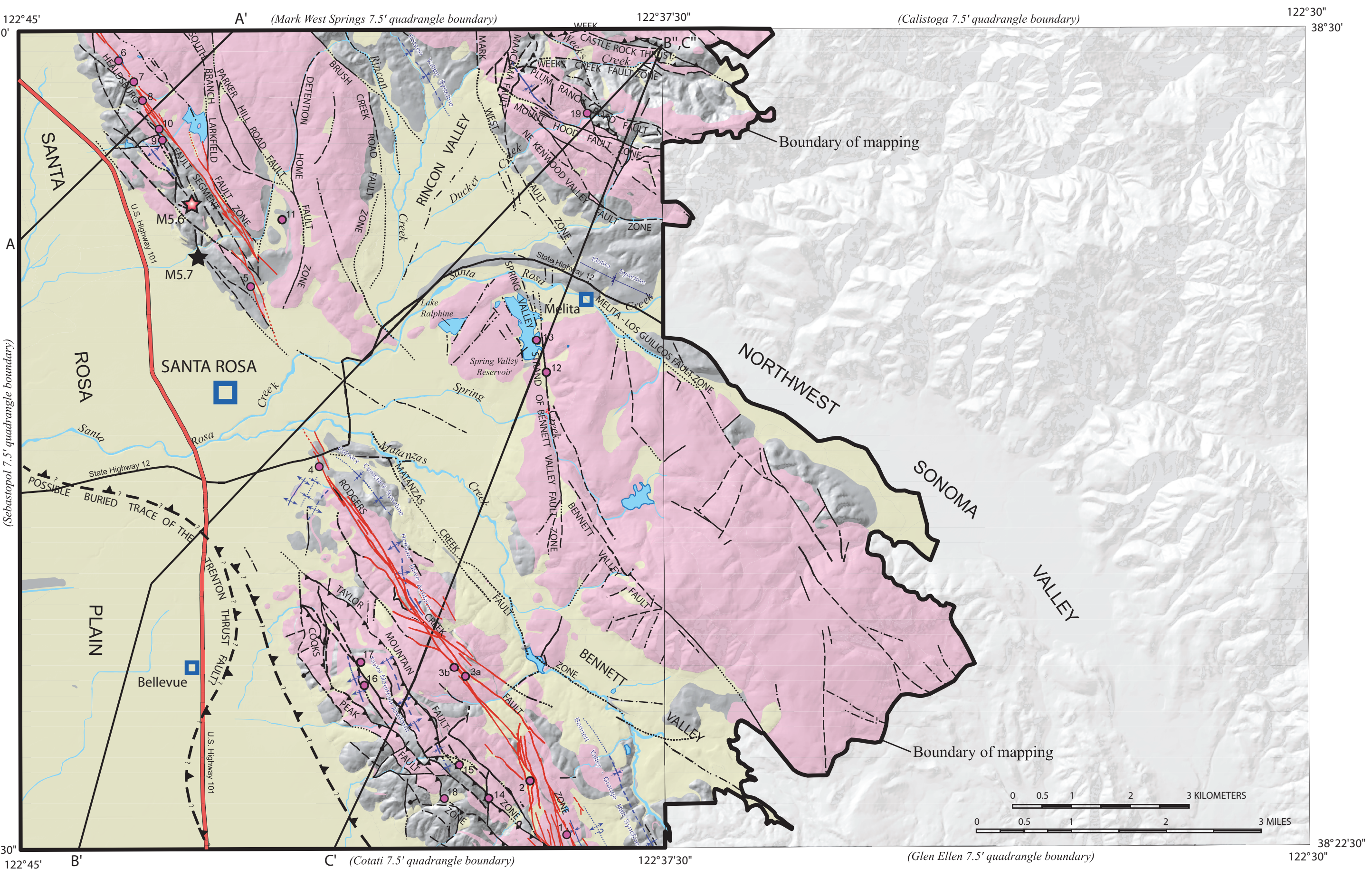


Figure 6. Map showing principal faults and folds and locations of structure sections in the Santa Rosa and western Kenwood quadrangles. Sonoma Volcanics are shown in pink, Quaternary deposits are shown in beige. Locations of the mainshocks of the 1969 Santa Rosa earthquake sequence (Wong and Bott, 1995) shown as red stars. Open squares show the locations of the cities of Santa Rosa, Bellevue, and Melita. Numbered magenta circles correspond to localities mentioned in the pamphlet text. Holocene traces of the Rodgers Creek and Healdsburg fault zones are shown in red, adopted from Graymer and others, 2006a. Heavy black lines with barbs delineate possible locations of traces of buried thrust faults on basement surface inferred from gravity data (Chapter B), along the southwest side of Trenton Ridge and east side of Bellevue basin.

Geologic and Geophysical Framework of the Santa Rosa 7.5' Quadrangle, Sonoma County, California

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2008

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