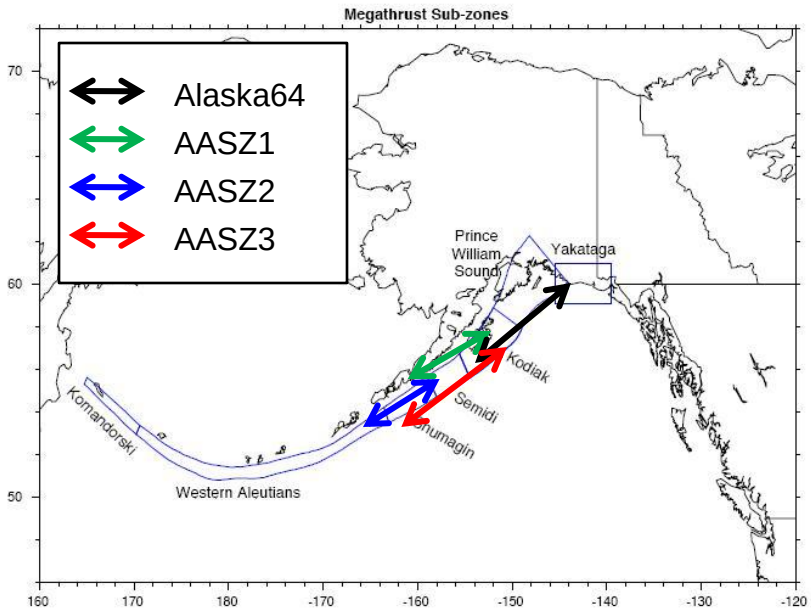
Four Scenarios Modeled from Alaska-Aleutians Subduction Zone

Scenarios Developed: Borrero, Dengler, Uslu, and Synolakis (2006) – Marine Oil Terminal Study in San Francisco Bay

Source Scenario Name	L (km)	W (km)	Slip (m)	dip (deg)	rake (deg)	strike (deg)	depth(km)	Mw	NOAA FACTS Segments
Alaska 1964	700	500	15	9.5	n/a	n/a	10	9.26	ABxyz: 21-28
Segment 1	400	200	10	10	90	218	5		
Segment 2	300	300	20	9	75	241	15		
Alaska-Aleutians I	600	100	10	15	90	n/a	5	8.9	AB: 17-22
Alaska-Aleutians II	600	100	10	15	90	n/a	5	8.9	AB: 13-18
Alaska-Aleutians III	800	100	25	15	90	n/a	5	9.2	AB: 15-22



Location	County	Historical High Tsunami Runup (mostly tide gauge data)		Historic High Runup Source Event	Max Onshore Runup (elev.)	AASZ3 = High Flow Depth - Distant Source	Alaska64	AASZ1	AASZ2
Crescent City	Del Norte	4.8	1964	7.1	5.3	4.7	3.1	1.9	
Humboldt - Inside Bay	Humboldt	2.2	1964	[illegible]	2.8	2.7	2.4	1.6	
Humboldt - Outside Bay	Humboldt			5.5	4.8	4.6	3.0	1.6	
Arena Cove	Mendocino	2.4	1946	6.7	3.7	1.9	2.0		
Bodega Bay	Sonoma	0.9	1964	6.4	4.6	2.9	2.5	1.4	
Point Reyes	Marin	0.4	2009	6.9	5.8	3.0	2.7	1.8	
Bolinas	Marin	1.5	1960	7.7	5.9	2.9	2.1	2.0	
San Francisco	San Francisco	4.5(?)*	1868	5.7	4.1	2.4	2.2	1.8	
Saucilito	Marin	1.8	1964	3.7	3.1	2.1	2.0	1.4	
Mare Island	Solano			1.6	1.2	0.9	1.0	0.9	
Richmond	Contra Costa			3.5	2.9	2.2	2.0	1.2	
Alameda	Alameda	0.6	1964	5.1	4.9	2.6	2.6	1.6	
Redwood City	San Mateo			2.1	1.6		1.3		
Pacifica	San Mateo	0.9	1960	7.4	5.6	4.1	2.7	1.5	
Half Moon Bay	San Mateo	4	1946	[illegible]	8.1		3.5		
Santa Cruz	Santa Cruz	3.4	1946	9	5.9	3.7	3.1	1.7	
Monterey	Monterey	2.4	1964	[illegible]	3.7	2.8	1.8	1.0	
Cayucos	San Luis Obispo			9.9	7.3	3.9	3.2	1.6	
Port San Luis	San Luis Obispo	1.5	1946	[illegible]	11.3	5.5	4.6	2.0	
Pismo Beach	San Luis Obispo	1.2	1960	9.6	8.1	4.0	4.0	2.3	
Pt Arguello (near platform)	Santa Barbara	1.2	1946	[illegible]	2.2	1.7	1.2	0.8	
Santa Barbara	Santa Barbara	2.1	1812	2.7	2.6				
Ventura	Ventura	2.1	1812	3.8	3.1	2.2	1.5	1.1	
Oxnard	Ventura	1.2	1960	3.1	2.6	1.6	1.6	0.9	
Malibu	Los Angeles			1.8	1.5	1.4			
Santa Monica	Los Angeles	1.5	1960	[illegible]	2.7	1.9	1.4	0.9	
San Pedro/LA Harbor	Los Angeles	2.1**	1877	5.1	4.0	2.4	1.3	0.8	
Huntington Beach	Orange			[illegible]	2.5	1.9	1.2	0.9	
Newport Beach	Orange			2.2	1.4	1.0			
Dana Point	Orange			2.5	2.1	1.7	1.3	1.0	
San Clemente	Orange			2.3	1.9	1.5	1.1	0.9	
Oceanside	San Diego			3.5	2.7	1.9	1.4		
Del Mar	San Diego			2.8	2.4	1.0	1.3		
La Jolla	San Diego	0.6	1964	2.8	2.3	1.2	1.3	0.9	
San Diego Bay	San Diego	1.2***	1882	2.1	1.3	1.0	0.9	0.8	
Coronado	San Diego			3.2	2.3	1.2	1.3	0.9	
Imperial Beach	San Diego			2.5	2.1	1.1	1.1	0.9	

Note: *questionable runup from 1868 EQ in Bay Area, **M8.3 1877 north Chile EQ, ***M5.9 1862 San Diego EQ

Potential Local Tsunami Sources Impacting California

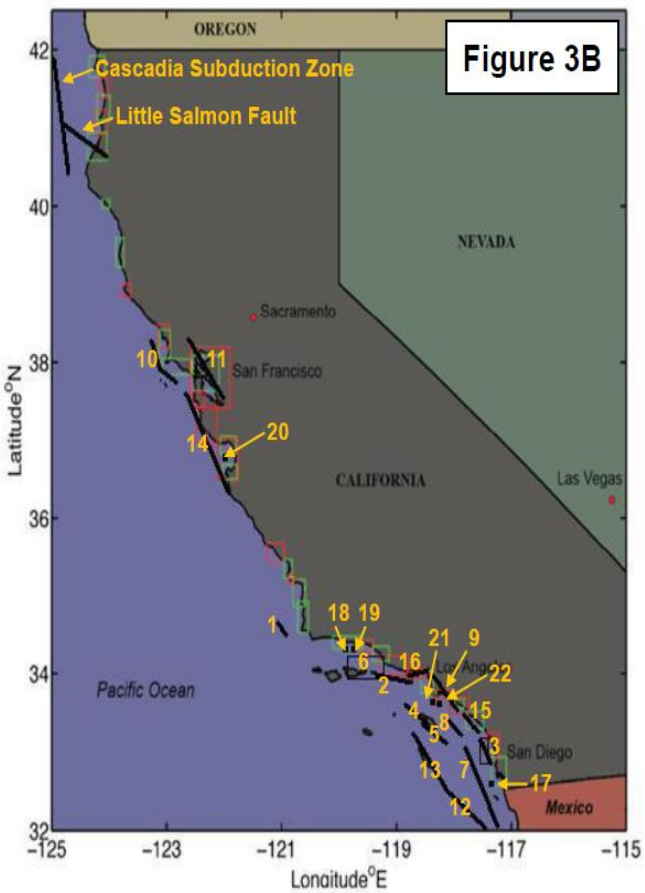


TABLE 2B: Database variables of local tsunami fault sources used in new statewide inundation mapping project.

Non-Cascadia Local Source Names	L (km)	W (km)	Slip (m)	dip (deg)	rake (deg)	strike (deg)	depth(km)	Mw
1-1927 Point Arguello Earthquake	28	14	2.5				3	7
2-Anacapa-Dume Fault	40	18	2.5	55	90	270	5 or 15	7.15
3-Carslbad Thrust Fault	30	12	5	30	90	324	1.5	
4-Catalina Fault	164	14	4.46	n/a	n/a	n/a	n/a	7.66
Segment 1	21.9	14	4	89	172.9	313	0.5	
Segment 2	28.2	14	5	85	143.1	293	1	
Segment 3	16.1	14.9	4.8	70	123.7	277	1	
Segment 4	20.2	14	3.6	80	146.3	303	1	
Segment 5	8.1	14	6.4	80	149	300	1.5	
Segment 6	40.2	14	4.5	80	153.4	297	1	
Segment 7	29.7	14	4.1	89	166	315	0.5	
5-Catalina Thrust Fault								
6-Channel Islands Thrust Fault	56	34	3.6	20	90	280	17	7.5
7-Coronado Bank Fault								7.34
Segment 1	39.56	10	2.4					
Segment 2	24.55	10	4.2					
Segment 3	29.66	10	2.8					
8-Oceanside Thrust, Lasuen Knoll Fault	16.7	12.5	2.2	n/a	n/a	n/a	0.5	7
Segment 1	8.8	12.8	1.5	70	135	290	0.5	
Segment 2	7.9	12.2	3	80	135	318	0.5	
Segment 3	10	12.2	5	80	135	316	0.5	
9-Newport Inglewood Fault	30	8	4	70	10	315	10	7
10-Point Reyes Thrust Fault	77	12	3.4	50			0.38	7.3
Segment 1	42		3.4	50		333		
Segment 2	35		3.4	50		300		
11-Hayward-Rodgers Creek Fault	10	18	1.5	70	-90	40	5	6.61
12-San Clemente Fault Bend Region	97	10	2.2					
shallow (surface)	30	8		70	162	305	7.6	
deep (blind)	25	14		48	134	270	16	
13-San Clemente Island Fault	30	8	8	70	162	305	7.6	7.54
14-San Gregorio Fault	50	15	2	60	90	320	5	7.1
15-San Mateo Thrust	27.75	12	4				0.5	7.11 or7.07
Segment 1	5.5	12	4	45	120	293	0.5	
Segment 2	11.4	12	4	45	120	322	0.5	
Segment 3	15	12	4	45	120	350	0.5	
16-Santa Monica Bay Fault	40	18	2.4	55	90	260	15	7.14

TABLE 2C: Database variables of local tsunami landslide sources used in new statewide inundation mapping project.

	Max Pos IC (m)	Max Neg IC (m)	LS Peak (m)	LS Trough (m)	Center Latitude	Center Longitude
17-Coronado Canyon Landslide						
18-Goleta Landslide Case 1	3	-7	6	-18		
19-Goleta Landslide case 2	3	-7	6	-18		
20-Monterey Canyon Landslide			2	-4		
21-Palos Verdes Landslide 1			3	-7		
22-Palos Verdes Landslide 2			3	-7		

FROM Wilson, R.I, Barberopoulou, A., Borrero, J.C, Bryant, W.A, Dengler, L.A., Goltz, J.D., Legg, M.R., McGuire, T., Miller, K.M., Real, C.R., and Synolakis, C.E., 2010b, Development of new databases for tsunami hazard analysis in California: *in* Lee, W.H.K., Kirby, S.H., and Diggles, M.F., compilers, 2010, Program and abstracts of the Second Tsunami Source Workshop; July 19-20, 2010: U.S. Geological Survey Open-File Report 2010-1152, 33 p.