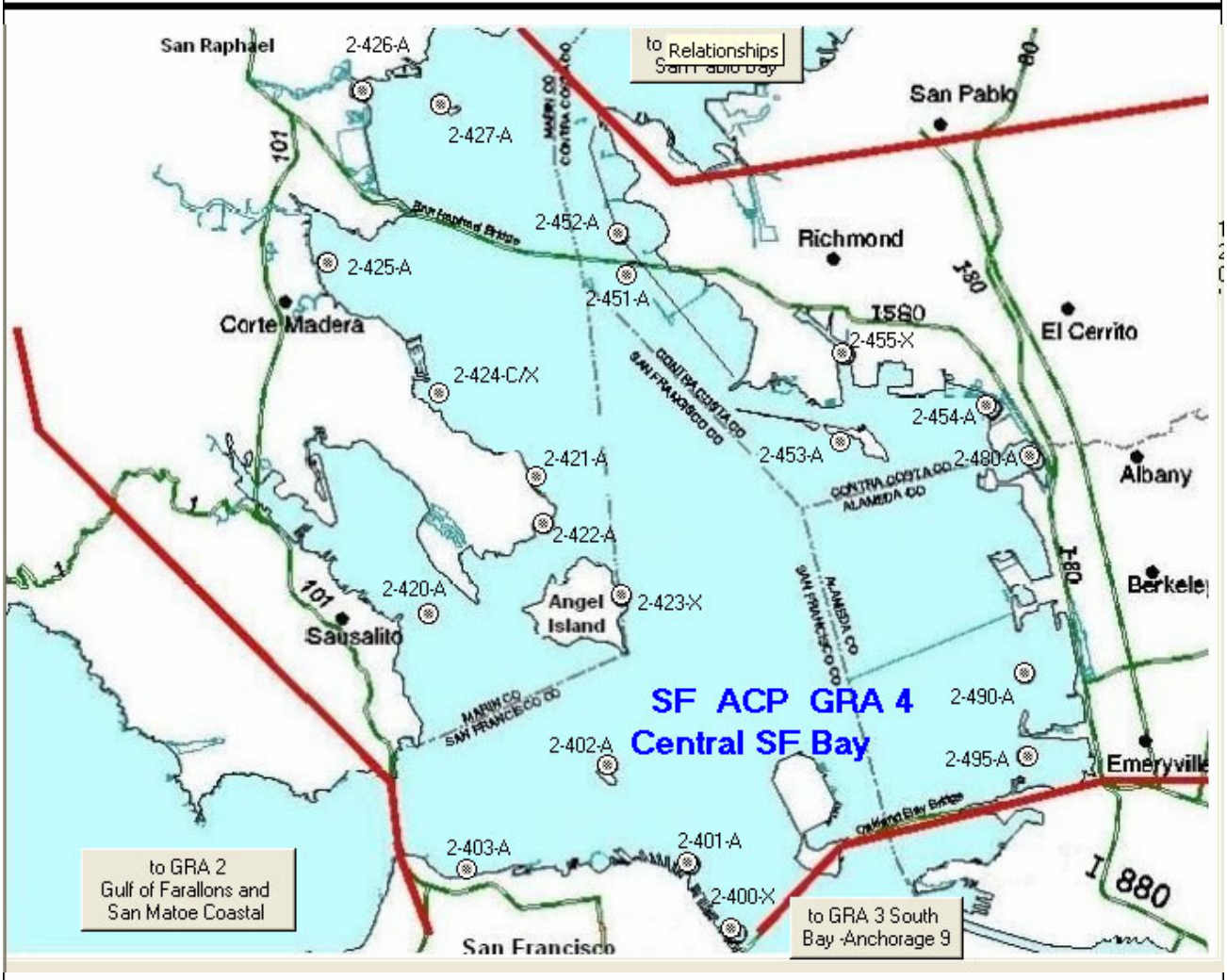
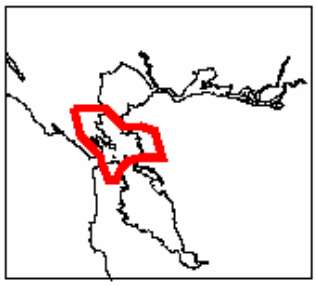
SF Geographic Response Area 4
Central SF Bay
Environmentally Sensitive Sites





0 5 10 Miles

Note: Marker symbols (⊙) are only site reference and do not indicate full extent of sites.

Section 9844 – GRA 4 Central San Francisco Bay

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Section 9844.2 Cultural and Other Resources at Risk

Section 9844.3 Economic Sites

Section 9844.4 Shoreline Operational Divisions

GRA 4 Site Index/Response Actions

Site ID	Priority	Site Name	Assignment	Date/Time Required	Date/Time Completed
2- 400		San Francisco Waterfront			
2- 401		Pier 39			
2- 402		Alcatraz Island			
2- 403		Crissy Field			
2- 420		Richardson Bay Marshes			
2- 421		Tiburon Peninsula			
2- 422		Kiel Cove			
2- 423		Angel Island			
2- 424		Paradise Cove			
2- 425		Corte Madera Marshes			
2- 426		San Rafael Creek Marsh			
2- 427		Marin Islands			
2- 451		Castro Rocks			
2- 452		Richmond Eelgrass Beds			
2- 453		Brooks Island			
2- 454		Richmond Inner Harbor/Hoffman Marsh			
2- 455		Santa Fe Channel			
2-480		Albany Marsh			
2-490		Berkeley Eelgrass Beds			
2-495		Emeryville Lagoon			

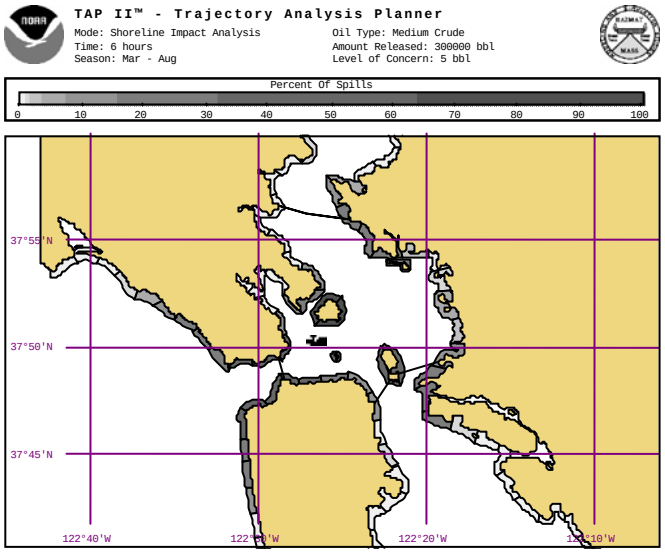
Summary of Geographic Response Area 4 Response Resources by Site and Sub-Strategy

Site	Site Name															
sub-strategy	PREVENTION OBJECTIVE OR CONDITION FOR DEPLOYMENT															
	Harbor Boom	Swamp boom	Other boom/TYPE	Sorbant boom	Anchoring No	type of gear	Boom boat	Skiff	Skimmer No	Type	Special Equipment No	and kinds	(and notes)	deploy staff	Staff t tend
2-400	***San Francisco Waterfront***														
.1	**-**	**Deflect to Collection at shoreline: recover oil at seawalls where there is shoreline access. Deflect oil to areas where curr**													
	6000			500	60	60	2	2	1	SSS				10	
.2	**-**	**Economic Objective: Exclude from intakes pier 72 - stop oil from entering the power plant cooling water intake.**													
	1600				4	4	2	1						8	
2-401	***Pier 39***														
.1	**-**	**Exclude oil from entering breakwater - to protect sea lions. Beware of high boat traffic activity here.**													
	1600			700		tie boom off to pilings / breakw	1		2	SSS 1			boom tending for traffic; manueverable boom boats	3	2
.2	**-**	**Sorbent Protection - complete the sorbent barrier in the interior of the marina breakwater to intercept seepage past boom**													
	0	0		1100	5	small anchors	0	1	0				1400 ft sorbent or swamp boom+5 anchors on standby	2	
2-402	***Alcatraz Island***														
.1	**-**	**Protection booming in unusual conditions: When wave reflection will not likely keep oil off shoreline, protect the sensiti**													
	800				7	40# danforths w/ 1/2" chain	1		0					3	
.2	**-**	**Deflection booming in unusual conditions: When wave reflection will not likely keep oil off shoreline, deflect oil away fro**													
	2100	0	0	0	15	40# danforths w/ 1/2" chain	2	0	0		0			6	
2-403	***Crissy Field Tidal Marsh***														
.1	**-**	**Primary: Exclude oil from entering the mouth**													
		300			1	12+/danforth & stakes		1						3	
.2	**-**	**Back-up: exclude / collect: capture of oil which excapes past primary protection**													
		400		300	3	3/22+/danforth & Stakes & line	0	0						2	
.3	**-**	**Exclude by berming**													
	0	0	0	0	0		0	0	0		0		skiploader and culvert	3	
2-420	***Richardson Bay Marshes***														
.1	**-**	**Prmary: Exclude oil at bay mouth by booming Sausalito main channel and Tiburon minor flood channels. This is main pa**													
	2700			300	12	22#+/danforths + chain	3	1	0				Bboats capable of shallows & obstructions	11	
.2	**-**	**Secondary exclusion; Part 2 - complete exclusion across the low current portion of the bay. This is added-on to previous**													
	3300	0	0	300	6	22#+ danforths	2	0	0		0			6	
.3	**-**	**Exclude/collect oil that has entered Richardson Bay**													
		3100	600 OS	600	12	12/22+/danforths + chain	2	1	2	SSS			Bboat: shallow draft	8	2
2-421	***Tiburon Peninsula & Paradise Cove***														
.1	**-**	**At Paradise cove, deflect to collection during ebb and away from shores during flood**													
	2000	4500		0	13	22# danforths w. 5/16" chain	2	1	0					8	2
.2	**-**	**At Bluff Point, deflect oil to natural collection sites**													
	1200	0	600 OS	0	0		1	0	0					3	
2-422	***Keil Cove***														
.1	**-**	**Protection booming for eelgrass and coarse sand beach.**													
	0	2400			7	20#+ w/ 10' 1/2" chain	2						1,200 feet of 1/2" anchor rope	6	
2-423	***Angel Island***														
.1	**-**	**Collection: natural collection at Blunt Pt & Quarry Pt.**													
	2600	1200	0	0	20	20 20# w/ 20' 1"chain	2	1					1000' 1/2" anchor line	10	
2-424	***Paradise Cay Eelgrass & Marina***														
.1	**-**	**Primary: Assess vulnerability of eelgrass to oil**													
	0	0	0	0	0		0	0	0		1		aircraft or skiff	2	
.2	**-**	**exclusion around eelgrass nearshore area immediately south of Paradise Cay**													
		4500		0	6	22#+ danforths	1	1	0					4	
.3	**-**	**exclude oil from Paradise Cay Marina**													
	0	500	0	0	6	13#+ anchors	0	1	0		0			2	
2-425	***Corta Madera Marshes***														
.1	**-**	**Exclude oil from entering tidal inlets and cove mouth and creek.**													
	8200	600		600	16	16/22+/danforths & chain + sta	6	1	0				Bboats very shallows & obstructions impervious	20	
.2	**-**	**containment for upstream oil spills**													
	0	3	0	0	3	1 22#+ & 2/12#+ anchors	0	1	0		0			2	
2-426	***San Rafael Creek Marsh***														
.1	**-**	**Exclusion from San Rafael Creek and local harbors**													
	3000				8	8/22+/danforths & stakes	1	1					Very Shallow draft boom boats.	5	
.2	**-**	**Shoreline protection when marshy margins are threatened by severe oiling - north and south of creek mouth.**													
	6900	600			8	8/22+/danforths & stakes	3	2					Very Shallow draft boom boats.	12	
2-427	***Marin Islands***														

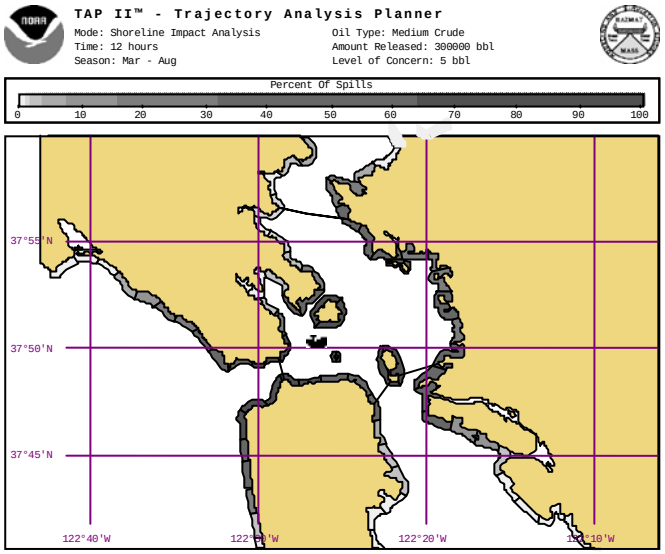
Site	Site Name															
sub-strategy	PREVENTION OBJECTIVE OR CONDITION FOR DEPLOYMENT															
	Harbor Boom	Swamp boom	Other boom/TYPE	Sorbant boom	Anchoring No	type of gear	Boom boat	Skiff	Skimmer No	Type	Special Equipment No	and kinds	(and notes)	deploy staff	Staff t tend	
.1 -	Deflect oil past islands with chevron at east end.															
	3000				7	7/22+/danforths + chain.	3	0						9		
.2 -	protective enclosure booming of both islands in the event of heavy oil threat.															
	4000				7	7/22+/danforths + chain	4	0						12		
2-451	Castro Rocks															
.1 -	Deflection/exclusion of oil from west or southwest in ebb or flood - deploy protection legs 1 (SW) and 2 (NW)															
	3000				13	5/40+/northhill, & 5/22+/Danfor	3	0					maneuverable Bboats & 1500' line	11		
.2 -	Deflection/protection boom for oil from south and southeast on flood currents in a chevron on the north side of the rocks															
	6000				9	5/40+/northhill, & 4/22+/Danfor	3	1					maneuverable Bboats & 1500' line	11	2	
.3 -	Deflection/exclusion for oil from north or northwest on ebb in a chevron on the north side of the rocks - protection legs 2															
	3000	2500			15	5/40+/northhill, & 10/22+/Danf	3	1					maneuverable Bboats & 1500' line	11	2	
.4 -	Confine/deflect oil to shore for collection after completion of protection strategy															
	2300				6	22#+ daforth with heavy chain	3	1						11		
.5 -	Backup secondary boom when oil overwhelms initial protection strategy															
	0	6000	600	OS	0	6 22#+ anchors	2	1	0		0			8		
2-452	Richmond Eelgrass Beds															
.1 -	Exclude oil from pocket marsh at Castro Pt.															
	0	300			2	stakes or anchors	0	1						2		
.2 -	exclude oil from emergent eelgrass bed in coves between Molate Pt and Pt Orient.															
	2500				6	22#+ with chain	2	1						6		
.3 -	Deflect to Collection/confinement at shoreline when oil impacts are likely to be heavy and unavoidable at this site															
	4500	500			22	22#+ w/ 10' 1" chain	3	2	3	SSS			2,500' 1/2" anchor line	11		
2-453	Brook's Island															
.1 -	PRIMARY: Exclusion Booming on south side of spit: exclude oil from high marsh and break in spit															
	2300	0	0	0	7	22#+ danforths	1	1	0		0			4		
.2 -	North shore exclusion for north-side threat to shoreline, jetty breech, marsh entry (Sante Fe Channel and Richmond Cha															
	0	3200	0	0	8	5/22#+ danforths+ 3 stakes	1	1	0		0			4		
2-454	Richmond Inner Harbor/Hoffman M															
.1 -	Exclude oil from marsh entry channels															
	2500	1100		200	8	6-8 25# danforth, 15' 1/2 chain	2	2	1				Shallow draft boom boat.	8		
.2 -	protection for splash-over or porous breakwater															
	0	0	0	0	0		0	0	0		0					
.3 -	Protection booming															
	5000	0	0	0	11	22# danforth, 15' 1/2 chain	3	1	0		0		very shallow water boom boats	12		
2-455	Santa Fe Channel															
.1 -	Contain/collect oil within Channel and prevent oil from leaving the channel and threatening sensitive sites immediately o															
	6200			500	10	10	5							10		
2-480	Albany Marsh															
.1 -	Primary: Exclude oil from embayment on northwesterly winds by directing oil to collection.															
	2500				6	22#+ /danforths	3	2					very shallow Bboats	11		
.2 -	Exclude oil from embayment on west or southwesterly winds.															
	1500			100	8	22#+ /danforths	2	1	1	shallow				8		
.3 -	Backup initial exclusion strategy when strong winds or wave conditions are likely to move oil past initial exclusion deplo															
		2500		2500	6	22#+ /danforths	1	1					very shallow draft vessels	5		
.4 -	Skimming when skimmable thicknesses of oil are present.															
	0	200	0	200	3	6#+ anchors	0	1	1	SSS	0			2	2	
2-490	Berkeley Eelgrass Beds															
.1 -	Assess need for protective booming: Eelgrass is only vulnerable at very low tides when eelgrass tops are exposed to flo															
	0	0	0	0	0		0	0	0		0		none	1		
.2 -	Protective / deflective booming when oil coming from the west															
	5000			2000	14	20 /20# w/ 10' 1" chain	10	2						20		
2-495	Emeryville Lagoon/Mudflats															
.1 -	Exclude/Deflect oil past the site and exclude it from entering lagoon by winds, waves and very light tidal current															
	3600				7	7/22+/danforths + chain	3	2					Bboat: very shallow draft at south side	11		
.2 -	Exclude/Deflect oil when there are aggressive waves.															
	4500			2000	28	28/22+/danforth + 15' chain	3	3	1	SSS			Bboat: 1 very shallow draft	15		
.3 -	Collection at shoreline favored by prevailing currents															
	0	100	50	OS 200	0		0	0	1	SSS	0			2		

PROBABILITY OF OIL REACHING EACH SITE STRATEGY IN GRA 4

GRA 4



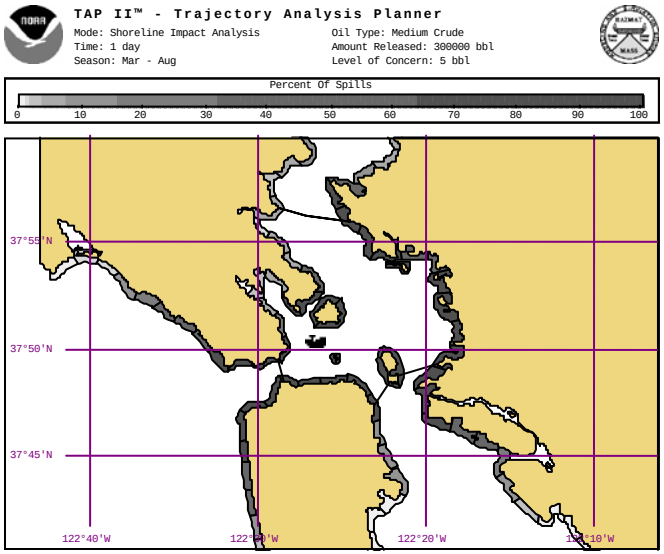
6 hours from start of spill



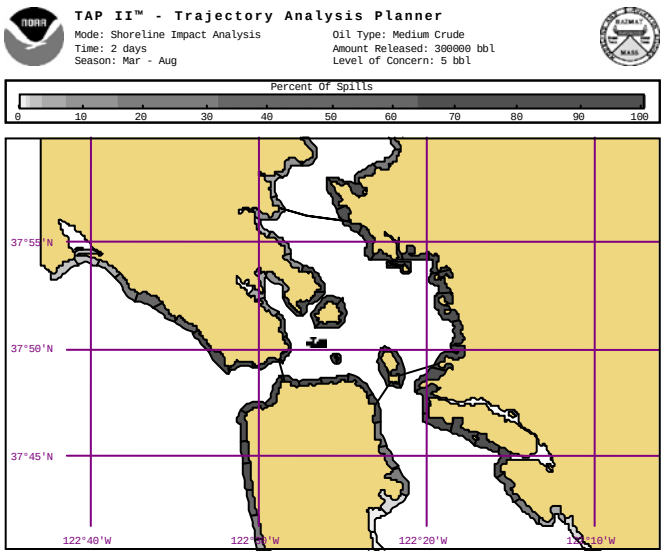
12 hours from start of spill

TAP II Maps for GRA4 Scenario: Spill of 300,000 bbls of crude at Harding Rock in the Spring. The shades of grey at each impacted site correspond to a percentage in the legend of the number of spill scenarios (from 500 runs of various wind, tides and currents) that brought more than 5 bbls (= Level Of Concern) of oil to that site in the specified time frame (6 hours or 12 hours).

GRA 4



24 hours from start of spill



48 hours from start of spill

TAP II Maps for GRA 4 Scenario: Spill of 300,000 bbls of crude at Harding Rock in the Spring. The shades of grey at each impacted site correspond to a percentage in the legend of the number of spill scenarios (from 500 runs of various wind, tides and currents) that brought more than 5 bbls (= Level Of Concern) of oil to that site in the specified time frame (24 hours or 48 hours).

Table of Percent of Spills that bring oil (> 5bbls) to each site from the GRA4 scenario.

ACP SITE#	ES	SITENAME	LAT N (Deg. Min.)	LONG W (Deg. Min.)	6 HOURS (% prob)	12 HOURS (% prob)	24 HOURS (% prob)
2-423	C	Angel Island	37 54	122 27	79	98	100
2-236	C	Pt. Diablo to Lime Pt.	37 49	122 30	64	81	95
2-422	B	Keil Cove	37 55	122 27	54	55	80
2-351	A	Yerba Buena Island	37 48	122 22	53	88	97
2-402	B	Alcatraz Island	37 50	122 25	50	87	96
2-244	A	Land's End	37 47	122 30	46	69	94
2-246	A	Cliff House and Seal Rocks	37 47	122 31	46	69	94
2-234	C	Point Bonita and Bonita Cove	37 49	122 31	37	59	74
2-228	A	Rodeo Lagoon	37 50	122 32	34	53	70
2-231	A	Bird Island	37 49	122 32	34	53	70
2-421	C	Tiburon Peninsula	37 54	122 27	12	31	55
2-424	B	Paradise Cove	37 54	122 27	12	31	55
2-420	A	Richardson Bay Marshes	36 56	122 30	15	46	73
2-248	A	Ocean Beach/Fort Funston	37 45	122 30	29	44	68
2-452	A	Richmond Eelgrass Beds	37 58	122 24	26	44	81
2-455	C	Santa Fe Channel	37 55	122 22	25	42	79
2-451	A	Castro Rocks	37 50	122 24	25	36	78
2-452	A	Richmond Eelgrass Beds	37 58	122 24	25	36	78
2-453	A	Brook's Island	37 54	122 21.5	23	44	86
2-225	A	Redwood Creek/Muir Beach	37 52	122 35	21	37	59
2-222	A	Bolinas Lagoon	37 55	122 40	20	31	51
2-401	B	Pier 39	37 48	122 22	15	54	81
2-420	A	Richardson Bay Marshes	36 56	122 30	15		
2-219	B	Duxbury Reef	37 53	122 40	14	22	38
2-501	A	Castro Creek and Marshes	37 58	122 24	14	16	44
2-495	A	Emeryville Lagoon/Mudflats	37 50	122 29	12	38	82
2-400	C	San Francisco Waterfront	37 46	122 23	8.6	36	71
2-506	A	San Pablo Bay Eelgrass Bed	37 59	122 25	6.8	16	44
2-490	A	Berkeley Eelgrass Beds	37 51	122 19	4.8	33	72

2-454	A	Richmond Inner Harbor/Hoffman Marsh	37 54.5	122 20	3.4	27	60
2-427	A	Marin Islands	37 58	122 28	3	3.8	10
2-420	A	Richardson Bay Marshes	36 56	122 30	2.8		
2-490	A	Berkeley Eelgrass Beds	37 51	122 19	2.6	29	74
2-480	A	Albany Marsh	37 54	122 19	1.6	30	70
2-216	B	Point Resistance	38 00	122 50	1.6	4.4	8.8
2-213	B	Miller Point	37 59	122 49	1.6	4.4	8.8
2-210	A	Double Point and Stormy Stack	37 57	122 47	1.6	4.4	8.8
2-552	A	China Camp Marsh	38 00	122 28	1.6	3.8	10
2-420	A	Richardson Bay Marshes	36 56	122 30	0.8		
2-454	A	Richmond Inner Harbor/Hoffman Marsh	37 54.5	122 20	0.4	23	56
2-420	A	Richardson Bay Marshes	36 56	122 30	0.4		
2-302	C	Alameda Eelgrass Beds	37 45	122 16	0.2	7.8	38
2-425	A	Corte Madera Marshes	38 56	122 30	0.2	1.4	5.2
2-426	A	San Rafael Creek Marsh	37 58	122 29	0.2	0.4	2.4
2-425	A	Corte Madera Marshes	38 56	122 30	0.1		
2-502	A	San Pablo Creek Marshes	37 58.5	122 23		3.8	13
2-506	A	San Pablo Bay Eelgrass Bed	37 59	122 25		3.8	13
2-303	A	San Leandro Bay	37 45	122 13		3.6	26
2-354	B/A	Islais Creek - Pier 94 Saltmarsh	37 44.3	122 22.5		3	10
2-353	B/A	Herron's Head Park - India Basin	37 44.3	122 22.5		3	9.4
2-304	C	Bay Farm Island Eelgrass Beds	37 44	122 15.5		0.2	11
2-503	A	Pinole Pt. Marshes-South	37 59	122 21.6		0.2	7.4
2-504	A	Pinole Pt. Marshes - North	38 05	122 21			6.4
2-250	A	Thornton Beach State Park	37 42	122 30			2
2-205	A	Drakes Estero	38 02	122 56			1
2-207	A	Limnatour Spit	38 02	122 55			1
2-201	A	Point Reyes Headlands	38 00	123 00			0.8
2-203	A	Drakes Beach (West)	38 07	122 57			0.8
2-352	B	South Basin, Hunters Point	37 43	122 23			0.6
2-505	A	Pinole Creek and Wetlands	38 01	122 18			0.6
2-552	A	China Camp Marsh	38 00	122 28			0.6

Response Priorities For Harding Rock Scenario* - GRA 4

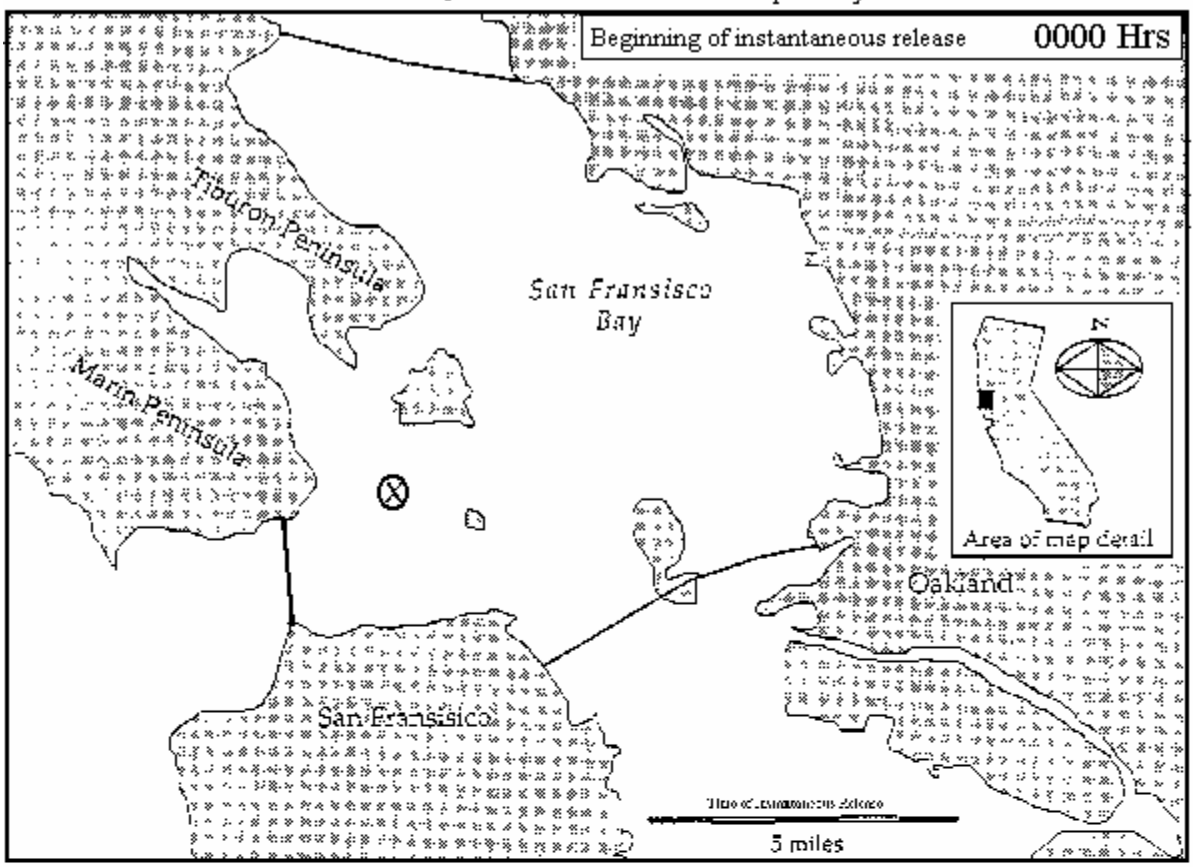
TIDE AND WIND AT TIME OF INSTANEOUS DISCHARGE	TIME PERIOD OILED (HOURS)	PRIORITY	SITE ID	SITE DESCRIPTION
FEBRUARY SCENARIO	0	1		Spill Site Containment
300,000 bbl ANS Crude	0	2		On-Water Recovery
Slack < flood @ 0600	0-3	3	2-402	Alcatraz Island
Historical wind data	3-6	4	2-420	Richardson Bay Marshes
Runoff unknown	3-6	5	2-495	Emeryville Lagoon and Mudflats
	3-6	6	2-490	Berkeley Eelgrass Beds
	3-6	7	2-424	Paradise Cove
	3-6	8	2-452	Castro Rocks
	3-6	9	2-35-	Yerba Buena Island
	3-6	10	2-252	Richmond Eelgrass Beds
	6-12	11	2-454	Richmond Inner Harbor & Hoffman Marsh
	6-12	12	2-401	Pier 39
	12-24	13	2-453	Brook's Island
	12-24	14	2-480	Albany Marsh
	12-24	15	2-425	Corte Madera Marsh
	12-24	16	2-426	San Rafael Creek Marsh
	12-24	17	2-427	Marin Islands
	12-24	18	2-352	South Basin, Hunters Pt.
	12-24	19	2-244	Land's End
	12-24	20	2-236	Pt. Diablo - Lime Pt
	12-24	21	2-307	Alameda Eelgrass Beds
	24-48	22	2-234	Pt. Bonita & Bonita Cove
	24-48	23	2-246	Cliff House and Seal Rocks
	24-48	24	2-248	Ocean Beach/Fort Funston
	48-72	25	2-309	San Leandro Bay
AUGUST SCENARIO	0	1		Spill Site Containment
300,000 bbl ANS Crude	0	2		On-Water Recovery
Slack < flood @ 0600	6-12	3	2-402	Alcatraz Island
Historical wind data	12-24	4	2-236	Pt. Diablo - Lime Pt
Runoff unknown	24-48	5	2-350	Yerba Buena Island
	24-48	6	2-424	Paradise Cove
	48-72	7	2-425	Corte Madera Marsh
	48-72	8	2-420	Richardson Bay Marshes
	48-72	9	2-453	Brooks Island
	48-72	10	2-452	Richmond Eelgrass Beds
	48-72	11	2-495	Emeryville Lagoon and Mudflats
	48-72	12	2-490	Berkeley Eelgrass Beds

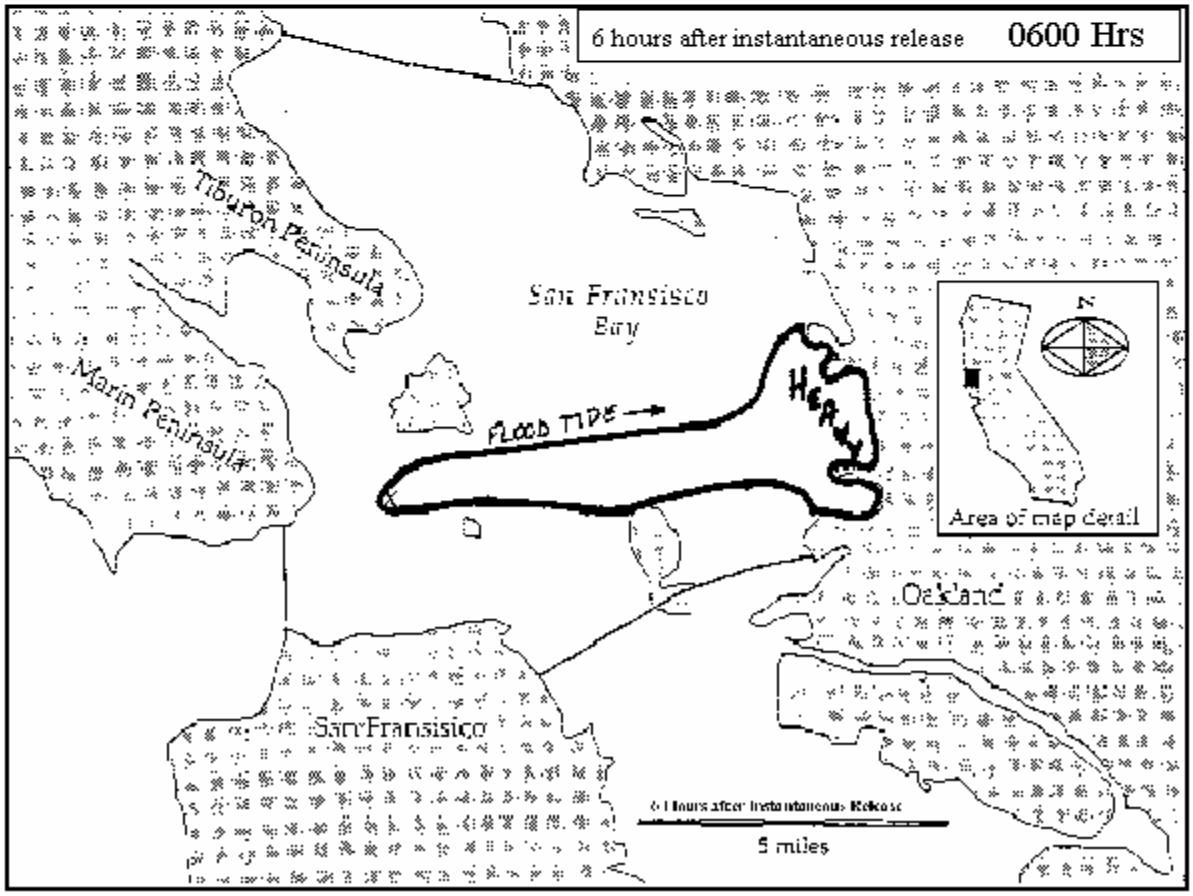
* Based on the NOAA trajectory model run 29 June 1994

Harding Rock Spill Scenario Map

12,000 Barrels of Alaska North Slope Crude

Use Only as a General Reference.
Oil may move beyond map boundaries.
Prepared by NOAA





Harding Rock Spill Scenario Map

12,000 Barrels of Alaska North Slope Crude

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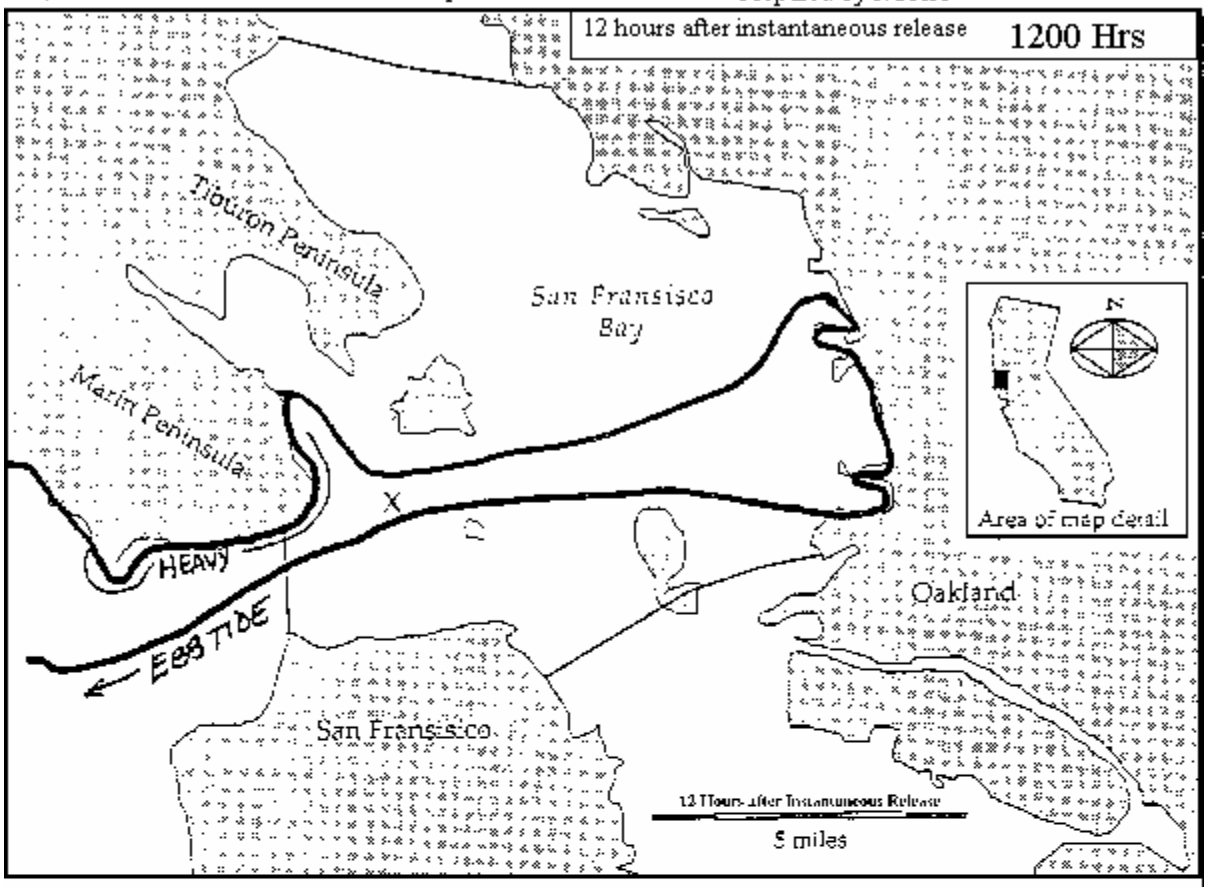
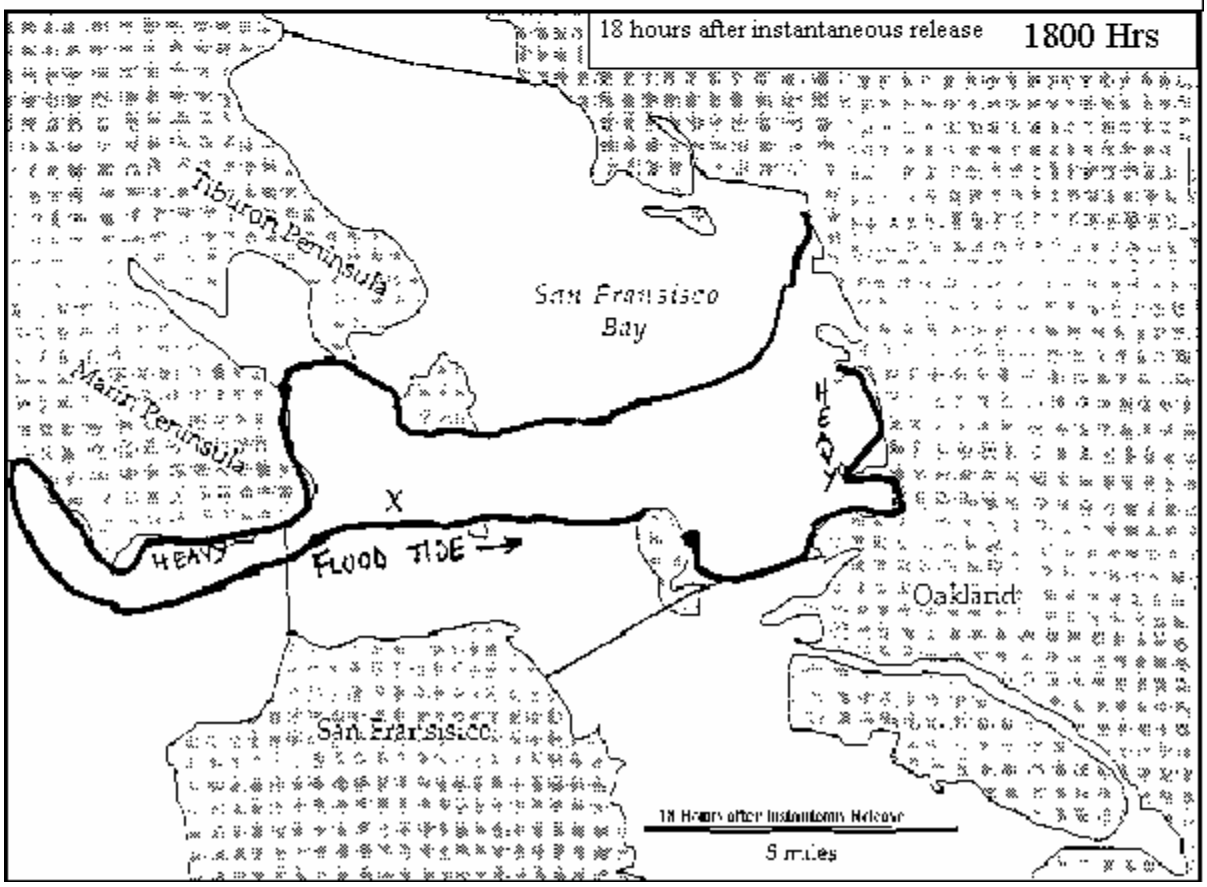
Oil may move beyond map boundaries.
Prepared by NOAA

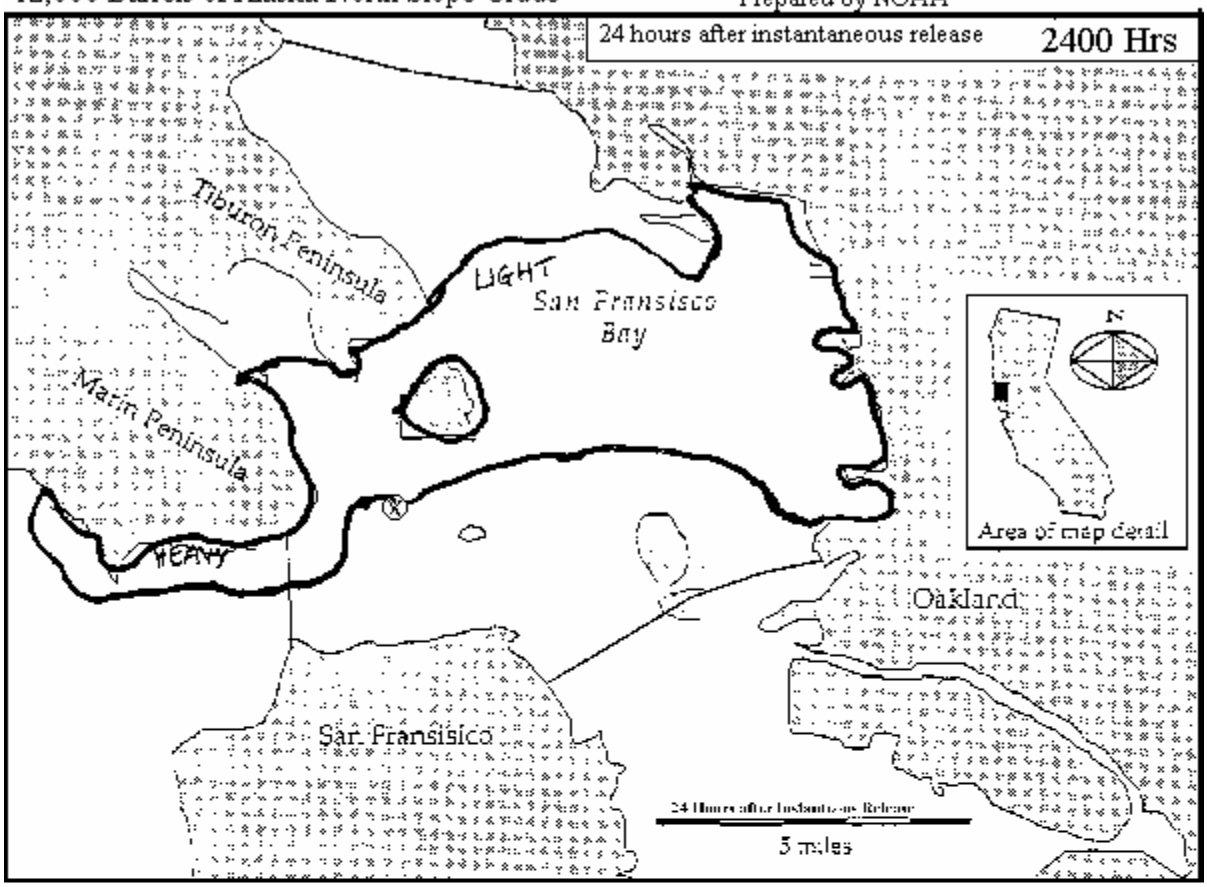


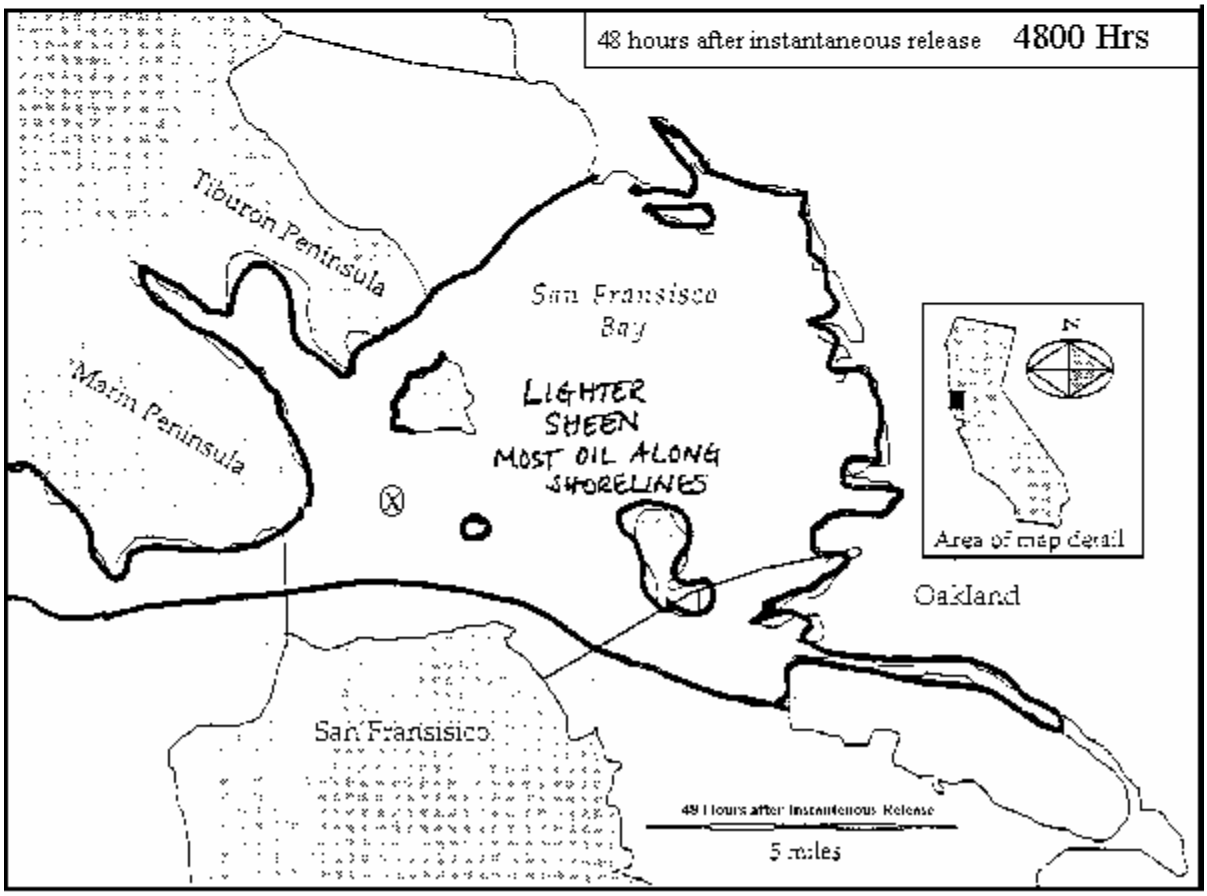


Harding Rock Spill Scenario Map

12,000 Barrels of Alaska North Slope Crude

Use Only as a General Reference.
Oil may move beyond map boundaries.
Prepared by NOAA

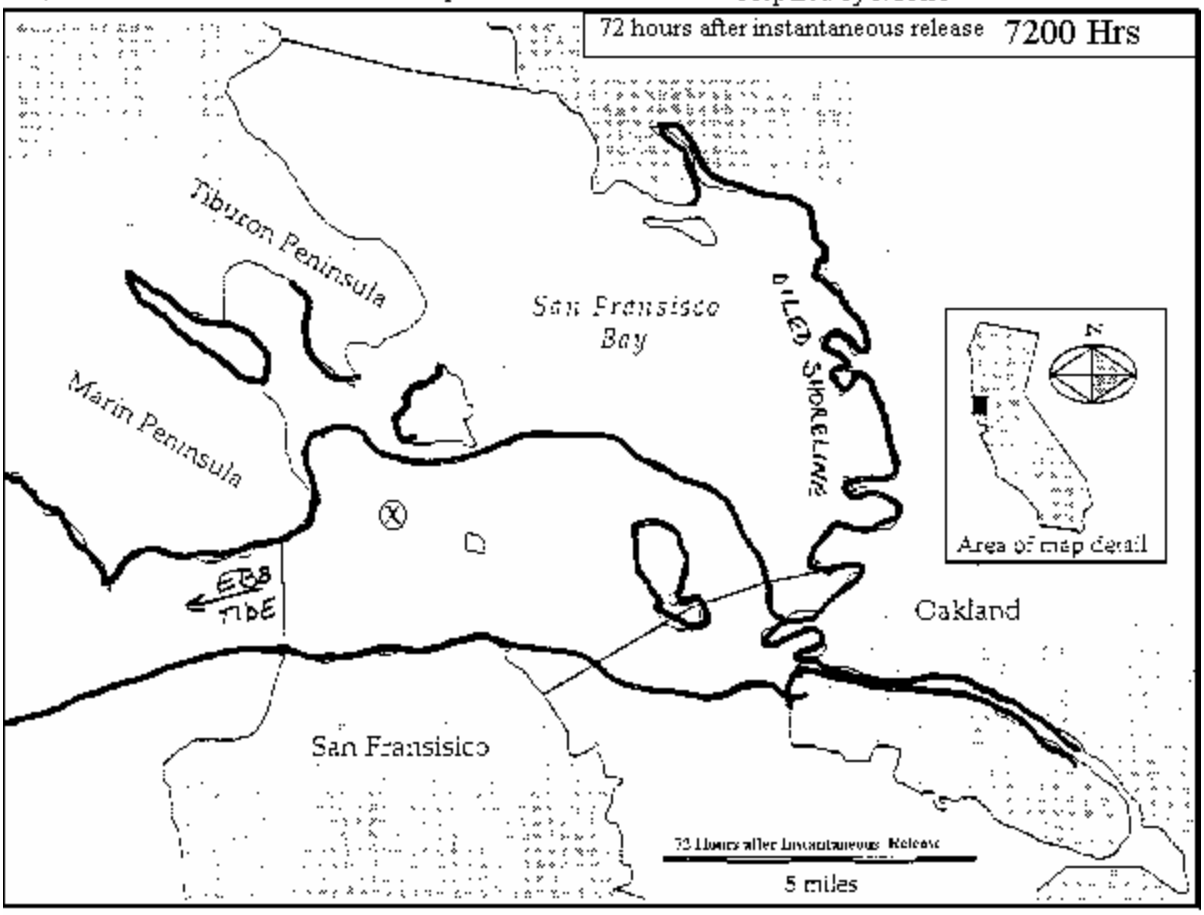




Harding Rock Spill Scenario Map

12,000 Barrels of Alaska North Slope Crude

Use Only as a General Reference.
Oil may move beyond map boundaries.
Prepared by NOAA



Site Summary- San Francisco Waterfront Collection/Protection

County:	San Francisco	Thomas Guide Location	AAA - San Franc	Latitude N	3 7 46	Longitude W	122 23
USGS Quad:	San Francisco North	NOAA Chart:	Entrance to San Francisco Bay18649				

Last Page Update : 1/1/2000

SITE DESCRIPTION:

The shoreline of San Francisco from Fort Mason to the Bay Bridge. This shoreline consists of man made structures including piers, seawalls and rip rap. The bottom of the channels generally consist of soft sediments. Currents can be strong, approaching 6 knots.

SEASONAL and SPECIAL RESOURCE CONCERN

Herring spawn during the winter. There are water diversions near Potrero Pt. (pier 72) and India Basin (pier 98).

RESOURCES OF PRIMARY CONCERN

Aquatic vegetation and invertebrates growing on pilings, seawalls and riprap may be injured by oil and cleanup activities. Herring spawn on these surfaces during the winter months.

Sea birds are present throughout the year.

Herring spawn here in the winter. Fish are present throughout the year.

Algae and invertebrates live on all hard surfaces

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
B	Peter Baye, Ph.D. Coastal Plant Ecologist		(415) 310-5109
	Baylands Nature Preserve Office	Baylands Nature Preserve	(650) 329-2506
O	City of San Francisco	San Francisco, City and County of	(415) 556-8371
B	Diane Watters	CA Dept. of Fish & Game	(650) 631-2535

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - San Francisco Waterfront Collection/Protection

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA - San Franc San Francisco	Entrance to San Francisco Bay18649	3 7 46	122 23

Last Page Update :

CONCERNS and ADVICE to RESPONDERS:

This collection strategy should be used to take advantage of the slow water between piers and the boats at anchor to divert oil out of swifter along shore currents to shoreline where collection is possible.

HAZARDS and RESTRICTIONS:

There are sunken obstructions to navigation in many areas, sunken vessels and old pier pilings.

SITE STRATEGIES

Oil moving along the SF waterfront tends to move swiftly in the currents off the end of the wharfs were current may exceed 3 knots, but alongshore eddies and pier pilings slow currents making opportunities to collect oil. Oil may be deflected to collection into these quieter waters, between piers, and eventually at collection points in the slow moving water at the shoreline.

Strategy 2-400.1 **Objective: Deflect to Collection at shoreline: recover oil at seawalls where there is shoreline access. Deflect oil to areas where current is slowest to minimize the distance the oil travels, especially on the ebb tide.** ACP DATE 10/2/2005

Deflect oil to the shoreline and setup shore side skimmers (SSS). Some potential collection sites are at the steps on the promenade near the foot of Howard St. (diagram site a) and the foot of pier 39. Also, deploy short pieces of small boom between piers and other manmade structures down current from the spill source to direct oil to slowest waters at shoreline. The boom should be placed at an angle to the current to prevent entrainment, and should be tightened sufficiently to prevent the current from bending the boom such that some portion of it is perpendicular to the current. Where oil entrains under a boom another length of boom must be placed down current of the first to catch the entrained oil and deflect it to slower moving water near shore.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No and kinds	staff deploy	Staff tend
2-400.1	6000			500	30	22+#	2	2	1	SSS		10	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

Boat launch ramp near pier 50 at Mission Rock Resort, 817 China Basin St. Shoreline access from the Embarcadero and China Basin St. The shoreline of San Francisco from Fort Mason to the Bay Bridge.

LAND ACCESS: There is access for large trucks on most piers and seawalls.

WATER LOGISTICS:
Limitations: depth, obstruction — There are sunken obstructions to navigation.

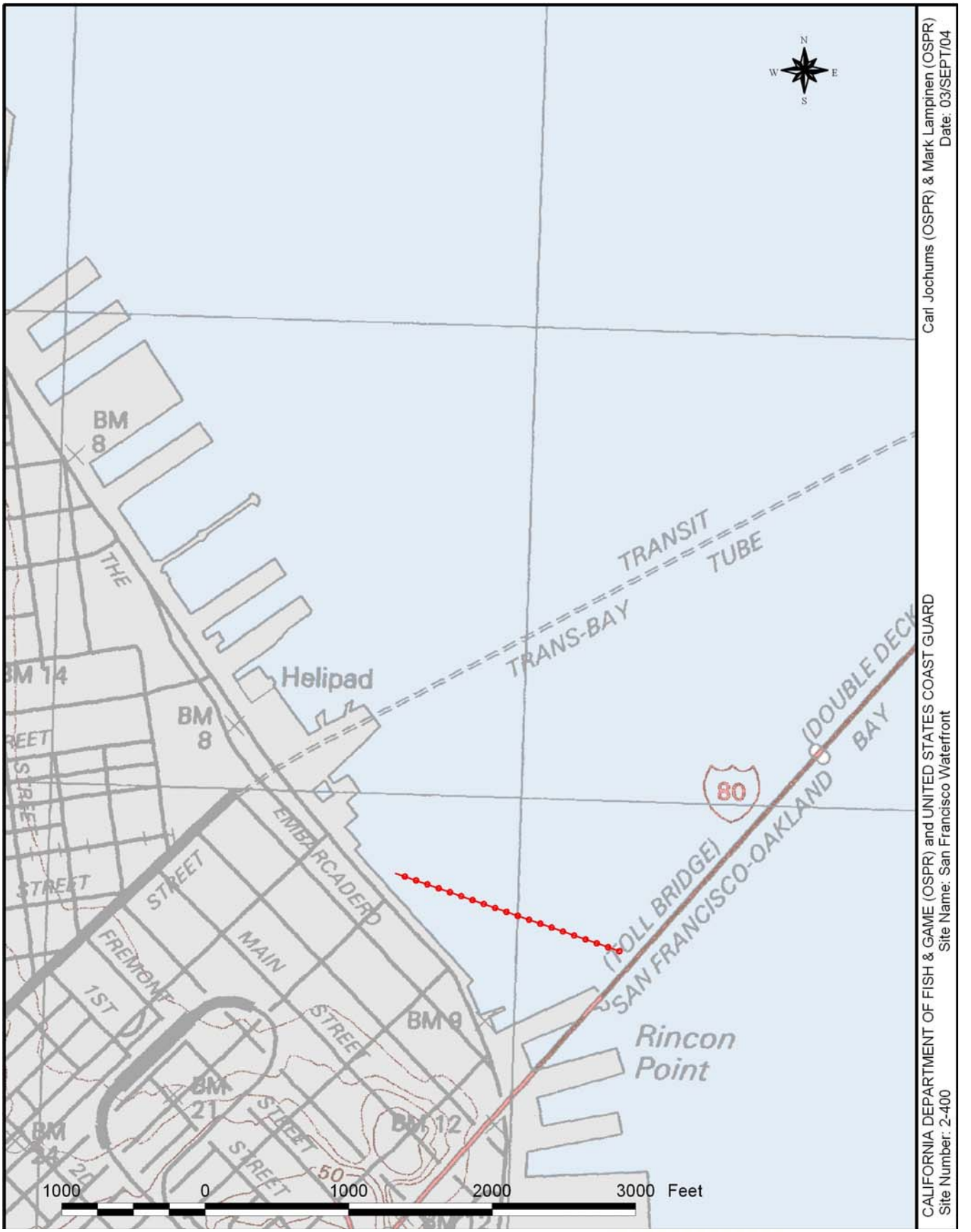
Launching, Loading, Docking and Services Available: Boat launching is available near pier 50 at Mission Rock Resort, 817 China Basin St.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Flat paved areas for staging and field posts are common throughout this area

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Pier 39

2-401 -B

County:	San Francisco	Thomas Guide Location	AAA - San Franc	Latitude N	3 7 48	Longitude W	122 22
USGS Quad:	San Francisco North	NOAA Chart:	Entrance to San Francisco Bay 18649				

Last Page Update : 7/1/2005

SITE DESCRIPTION:

This site is the basin bounded by Pier 39 on the northeast and seawalls on the other sides. It is an abandoned marina. California sea lions haul out on the former docks of the marina. These floating docks and all of Pier 39 are fronted with a sea wall along the outer perimeter. This area is entirely man made structures. Several times each day, the commuter ferry passes by these floating sealion haulout docks and moores nearby.

SEASONAL and SPECIAL RESOURCE CONCERN

This is a B priority from August through March.

RESOURCES OF PRIMARY CONCERN

This is a haulout for 500 to 600 juvenile and adult California sea lions from August through March. This is a B priority from August through March and a C priority the remainder of the year.

California sea lions haul out at this location.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
B		Empty	
ELO	Carol Bach	Port of San Francisco	(415) 274-0568
T	Dispatch GGNRA	US National Park Service, Golden Gate (NRA)	(415) 561-5505
T	M. Park	US Fish and Wildlife Service	(510) 792-0222

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - Pier 39

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA - San Franc San Francisco	Entrance to San Francisco Bay 18649	3 7 48	122 22

Last Page Update :

CONCERNS and ADVICE to RESPONDERS:

Sea lions that inhale or ingest petroleum can be expected to be injured or die.

HAZARDS and RESTRICTIONS:

Beware of high (ferry) boat traffic activity here, large wakes, potential for 2 to 3' seas. Piers, pilings.

SITE STRATEGIES

Strategy 2-401.1 **Objective: Exclude oil by booming from entering breakwater. TEND BOOM To permit Ferry traffic.** ACP DATE 1/15/2007

(This is a high traffic and commuter terminal; so, there will need to be staff tending the booms at north entry to allow for traffic, unless the marina is closed by IC/UC). Exclude oil from entering the two vessel entrances to Pier 39 with harbor boom. 200 ft is needed at the north entrance and 500 ft is needed at the east entrance. Complete exclusion by booming the north and west side of the marina and breakwater. Approximately 900 ft of harbor boom is needed along the breakwall located on the west side of Pier 41 to prevent oil from passing through breakwater and along western margin. At the north mouth, angle boom such that a shore side skimming operation can be operated on pier 39 (access has been verified by Clean Bay). At east entrance, angle boom such that a shore side skimming (SSS) operation can be operated on near the foot of pier 35. A self propelled skimmer (SPS) may be necessary near the north mouth, and shore side staff should confer with on water Ops through ICS. Back entry booms with sorbent 700 ft.

Strategy 2-401.2 **Objective: Sorbent Protection - complete the sorbent barrier in the interior of the marina breakwater to intercept seepage past booms or through breakwater.** ACP DATE 1/15/2007

Complete the sorbent enclosure inside of breakwalls. Use approximately 1100 ft on east side of Pier 41m to link with the 200 ft at the north entrance. If oil is entering along through the concrete seawall around the Pier 39 marina (east side of pier 39), then an additional 1400 ft of sorbent or swamp boom (and 5 anchors) will be needed to line the east side breakwater to link up with the 500 ft of sorbent and boom at the east entrance (assess and request additional resources). Light anchoring will be needed to keep sorbent positioned near breakwaters and preventing them from hanging up during hightides. (five anchors)

Strategy 2-401.3 **Objective: skimming oil with 1 SPS skimmer and 1 Shoreside Skimmer** ACP DATE 1/15/2007

One shoreside skimmers can be operated at the southeast corner of the marina. A self propelled skimmer should be operated within and mostly at the west side of the pier to collect free-floating oil.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-401.1	1600			700		tie boom off to pilings / breakwall	1					boom tending for traffic; manueverable b	3	2
2-401.2	0	0		1100	5	small anchors	0	1	0			1400 ft sorbent or swamp boom+5 ancho	2	
2-401.3	0	0	0	0	0		0	0	2	1 SSS 1	0		4	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

From the Oakland-San Francisco Bay Bridge (Highway 80), take the Embarcadero Street exit. Proceed on Embarcadero Street for approximately two miles, Pier 39 will be on your right. Access via "K" dock gate from Pier 39. This site is the basin bounded by Pier 39 on the northeast and seawalls on the other sides. It is an abandoned marina. California sea lions haul out on the former docks of the marina.

LAND ACCESS: paved access for vehicles

WATER LOGISTICS: none
Limitations: depth, obstruction

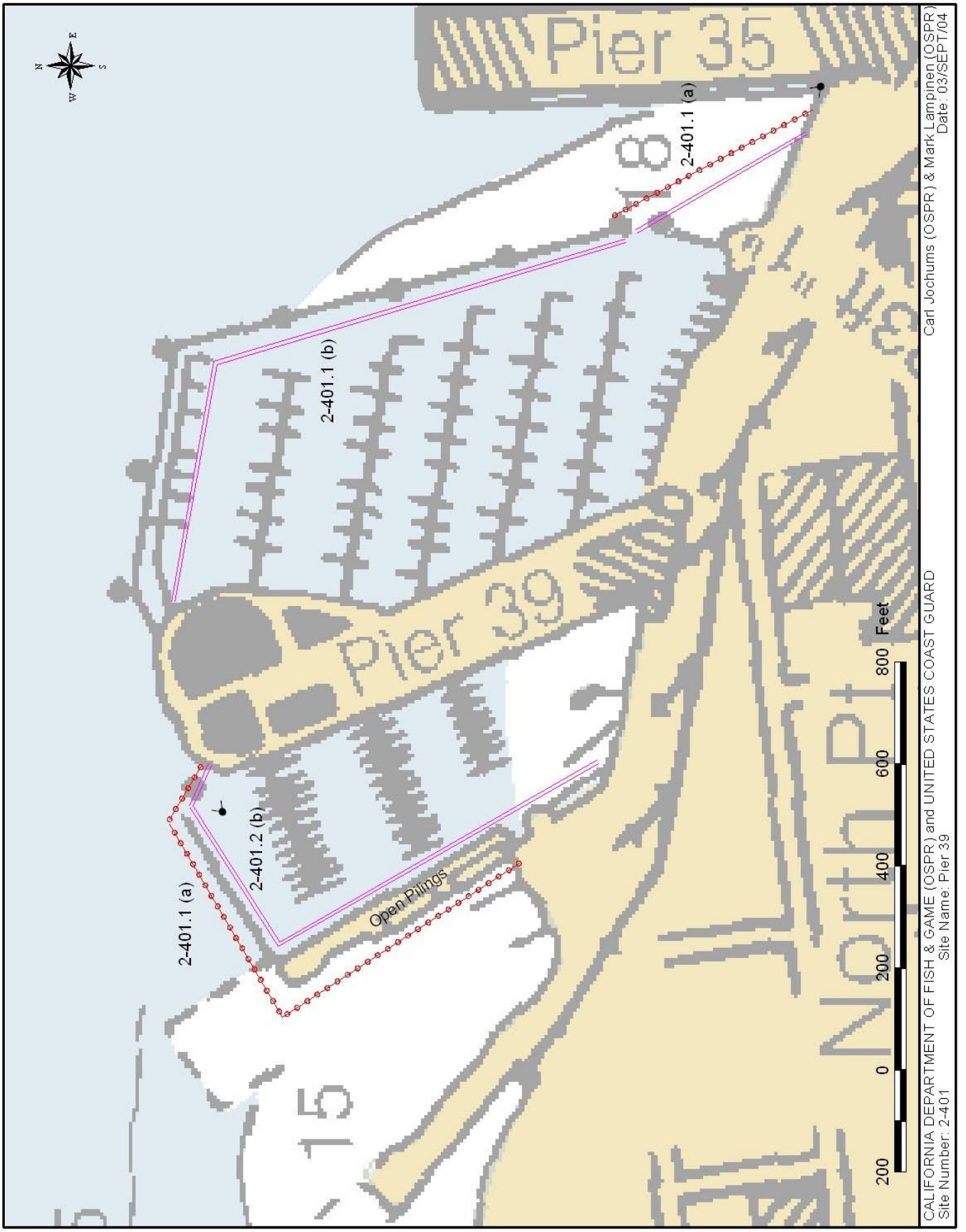
Launching, Loading, Docking and Services Available: Launching: Harbor Drive, Sausalito; Turney St, Sausalito; Berkeley Marina; Emeryville Marina; Fifth Ave. Marina, Oakland; Ballena Isle Marina, Alameda Fuel: Gashouse Cove, San Francisco

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

San Francisco OES will identify available staging areas, field posts and command posts.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Alcatraz Island

2-402 -C

County:	San Francisco	Thomas Guide Location	AAA - San Franc	Latitude N	3 7 50	Longitude W	122 25
USGS Quad:	San Francisco North	NOAA Chart:	Entrance to San Francisco Bay 18649				

Last Page Update : 1/1/2000

SITE DESCRIPTION:

Alcatraz Island is a historical site which includes an old prison and lighthouse. The island is located in central San Francisco Bay and exposed on all sides to extreme tidal current, wave action, and weather conditions. The shorelines are rocky intertidal platforms on the west and southwest sides; a gravel beach extends from the southern rocky platforms to the eastern side; rock cliffs are present on the majority of the west, north, and northeast sides; and pier pilings and dock facilities are present on the east side. The buildings are operated as a National Historic Park by Golden Gate National Recreation Area.

SEASONAL and SPECIAL RESOURCE CONCERN

RESOURCES OF PRIMARY CONCERN

Bird breeding colonies all around the island are of primary concern during spring and summer. Rocky intertidal platforms on the east and southwest sides has rich and diverse life year-round. Generally, sensitivity is low because intertidal resources are wet and deluged with wave-wash and, consequently, petroleum does not tend to penetrate or stick. Most nesting habitat is above the influence of spilled material. Also, there is a lot of wave refraction off the island shores which tends to keep oil off the island.

Site is important because western gulls, cormorants and black crowned night herons breed and rest here.

Pacific herring may spawn and transverse this area in the winter time .

Numerous intertidal species inhabit the rocky areas of this site.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

This is a national historic site. For specific information on historic or cultural resources in this area, contact the Golden Gate National Seashores cultural / historic staff, California Dept of Parks and Recreation - Office of Historic Preservation, (Eric Allison - 916-653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College (707-664-2494))

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	DPR Dispatch	US National Park Service, Golden Gate (NRA)	(415) 561-4620

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - Alcatraz Island

2-402 -C

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA - San Franc San Francisco	Entrance to San Francisco Bay 18649	3 7 50	122 25

Last Page Update :

CONCERNS and ADVICE to RESPONDERS:

Based on experience, oil doesn't impact this site because waves reflect off the rocky shoreline keeping oil off. Distrubance of nesting birds in Spring and Summer is a real concern. The gravel beach would be difficult to clean if affected. Anchoring is difficult but possible on the W,S, and E sides of the island. Depths range from 30 to 80 ft. close to the island. Strong flood and ebb currents exist here. Back eddies form on the east side during flood tide.

HAZARDS and RESTRICTIONS:

There is a wash rock located off the west tip of the island and shallow rock platforms and rocks near shore.

SITE STRATEGIES

Strategy 2-402.1 **Objective: Protection booming in unusual conditions: When wave reflection will not likely keep oil off shoreline, protect the sensitive rocky intertidal zone on the south eastern part ot the island.** ACP DATE 1/1/2000

In order to protect the sensitive rocky intertidal zone on the south easterlyside of the island, use 650 to 800 ft of harbor boom. Position the boom from the dock around the south and west sides to the end of the rocky intertidal bench located near the bird colony on the cliff. The boom will act to deflect oil into the current and protect the shoreline.

Strategy 2-402.2 **Objective: Deflection booming in unusual conditions: When wave reflection will not likely keep oil off shoreline, deflect oil away from and around west end of island when wave refraction is unlikely to keep oil off the shoreline** ACP DATE

On the west end of the island, position boom in a deflection wedge configuration off the bell buoy or anchored to the reef to deflect oil into current away from island. Boom legs 600 to 1000 ft each.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-402.1	800				7	40# danforths w/ 1/2" chain	1		0				3	
2-402.2	2100	0	0	0	15	40# danforths w/ 1/2" chain	2	0	0		0		6	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

Alcatraz is an island located in central San Francisco Bay. Access is available by boat only. Alcatraz Island is a historical site which includes an old prison and lighthouse.

LAND ACCESS: Access available by water only.

WATER LOGISTICS: Limitations: depth, obstruction — Submerged rocks on west and south shores

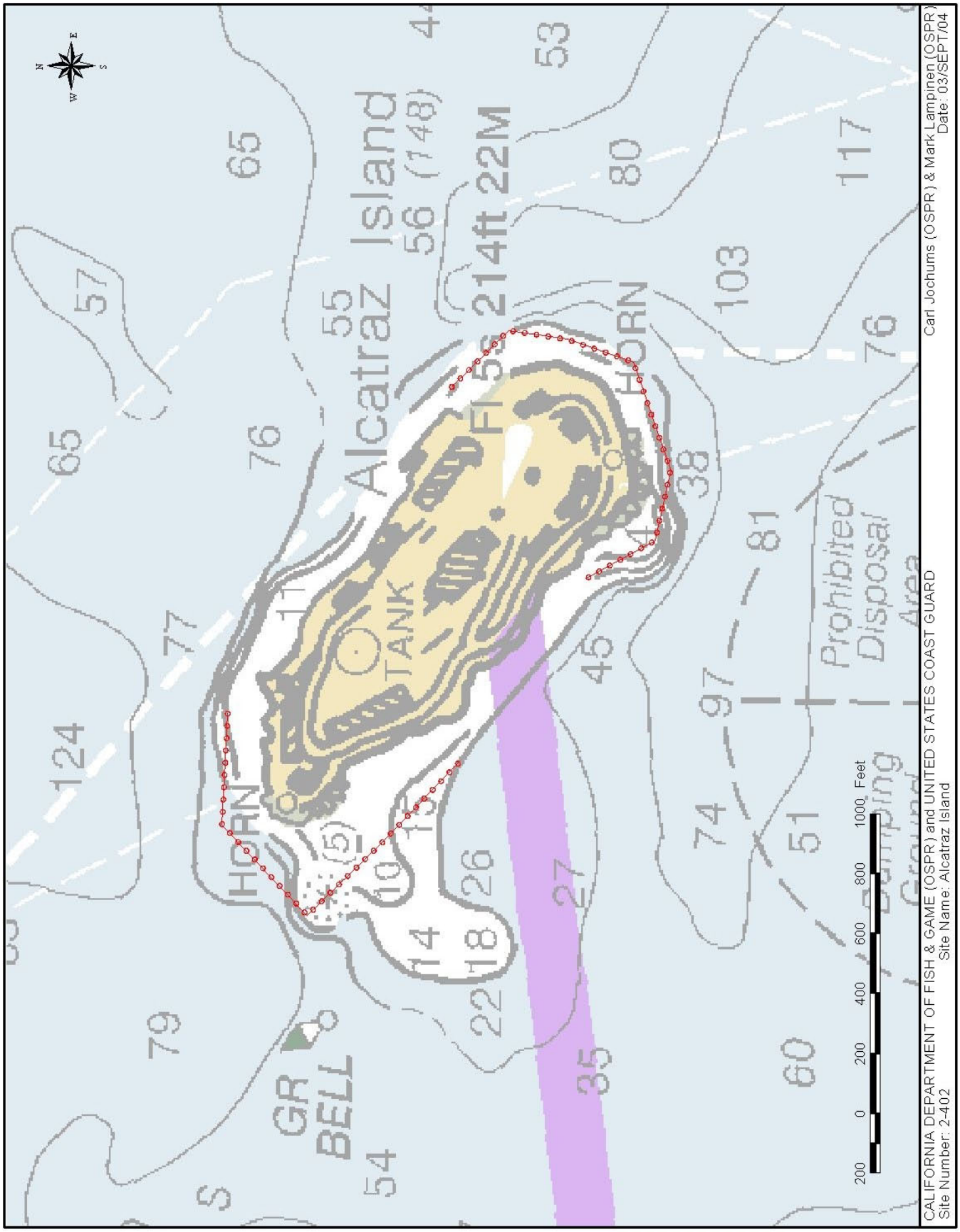
Launching, Loading, Docking and Services Available: — National Parks Service maintains landing at east end of island. Otherwise boat services are at San Francisco shoreline

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Staging, storage and skimming systems from land could be accommodated on the dock located on the east side of the island. Extensive services are at the SF shoreline

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Crissy Field Tidal Marsh

2-403 -A

		Thomas Guide Location	Latitude N	Longitude W
County:	San Francisco		37 48.3	122 27.3
USGS Quad:	San Francisco North	NOAA Chart: Entrance to San Francisco Bay 18649		

Last Page Update : 9/15/2005

SITE DESCRIPTION:

Crissy Field Tidal Marsh is a restored wetland at the east end of Crissy Field and includes a tidal channel which opens to San Francisco Bay at the east end of the marsh. This wetland lies within Golden Gate National Park, and the primary contact is Daphne Hatch or Vika Sirova (dispatch is 415-561-5505) It was constructed and opened to tidal exchange in 1999. It is being revegetated with native species. It is an uncommon habitat for waterbirds and shorebirds in an urban habitat, thus, has great value as a resting area. The tidal inlet has silted in remarkably and has not yet scoured a low flow channel. There is a large community focus and investment in this marsh.

SEASONAL and SPECIAL RESOURCE CONCERN

Marshes have " A " sensitivity and protection priority year-round.

RESOURCES OF PRIMARY CONCERN

This is a restored tidal marsh. Native species are being established. Tidal marshes are very vulnerable to oil impacts

This marsh is important resting and foraging habitat for bay birds. It is particularly important bird habitat in an otherwise urban setting.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

This is a cultural/historic site. For specific information on historic or cultural resources in this area, contact the Golden Gate National Seashores main office, cultural resource specialist, the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125, and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)).

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
CBLCT	DPR Dispatch	US National Park Service, Golden Gate (NRA)	(415) 561-4620
EO	Dispatch GGNRA	US National Park Service, Golden Gate (NRA)	(415) 561-5505
BTE	Daphne Hatch	US National Park Service, Golden Gate (NRA)	(415) 331-0744
B	Jan Roletto Research Coordinator	National Marine Sanctuaries, Gulf of the Farallones	(415) 561-6622
TEO	Vika Sirova	US National Park Service, Golden Gate (NRA)	(415) 561-4409

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - Crissy Field Tidal Marsh

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
San Francisco	Entrance to San Francisco Bay 18649	37 48.3	122 27.3

Last Page Update : 9/15/2005

CONCERNS and ADVICE to RESPONDERS:

The concern is to keep oil from entering the marsh by excluding it at the tidal entry channel. Avoid disturbing wildlife and tracking oil around the site. This is a high visibility site with a lot of public awareness. Contact Golden Gate National Seashores to advise of response activities at 415-331-0744 (Daphne Hatch) or 415-561-4620 (park police dispatch).

HAZARDS and RESTRICTIONS:

Be aware of swift currents.

SITE STRATEGIES

Strategy 2-403.1 Objective: Primary: Exclude oil from entering the mouth

ACP DATE 1/1/2000

Exclude oil from entering the mouth of the tidal channel using a shallow lopsided chevron boom deployment. Anchor boom to shore west of the tidal mouth and angle out at about 45 degrees with 100 ft boom and then angle back to shore east of mouth using 200 ft of boom. Be sure to provide for a boom seal which will keep oil from getting around the shore boom ends at low tide. Under some tides this can be deployed from shore without a skiff.

Strategy 2-403.2 Objective: Back-up: exclude / collect: capture of oil which excapes past primary protection

ACP DATE 1/1/2000

Deploy deflection to shoreside collection in the tidal channel. Currents in the tidal channel are swift (can exceed 2 knots). Deploy riverboom (swamp boom) (300') at a very slight angle to collect oil on the east bank of the channel. Use mid boom anchor(s) and lines to keep boom from forming catinary curves (and promoting entrainment of oil). Establish a skimming pocket and backup collection boom (100' swampboom) to confine accumulating oil and allow collection. Back with sorbent. This deployment should be done from land: with the permission of Golden Gate National Seashore, you may drive right to the location. There is a foot bridge across the channel, and the channel is very shallow or empty at some tides.

Strategy 2-403.3 Objective: Exclude by berming

ACP DATE 7/1/2005

Using sand at the mouth of the channel and seaward of riprap, construct a berm with a culver to permit tidal exchange. Make provision to block-off culvert if oil threatens. Contact GGNRA about front-end loader and culvert which may be available in the park.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-403.1		300			1	12+/danforth & stakes		1					3	
2-403.2		400		300	3	3/22+/danforth & Stakes & line	0	0					2	
2-403.3	0	0	0	0	0		0	0	0	0		skiploader and culvert	3	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

By land, Crissy Field is just east of the Golden Gate Bridge and is just north of Hwy 101. The wetland is at the east end of Crissy Field. By boat, the opening to the wetland is about a half mile west of Marina Park. Crissy Field Tidal Marsh is a restored wetland at the east end of Crissy Field and includes a tidal channel which opens to San Francisco Bay at the east end of the marsh. This wetland lies within Golden Gate National Park, and the primary contact is Daphne Hatch or Vika Sirova (dispatch is 415-561-5505)

LAND ACCESS: All equipment types with Park Service authorization

WATER LOGISTICS: good depth
Limitations: depth, obstruction

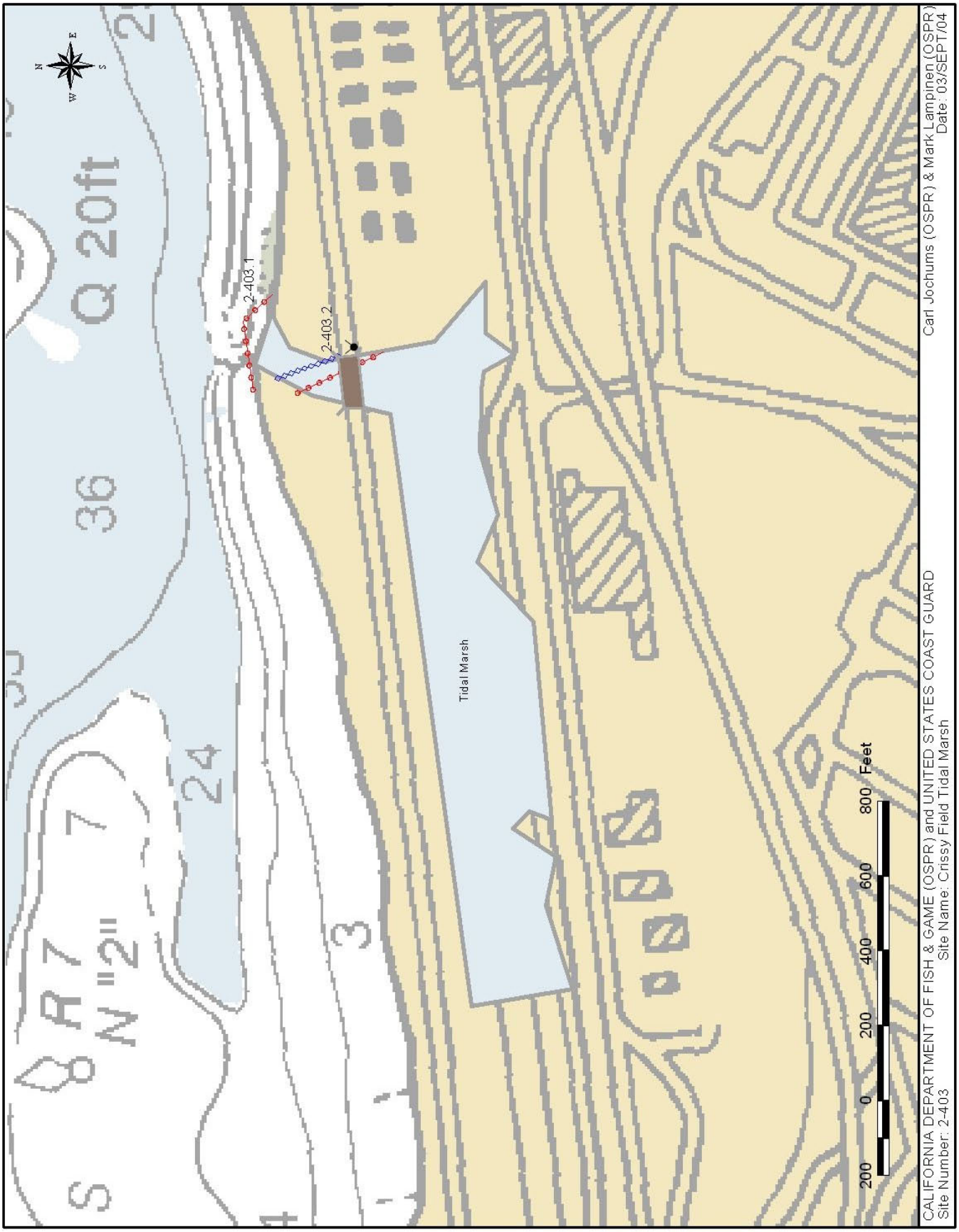
Launching, Loading, Docking and Services Available: Nearest marina is Gas House Cove a mile to the east.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Crissy Field is a possible staging area for local activities - contact Golden Gate National Recreation Area

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Richardson Bay Marshes

2-420 -A

County:	Marin	Thomas Guide Location	Latitude N 3 6 56	Longitude W 122 30
USGS Quad:	San Rafael, San Quentin, San Fran N	NOAA Chart:	18649 Entrance to San Francisco Bay	

Last Page Update : 1/1/2000

SITE DESCRIPTION:

The site includes Richardson Bay and the marshes and mudflats at the back bay arms. Richardson Bay is a shallow bay with many natural resources, most notable among them are the pickleweed marshes in the Pickleweed Inlet arm and in the ecological reserve in northwest lobe. The mouth of the Bay is about one mile wide and the length of the bay is about four miles. The much of the margin is urbanized or rocky. The average depth at low tide is about four feet, though the south side, where the channel is located, is generally deeper. There are extensive mudflats, and the bay bottom is a mud. There is a diffuse bed of eelgrass in the south central portion of the bay.

SEASONAL and SPECIAL RESOURCE CONCERN

Marshes are A-priority at all times. This is important habitat for migratory marsh and water birds during winter and spring and important herring spawning habitat from November to February.

RESOURCES OF PRIMARY CONCERN

There are a variety of habitats at risk. The pickleweed marshes are in the north and west margins, and there is a wildlife reserve in the north bay. The mudflats are habitat for a rich infauna and are foraging areas for birds and fish. The rocky shore lines are intertidal habitat. Exposed rocks are resting habitat for birds and seals. The eelgrass and wharves are prime spawning habitat for herring.

There are a wide variety of birds which use the bay and the marshes, including endangered clapper rail and brown pelicans.

The pickleweed marshes are habitat for the endangered saltmarsh harvest mouse. Harbor seals haul out on the rocks.

Fish concerns are focused on the spawning habitat of pacific herring which use the diffuse eelgrass beds, wharves and docks as spawning substrate.

Eelgrass beds are diffuse, extensive, and annually variable.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
B	Sarah Allen	US National Park Service, Pt. Reyes (NS)	(415) 464-5187
BEL	Baylands Nature Preserve Office	Baylands Nature Preserve	(650) 329-2506
	Bob Brown Sanctuary Manager	Tiburon Audubon Center	(415) 388-2524
B	Meryl Huning Educational Coordinator	Tiburon Audubon Center	(415) 388-2524
BEL	Marin Co Parks Dispatch	Marin, County of, Open Space District	(415) 499-6387
R	Michele Pearson Director	Tiburon Audubon Center	(415) 388-2524

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - Richardson Bay Marshes

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
Marin	18649 Entrance to San Francisco Bay	3 6 56	122 30

Last Page Update : 7/1/2005

CONCERNS and ADVICE to RESPONDERS:

The main objective is to exclude oil from Richardson Bay by exclusion booming of the mouth. This can successfully be executed just inside the mouth, and will protect all the resources of the bay including the marshes at the back shorelines, the mudflats, endangered species, ducks, eelgrass beds and herring spawning sites. If front exclusion is not successful, secondary strategies will be executed to collect oil.

HAZARDS and RESTRICTIONS:

Be aware of shallows and obstructions. Boat traffic is restricted in northwest lobe of the main bay.

SITE STRATEGIES

There is little tidal movement into the bay except at in the channels at the north (Tiburon) and south (Sausilito) sides. Oil will tend to eddy at the mouth, due to the strong Raccoon Strait passing current, and then be carried into the bay by these two local flood currents or by southerly wind. The main channel at the Sausalito margin has currents exceeding a knot that will carry any oil that enters, to back bay (including inland of Hwy 101). Along the Tiburon margin there is a light current.

Strategy 2-420.1 **Objective: Prmary: Exclude oil at bay mouth by booming Sausalito main channel and Tiburon minor flood channels. This is main part (part 1) of a total exclusion at the bay mouth which would include Part 2: 2-420.2**

ACP DATE 11/30/2001

1. Exclude oil from the south channel by deploying about 1,500 ft of 9X9+ boom from the breakwater north of the ferry landing to (or near) Red channel marker "4". Cascade boom in 2 or 3 lengths to allow vessel passage through this exclusion.
2. At the Tiburon shore inside (west) of cone rock, deploy boom at a 45 degree angle across the nearshore channel for 600 ft and then the last 600 ft perpendicular to shore toward the deployment on the south channel.

Strategy 2-420.2 **Objective: Secondary exclusion; Part 2 - complete exclusion across the low current portion of the bay. This is added-on to previous or concurrent execution of Part 1 substrategy 2-420.1**

ACP DATE

Boom across the bay mouth from end of southerly deployment to the end of the Tiburon side deployment. Connect boom ends if possible. Otherwise uses sorbants or skirted boom to close and seal the gaps between the boom sets in Part 1 and this deployment.

Strategy 2-420.3 **Objective: Exclude/collect oil that has entered Richardson Bay**

ACP DATE 1/1/2000

Establish the following collections / exclusions. Depending on the amount and kind of oil, sorbants may be effectively be substituted for shoreside skimming systems(SSS):
1) Deploy 1000' 6X6+ diagonal from Strawberry Pt. to the jetty with a J-hook collection pocket; back the collection pocket with swampboom (300' 4X4+). Use channel markers and anchors to maintain diagonal in the current. A cascade may be necessary to accommodate boat traffic. If there are skimmable quantities of oil, deploy a SSS for collection.
2) Deploy 1500' 6X6+ diagonal from Strawberry Pt. to the east with a J-hook collection pocket: back and back the collection pocket with swampboom (300' 4X4+). If there are skimmable quantities of oil, deploy a SSS for collection.
3) Close the tidegate to Belvedere Lagoon at north east margin.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-420.1	2700			300	12	22#+/danforths + chain	3	1	0			Bboats capable of shallows & obstruction	11	
2-420.2	3300	0	0	300	6	22#+ danforths	2	0	0		0		6	
2-420.3		3100	600 OS	600	12	12/22+/danforths + chain	2	1		2 SSS		Bboat: shallow draft	8	2

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

Closest water access is from Marinas in Sausilito which open to Richardson Bay. By vehicle, marshes can be accessed by exiting Hwy 101 at Sausilito or Tiburon at Almonte or Tiburon Blvd. The site includes Richardson Bay and the marshes and mudflats at the back bay arms.

LAND ACCESS: All types

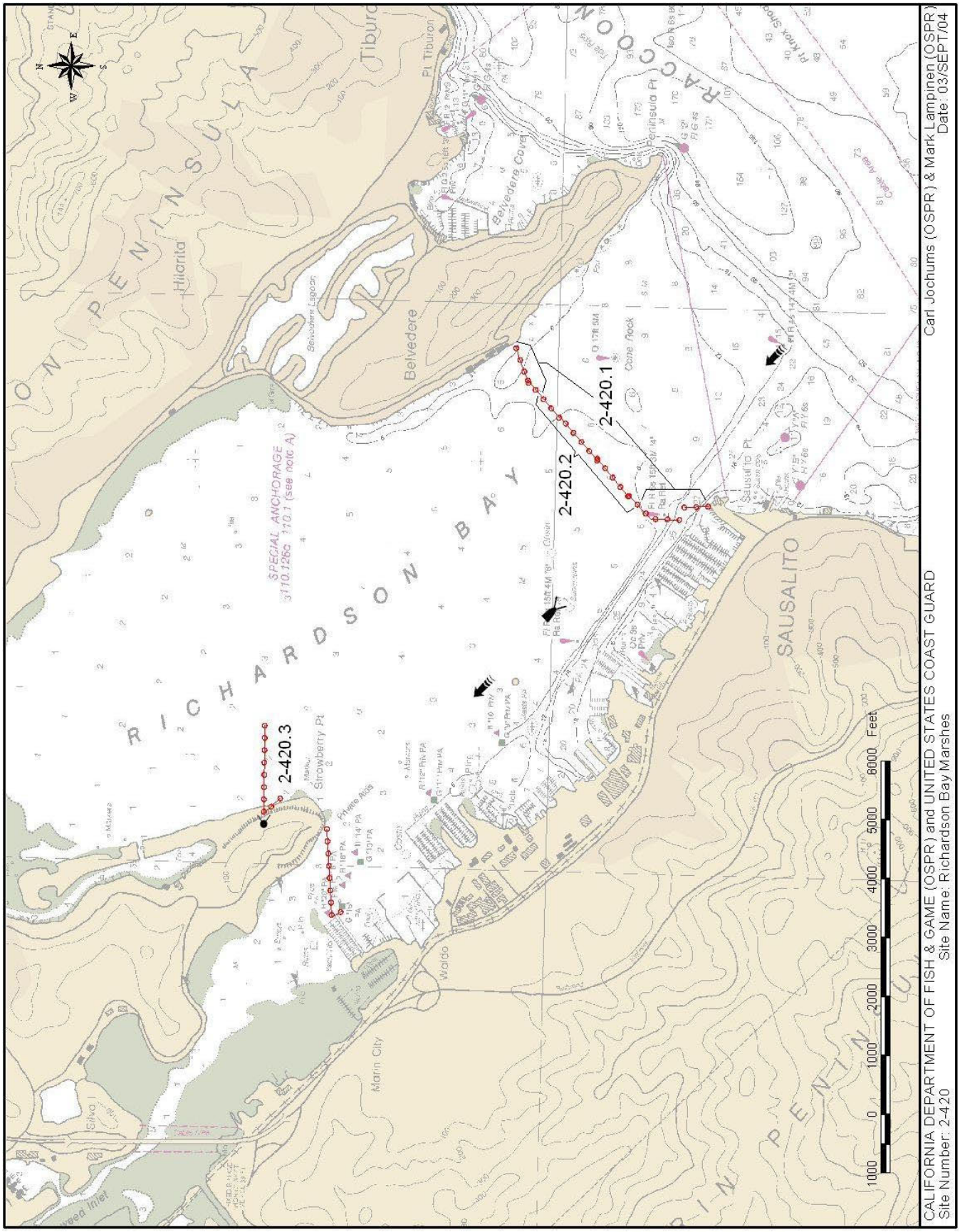
WATER LOGISTICS: Shallows everywhere; exceeding shallows in back & north bay
Limitations: depth, obstruction

Launching, Loading, Docking and Services Available: Launch on site at Clipper Yacht Harbor, Harbor Dr. Sausilito (415) 332-3500. Many marinas and services available.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

US Corp Engineers dock is onsite and is most convenient site for staging and out post. Many facilities are available at Sausilito.

COMMUNICATIONS PROBLEMS: none known



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Paradise Cove & Tiburon Peninsula

2-421 -X/B

County:	Marin	Thomas Guide Location	AAA - Mill Vall	Latitude N	3 7 54	Longitude W	122 27
USGS Quad:	San Quentin	NOAA Chart:	Entrance to San Francisco Bay 18649				

Last Page Update : 7/1/2005

SITE DESCRIPTION:

The eastern shore of the Tiburon Peninsula from Bluff Point in the south to north of El Campo (north of Paradise Cove). The current from the north sweeps past the peninsula so that oil and debris collect here naturally. This was the pattern a previous spill and is why strategies and focus has developed at this locale. There are a variety of shoreline types on the Tiburon Peninsula. They vary from rock bluff and platform to cobble and sand beaches. Most are exposed to moderate and high energy from boat wakes, wind waves, and strong currents. Public health and safety and birds feeding on the beaches and in nearshore waters are the major concerns. The Tiburon Peninsula is a residential area but includes Paradise Cove County Park. Other than the county park, most shorelines are accessable only by water.

SEASONAL and SPECIAL RESOURCE CONCERN

When brown pelicans or seals are using the area, sensitivity concerns increase.

RESOURCES OF PRIMARY CONCERN

The shoreline is rocky and variable and includes some sandy shores in Paradise Cove and other pocket beaches. The bottom drops away steeply.

Brown pelican, cormorant and other seabirds occasion this area for resting and feeding

Harbor seals and sealions forage here.

Herring spawn here in the winter time.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
BTLE	Marin Co Parks Dispatch	Marin, County of, Open Space District	(415) 499-6387
L	Marin County OES (Office	Marin, County of, Sheriff/Office of Emergency Serv	(415) 499-6584

ADDITIONAL SITE SUMMARY COMMENTS:

2-421 -X/B Site Strategy - Paradise Cove & Tiburon Peninsula

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA - Mill Vall Marin	Entrance to San Francisco Bay 18649	3 7 54	122 27

Last Page Update : 7/1/2005

CONCERNS and ADVICE to RESPONDERS:

This is a natural collection zone: oil tends to collect in nearshore eddies, particularly in the southern part of the Paradise Cove adjacent to Pt Chauncey, but little comes ashore. Skimmable quantities of oil can be easily collected by self propelled skimmers because the waters are deep. Natural resources of concern are brown pelicans and other birds which use this area for feeding and roosting.

HAZARDS and RESTRICTIONS:

Submerged rocks along most beaches, steep cliffs along most shorelines.

SITE STRATEGIES

Waters near shore are deep. Currents follow the depth contours and are strong. This is a natural collection zone: oil tends to collect in nearshore eddies, particularly in the southern part of the cove adjacent to Pt Chauncey, but little comes ashore. Skimmable quantities of oil can be easily collected by self propelled skimmers operating near shore because the waters are deep, and skimmable quantities of oil should be reported to Operations. During the flood tide, on-water recovery may be effective by locating an on-water skimmer at the tail edge of the El Campo diversionary boom: a selfpropelled skimmer is recommended for such skimming.

Strategy 2-421.1 **Objective: At Paradise cove, deflect to collection during ebb and away from shores during flood** — ACP DATE

Deploy 1000 ft 9X9+ deflection booms at both Point Chauncey and El Campo to deflect/divert oil out of currents into nearshore eddies, on ebb tides. Same boom set will also help keep oil in current.
To minimize oiling of Paradise Cove shoreline, use 4,500 ft of boom, swamp boom (4X4+) under most conditions (and 9X9+ when there is chop at this protected location).

Strategy 2-421.2 **Objective: At Bluff Point, deflect oil to natural collection sites** — ACP DATE 7/1/2005

Deploy boom from the two points north of Bluff Point to deflect oil to natural collection sites: 600 ft of harbor boom (9X9+) should be deployed from the shore just north of each point at 40 degree angles into the current at about to direct eddying oil to shoreline. Depending on oil type, oil snare or sorbents at shore may aid collection and reduce shorline cleanup.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-421.1	2000	4500		0	13	22# danforths w. 5/16" chain	2	1	0				8	2
2-421.2	1200	0	600 OS	0	0		1	0	0				3	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

From the Richmond-San Rafael Bridge, take Highway 101 south and exit at Paradise Drive. Proceed to Paradise Beach County Park. The eastern shore of the Tiburon Peninsula from Bluff Point in the south to north of El Campo (north of Paradise Cove).

LAND ACCESS: Paved to P C County Park & T Oceanographic Center. Foot traffic beyond

WATER LOGISTICS: generally good. occasional submerged rocks, small surf possible,
Limitations: depth, obstruction

Launching, Loading, Docking and Services Available: Services at Sausalito and Richmond

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

The P C County Park and Tiburon Oceanographic Center may be used as a staging area or field office; the cement pier may be used as an anchor point.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:

Carl Jochums (OSPR) & Mark Lampinen (OSPR)
Date: 27/APR/05

CALIFORNIA DEPARTMENT OF FISH & GAME (OSPR) and UNITED STATES COAST GUARD
Site Name: Paradise Cove & Tiburon Peninsula
Site Number: 2-421

Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

County:	Marin	Thomas Guide Location	AAA - Mill Vall	Latitude N	3 7 55	Longitude W	122 27
USGS Quad:	San Quentin	NOAA Chart:	Entrance to San Francisco Bay 18649				

Last Page Update : 7/1/2005

SITE DESCRIPTION:

Keil Cove is located on the southeastern shore of the Tiburon Peninsula, adjacent to Raccoon Straits and immediately west of Bluff Point. Keil Cove is a coarse sand and pebble beach bounded by rocky headlands on the south east end of the Tiburon Peninsula. There are eelgrass beds in the cove which is the primary concern at this locale. The blades of the eelgrass remain below the surface of the water except at the lowest of tides. Although some of the strongest currents in San Francisco Bay occur immediately offshore of this cove, the cove itself is more protected from wind waves and strong currents than most of the Tiburon Peninsula. The adjacent land is privately owned residential property.

SEASONAL and SPECIAL RESOURCE CONCERN

Herring spawn here during the winter. Eelgrass tops are exposed at low tides.

RESOURCES OF PRIMARY CONCERN

Eelgrass beds are vulnerable only on the lowest tides. Herring spawn here during the winter. The coarse sand beach is very difficult to clean.

Brown pelican, cormorants.

Herring spawn here in the winter time.

Eelgrass beds

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	Marin County OES (Office	Marin, County of, Sheriff/Office of Emergency Serv	(415) 499-6584

ADDITIONAL SITE SUMMARY COMMENTS:

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA - Mill Vall Marin	Entrance to San Francisco Bay 18649	3 7 55	122 27

Last Page Update :

CONCERNS and ADVICE to RESPONDERS:

Eelgrass beds are vulnerable only on the lowest tides, but once oiled would, continue to produce a sheen for several weeks and greatly extend the cleanup period. Herring spawn here during the winter. The coarse sand beach is very difficult to clean.

HAZARDS and RESTRICTIONS:

The water is very shallow throughout the cove, and the eelgrass may foul propellers at low tide. Although, the gravel beach is steep, experienced boat operators have found that landing of beach cleanup personnel was easiest at the Bluff Point end of the beach.

SITE STRATEGIES

Strategy 2-422.1 **Objective: Protection booming for eelgrass and coarse sand beach.**

ACP DATE 10/1/2005

Deploy boom from just west of Bluff Point to the rock, or gravel beach behind rock, at the southwest end of the cove. Deploy the the boom in the shallow, quiet water of the cove. Use sufficient anchors, every 100 to 200 feet, to prevent the boom from moving into the currents and wind of Racoon Strait. Two thousand four hundred feet of boom with four to six inches of freeboard should be sufficient

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No and kinds	staff deploy	Staff tend
2-422.1	0	2400			7	20#+ w/ 10' 1/2" chain	2				1,200 feet of 1/2" anchor rope	6	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

Land access is through private property. Marin County OES may be able to get permission for access across private property. Take highway 101 to Mill Valley, Take the Tiburon Blvd (state highway 131) exit. Take Tiburon Blvd east to the business district of Tiburon. Continue on Paradise Dr. to the residences past Agreste Av.
Access is best by boat. To launch boats take highway 101 to Sausalito, 3 miles north of Golden Gate Bridge. Take Bridgeway exit at north end of Sausalito about 1 mile south of the highway 1 exit. Go southeast on Bridgeway towards downtown Sausalito and the COE bay model. Turn left on Harbor Drive. Take harbor drive to the launch ramp at Clipper Yacht Harbor. Keil Cove is located on the southeastern shore of the Tiburon Peninsula, adjacent to Raccoon Straits and immediately west of Bluff Point.

LAND ACCESS: foot only

WATER LOGISTICS: Very shallow water.
Limitations: depth, obstruction

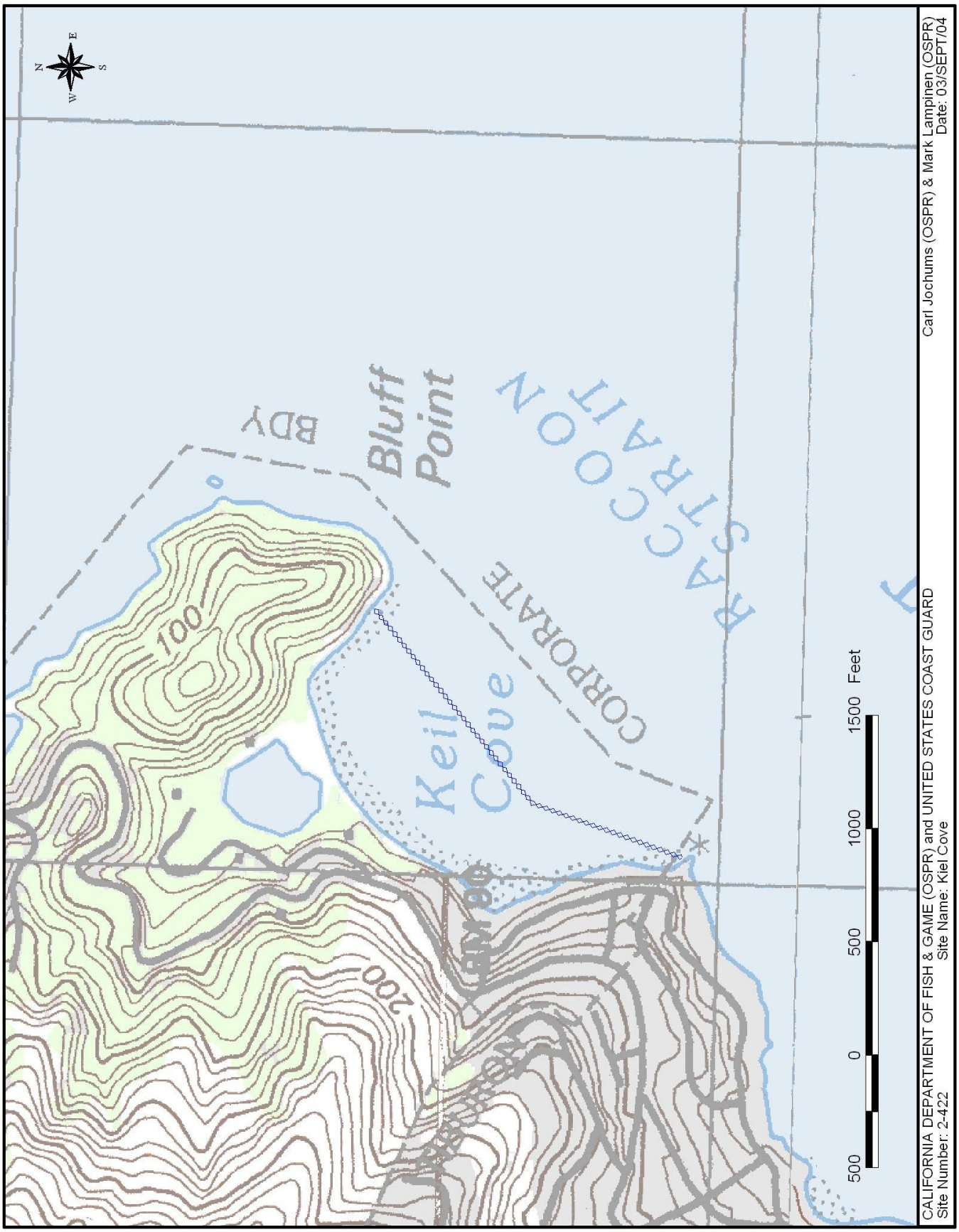
Launching, Loading, Docking and Services Available: Services at Sausalito and Richmond

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Possible staging and field post at Tiburon Oceanographic Center.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

2-423 -X/C Site Summary- Angel Island

County:	Marin	Thomas Guide Location	AAA - Mill Vall	Latitude N	3 7 54	Longitude W	122 27
USGS Quad:	San Quentin	NOAA Chart:	Entrance to San Francisco Bay 18649				

Last Page Update : 1/1/2000

SITE DESCRIPTION:

Angel Island is a state park located about one mile SE of the Tiburon Peninsula. It has an area of about one square mille, and a maximum elevation of 781 feet. There is a dock and numerous floating berths in Ayala Cove located on the North Western side of the island. A road runs the perimeter of the island. Sand beaches exists on the North Eastern, Eastern and South Eastern shores. Rock bluffs make up a large part of the shoreline. Strong currents run through Raccoon Straits (the deep channel located on the North West side of the island). Back eddies occur along the South Eastern shore and probably at numerous other locations around the island. An underwater cable is located between Ayal cove and Pt Stuart. Shorelines have been oiled to different degrees in several spills, and the eastern shoreline is a natural collection area for oil and other floating debris. This makes the points along the eastern shoreline natural collection areas.

SEASONAL and SPECIAL RESOURCE CONCERN

Herring spawn here during the winter.

RESOURCES OF PRIMARY CONCERN

Herring spawn here during the winter. Brown pelicans spend time on and around this island.

Various sites around the island are used by cormorants and other sea birds fish in Raccoon Strait for perching and probably nesting.

Harbor seals and sea lions haul out at various locations around the island.

Herring spawn here during the winter.

The shore is well populated by marine plants and animals living on rock surfaces and in the sand below the high tide level.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

There are historic buildings and other cultural resources present. Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
E	Marin County OES (Office	Marin, County of, Sheriff/Office of Emergency Serv	(415) 499-6584

ADDITIONAL SITE SUMMARY COMMENTS:

2-423 -X/C Site Strategy - Angel Island

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA - Mill Vall Marin	Entrance to San Francisco Bay 18649	3 7 54	122 27

Last Page Update :

CONCERNS and ADVICE to RESPONDERS:

Oil tends to collect on the eastern shore of the island, particularly on the beaches north of Blunt Point and Quarry Point. The beach between Blunt Point and the pier about 100 yards to the north is a mixture of coarse sand and gravel. Petroleum may penetrate this beach to a depth of six inches. The fine grained sand beach to the north would be much easier to clean. A similar situation exists to the north of Quarry Point where gravel beaches are both north and south of a fine sand grained beach.

HAZARDS and RESTRICTIONS:

Submerged rocks along most beaches, steep cliffs along most shorelines.

SITE STRATEGIES

Strategy 2-423.1 Objective: Collection: natural collection at Blunt Pt & Quarry Pt.

ACP DATE 1/1/2000

The following are the instructions to use this area as a collection site with a minimal amount of cleanup.

A) At Blunt Pt deploy 600 feet of boom (4 to 8 inch freeboard) in a northeasterly direction from the sand beach north of the piert to collect oil. To prevent oiling of the gravel beach south of the pier, deploy 800 ft of harbor boom from the south side of Blunt Point to the pier to the north of Blunt Point.

B) At Quarry Point, the shoreline and the eddies just off the shoreline are natural collection areas for shoreline and onwater recovery. Collect oil on fine grained beach about 1000' north of Quarry Pt by deploying 600 feet of boom (4 to 8 inch freeboard) from the beach in a northeasterly direction. To prevent oiling of the gravel beach to the north of the collection site, deploy 1,000' of boom parallel to the gravel beach. Anchor the ends at the high tide line and anchor the midpoint 50 feet offshore. To prevent oiling of the gravel beach to the south of the collection beach, deploy 600 feet of harbor boom from the shoreline near the pier at Quarry Pt to the south end of the fine grained sand beach.

C) Look for oil offshore. Direct on-water recovery vessels to concentrations offshore. Set up Shore Side Skimming
(SSS) as necessary. Both sites have some roads and piers for support of SSS.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No and kinds	staff deploy	Staff tend
2-423.1	2600	1200	0	0	20	20 20# w/ 20' 1"chain	2	1			1000' 1/2" anchor line	10	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

Angel Island is a state park located SE of the Tiburon Peninsula. Access to the island is by water only. Ferry service is available from Tiburon. Numerous launch ramps and boat launching facilities are located in Sausalito. To launch boats take highway 101 to Sausalito, 3 miles north of Golden Gate Bridge. Take Bridgeway exit at north end of Sausalito about 1 mile south of the highway 1 exit. Go southeast on Bridgeway towards downtown Sausalito and the COE bay model. Turn left on Harbor Drive. Take harbor drive to the launch ramp at Clipper Yacht Harbor. Angel Island is a state park located about one mile SE of the Tiburon Peninsula. It has an area of about one square mille, and a maximum elevation of 781 feet.

LAND ACCESS: Equipment and vehicles would have to be transported over water.

WATER LOGISTICS: Limitations: depth, obstruction — Submerged rocks off most beaches.

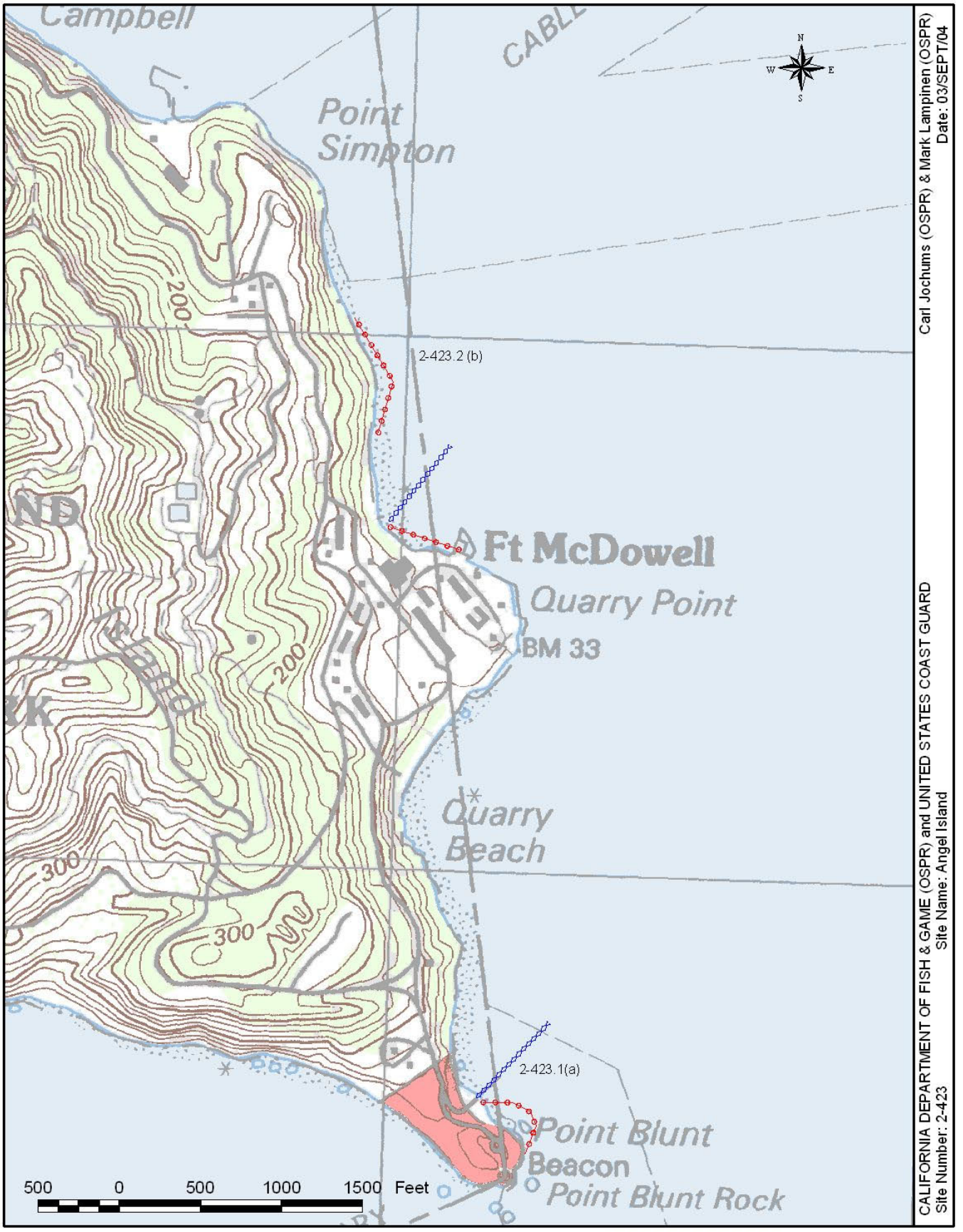
Launching, Loading, Docking and Services Available: Berths are available in Ayala Cove. There are piers just north of Blunt Point and at Quarry Point.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

California Parks and recreation can make space available for staging areas, and field posts. Marin County OES may be able to identify a command post.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Paradise Cay Eelgrass & Marina

2-424 -A/E

County:	Marin	Thomas Guide Location	AAA - Mill Vall	Latitude N	3 7 54	Longitude W	122 27
USGS Quad:	San Quentin	NOAA Chart:	Entrance to San Francisco Bay 18649				

Last Page Update : 7/1/2005

SITE DESCRIPTION:

Paradise Cay eelgrass bed and Marina lies on the north west side of the Tiburon Peninsula. It is bounded on the north by Paradise Cay Marina and on the south by on the south by Paradise Cove. The shoreline is protected behind Tiburon Peninsula and prograding, and so, has fine grain sand beach and mudflats extending out from shore. There is occasional patchy emergent vegetation along the shore. Eelgrass beds are scattered throughout the site in shallow water beginning at Paradise Cay and near the shoreline for over a mile; eelgrass is subtidal but fronds are commonly on the surface at low water.

SEASONAL and SPECIAL RESOURCE CONCERN

This is a A priority site when eelgrass tops are exposed.

RESOURCES OF PRIMARY CONCERN

Eelgrass beds are most vulnerable during summer months and are most exposed to oil when eelgrass leaves are at the surface and will become oiled.

Brown pelican may forage here when in the Bay.

Herring spawn here in the winter time. Lots of fish species use eelgrass beds as nursary, cover, and forage habitat.

Eelgrass is dominant subtidal plant.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	Office	Paradise Cay Yachet Harbor	(415) 435-4292
BT	Diane Watters	CA Dept. of Fish & Game	(650) 631-2535

ADDITIONAL SITE SUMMARY COMMENTS:

2-424 -A/E Site Strategy - Paradise Cay Eelgrass & Marina

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA - Mill Vall Marin	Entrance to San Francisco Bay 18649	3 7 54	122 27

Last Page Update : 7/1/2005

CONCERNS and ADVICE to RESPONDERS:

Eelgrass has high ecological value and is used by lots of birds and fish. Eelgrass leaves are rough, and unlike most water plants, oil will readily attach. Booming eelgrass will also protect the sandy shoreline.

HAZARDS and RESTRICTIONS:

Shallow throughout. Some obstructions near shore where old docs are in evidence.

SITE STRATEGIES

Because this is a low energy area, light boom and few anchors will be necessary to protect the areas. If winds are southerly, heavier or redundant gear will be necessary.

Strategy 2-424.1 Objective: Primary: Assess vulnerability of eelgrass to oil

ACP DATE 7/1/2005

send scientist to assess eelgrass exposure to oil at prevailing tides. Best vehicle is aircraft or skiff.

Strategy 2-424.2 Objective: exclusion around eelgrass nearshore area immediately south of Paradise Cay

ACP DATE 7/1/2005

Use 5,100 ft of boom (4X4+ under calm conditions and 9X9 when there is chop at this protected location) from the southeast corner (jetty) of Paradise Cay Marina to Elcampo to exclude oil from eelgrass and shoreline.

Strategy 2-424.3 Objective: exclude oil from Paradise Cay Marina

ACP DATE 7/1/2005

deploy swamp boom in chevron configuration at each of two enterances.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-424.1	0	0	0	0	0		0	0	0		1	aircraft or skiff	2	
2-424.2		4500		0	6	22#+ danforths	1	1	0				4	
2-424.3	0	500	0	0	6	13#+ anchors	0	1	0		0		2	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

1. From the south - US 101 NB to the Tiburon Blvd exit toard E. Blithedale. Turn right onto Tiburon Blvd. Turn left onto Trestle Glen Blvd. Turn left onto Paradise Dr. Turn right onto Antilles Way. Turn right onto Martinique and turn right onto Trinidad Dr and follow down to the end.
2. From the north - US 101 SB to the Tamalpais Dr exit toward Paradise Dr. Turn left onto Tamalpais Dr. Turn right onto San Clemente Dr. San Clemente Dr becomes Paradise Dr. Turn left onto Antilles Way. Turn Left onto Martinique Ave. Turn right onto Trinidad Dr and follow down to the end. Paradise Cay eelgrass bed and Marina lies on the north west side of the Tiburon Peninsula. It is bounded on the north by Paradise Cay Marina and on the south by on the south by Paradise Cove.

LAND ACCESS: Good land access at Paradise Cay Marina

WATER LOGISTICS: Shallow water
Limitations: depth, obstruction

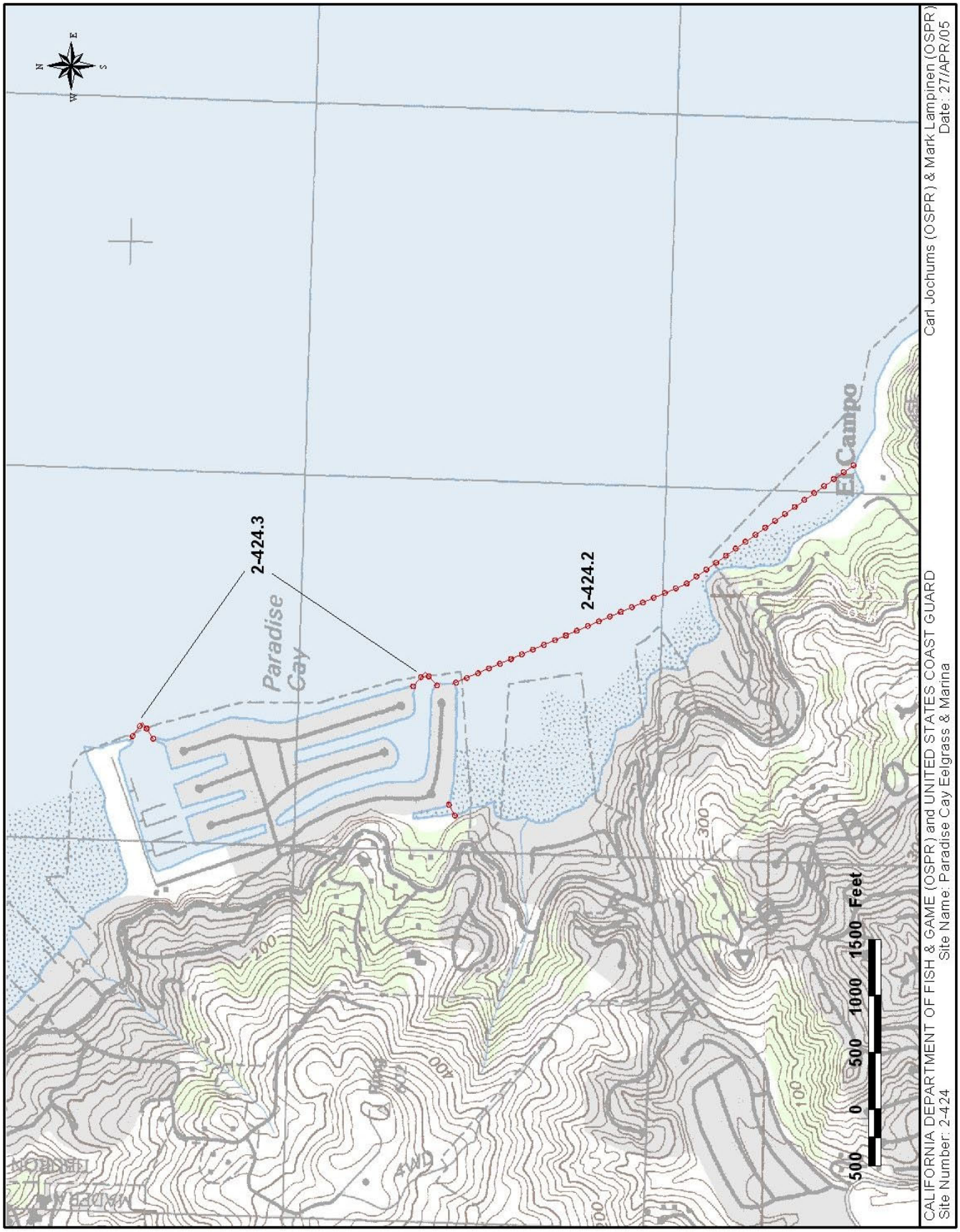
Launching, Loading, Docking and Services Available: Services at Sausalito and Richmond

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Stage at Paradise Cay. Boom may be pulled from van onto water. Alternative is Paradise Cove County Park.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Corte Madera Marshes

2-425 -A

		Thomas Guide Location	Latitude N	Longitude W
County:	Marin		3 8 56	122 30
USGS Quad:	San Quentin	NOAA Chart:	18649 Entrance to SF Bay	

Last Page Update : 1/1/2000

SITE DESCRIPTION:

The site includes the marshes and mudflats from south of Corte Madera Channel to Paradise Cay Yacht Harbor and the marshes up Corte Madera Creek. The site is a very shallow embayment with a prograding shoreline and an emergent marsh at the back bay. Historically the high marsh had been diked. Those diked marshes are now open to tidal exchange, and the north half is the Corte Madera State Ecological Reserve owned and controlled by the Calif Dept of Fish and Game, Region III. The mudflats in front are very shallow, and there is rarely any significant wave action here. Special Status Species are found here and the site is heavily used by bird species and migratory bird species during the winter.

SEASONAL and SPECIAL RESOURCE CONCERN

Marshes have A-priority at all times. There are Special Status Species present year-round. There is heavy migratory bird use in winter and harbor seal pupping in late spring.

RESOURCES OF PRIMARY CONCERN

There are a number of habitats at risk. These include the prograding shore with emergent marsh, the partially diked pickleweed saltmarsh, the shallow mudflats, the back marshes in the upstream portions of Corte Madera Creek, and some patches of eelgrass near Paradise Cay Harbor.

The marsh and mudflats are heavily used by migratory shorebirds and waterfowl during fall and winter. The marshes are year-round habitat for marsh birds including the endangered California clapper rail.

The endangered saltmarsh harvest mouse is also found here. Harbor seals pup here in late spring and haul out on higher tides.

The rich infauna found here are forage species for both birds and shorebirds.

There are also rare plants thriving here, including Marin knotweed and northcoast soft bird's beak.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	Sarah Allen	US National Park Service, Pt. Reyes (NS)	(415) 464-5187
	Mike Josselyn	NOAA, National Marine Fisheries Service	(415) 454-8868
	Marin County OES (Office	Marin, County of, Sheriff/Office of Emergency Serv	(415) 499-6584
	Barbra Salzman	Audubon Society, Marin County Chapter	(415) 924-6057
	Jim Swanson		
	Len Woolard Asst Emergency Ser Coord	Marin, County of, Sheriff/Office of Emergency Serv	(415) 507-2724

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - Corte Madera Marshes

2-425 -A

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
Marin	18649 Entrance to SF Bay	3 8 56	122 30

Last Page Update : 7/1/2005

CONCERNS and ADVICE to RESPONDERS:

The marshes are very sensitive, have sensitive plants and animals, and are almost impossible to clean or rehabilitate. There are additional marshes up Corte Madera Creek. The strategy is to exclude oil from being carried into the back marsh by closing small tidal inlets and excluding oil from the entire site by cascading boom across the entire marshfront landward of the currents and eddies.

HAZARDS and RESTRICTIONS:

There are shallows and obstructions throughout the bay. Local knowledge is important for navigation here.

SITE STRATEGIES

Currents are aggressive across the mouth of the cove but not just back from the mouth. West and southerly margins of the bay are exceedingly shallow and in many areas boat traffic is limited to very shallow draft vessels and only at higher tides.

Strategy 2-425.1 Objective: Exclude oil from entering cove mouth, creek, and tidal inlets.

ACP DATE 9/15/2005

a) To exclude oil from cove, boom across cove (5000' 9X9+ and 1500'4X4+ in 1000' or smaller lengths) from San Quentin Prison shoreline (make arrangements through Marin Co OES) directly south to a dock at a school north of Paradise Cay. Boom may be continuous or keep cascades close together to maintain exclusion (leave trailing ends and tie together or close gaps with boom and sorbent). In the Corte Madera Channel, cascade boom to leave a passage though the boom for boat traffic (ferry traffic).
b) At the marshfront, place boom across the eight tidal sloughs at the margin of the emergent marsh using short lengths of swamp boom (100' 4X4+ Hboom) backed with sorbent and staked inplace.

Strategy 2-425.2 Objective: Exclude oil from Creek mouth and containment for upstream oil spills

ACP DATE 10/2/2005

deploy 650 ft of harbor boom at a diagonal from the green channel marker at Ferry terminal across Corda Madera Creek to channel marker G 17 or at a location providing optimum containment/exclusion

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-425.1	8200	600		600	16	16/22+/danforths & chain + stakes	6	1	0			Bboats very shallows & obstructions impe	20	
2-425.2	650		0	650	3	1 22#+ & 2/12#+ anchors		1	0	0			2	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

By water the site is just south of Pt. San Quentin and may be accessible via Corte Madera Channel. Nearest land access is from Paradise Drive and Antilles Way (to Paradise Cay Harbor) on the south side, and on Pt. San Quentin Francisco Road (first exit off I-580 west of San Rafael Bridge). The site includes the marshes and mudflats from south of Corte Madera Channel to Paradise Cay Yacht Harbor and the marshes up Corte Madera Creek.

LAND ACCESS: Roadways are paved

WATER LOGISTICS:
Limitations: depth, obstruction — exceedingly shallow - only very shallow draft boats

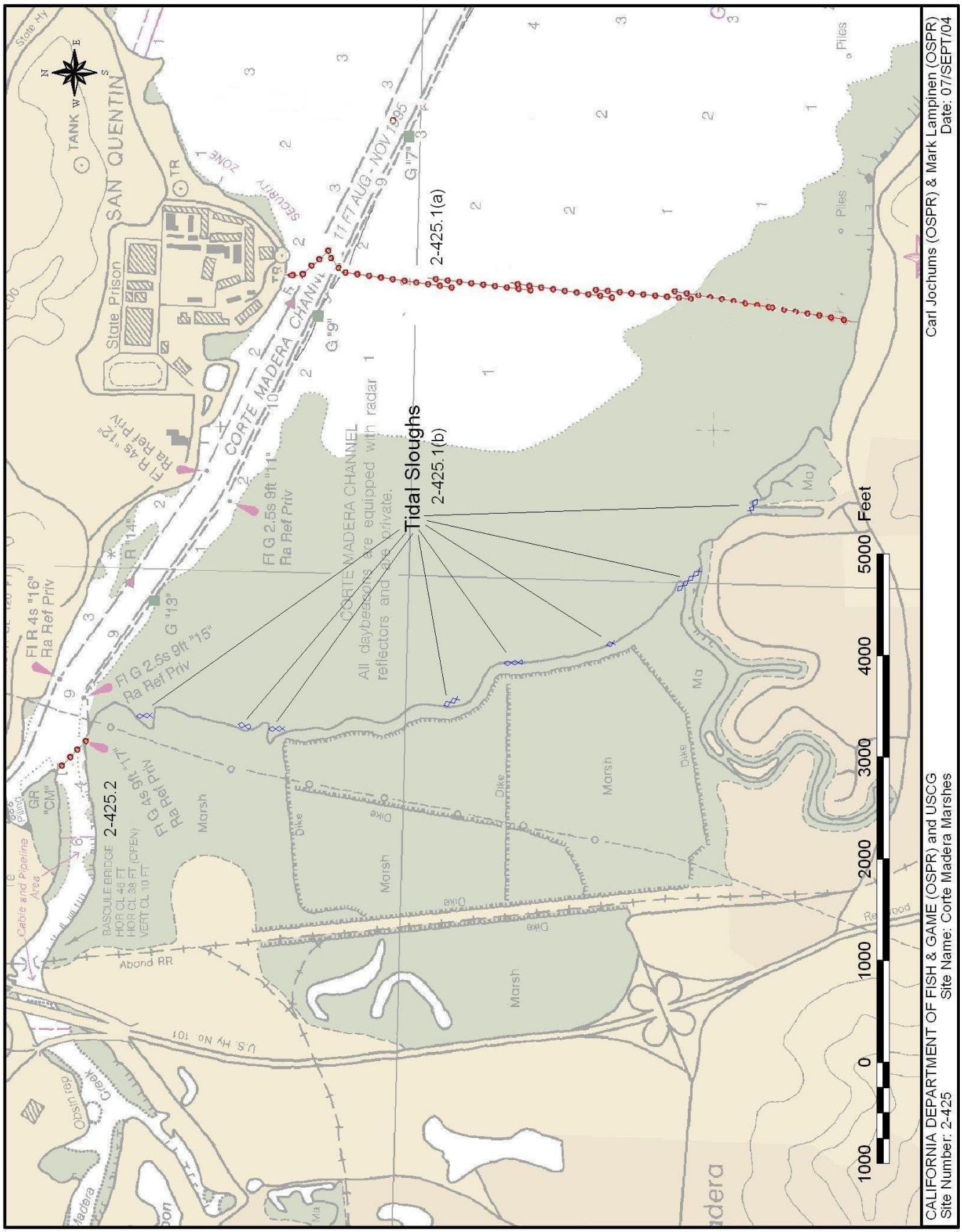
Launching, Loading, Docking and Services Available: Nearest launching is NOAA ramp on Tiburon Peninsula. Morage and fuel at Paradise Cay. Also launching at Loch Lomond Marina, San Rafael.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Best staging at NOAA-NFMS Marin center or Paradise Cay Harbor. Also possible staging at Paradise Cove Park. Facilities are available in Corte Madera, Sausilito, and San Rafael. Zone staging at Richmond.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:


SAN QUENTIN
State Prison
TANK
CORTE MADERA CHANNEL
11 FT AUG - NOV 1995
2-425.1(a)
2-425.1(b)
Tidal Sloughs
2-425.2
Fl R 4s "16" Ra Ref Priv
Fl G 2.5s 9ft "15" Ra Ref Priv
Fl G 2.5s 9ft "11" Ra Ref Priv
Fl R 4s "12" Ra Ref Priv
CORTE MADERA CHANNEL
All daybeacons are equipped with radar reflectors and are private.
BASCULE BRIDGE
HOR CL 46 FT
HOR CL 38 FT (OPEN)
VERT CL 10 FT
Cable and Pipeline Area
Aband RR
U.S. Hy No 101
Marsh
Dike
Piles
Feet
1000
0
1000
2000
3000
4000
5000
Carl Jochums (OSPR) & Mark Lampinen (OSPR)
Date: 07/SEPT/04
CALIFORNIA DEPARTMENT OF FISH & GAME (OSPR) and USCG
Site Name: Corte Madera Marshes
Site Number: 2-425
Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- San Rafael Creek Marsh

2-426 -A

County:	Marin	Thomas Guide Location	Latitude N 3 7 58 / Longitude W 122 29
USGS Quad:	7.5" Quad: San Quentin	NOAA Chart:	18649 Entrance to SF Bay

Last Page Update : 1/1/1994

SITE DESCRIPTION:

This site is San Rafael Creek and the bay margins and mudflats for 1 mile north and south of the channel mouth. The navigation channel connecting San Rafael Marina with San Francisco Bay passes through mud flats and marshes extending about one half mile on each side.

SEASONAL and SPECIAL RESOURCE CONCERN

This is an A priority all year.

RESOURCES OF PRIMARY CONCERN

There are marshes, mudflats, and other habitats present which are habitat for a wide variety of species. The entire area is largely sheltered. The adjacent mudflats are heavily used by migratory shorebirds during the fall and winter.

The area is heavily used by migratory shorebirds during the fall and winter. California clapper rail inhabits this marsh.

The saltmarsh harvest mouse is also found here.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
B	Peter Baye, Ph.D. Coastal Plant Ecologist		(415) 310-5109
B	J. T. Harvey, Ph.D	Moss Landing Marine Laboratories	(831) 755-8650
BL	Mike Josselyn	NOAA, National Marine Fisheries Service	(415) 454-8868
B	Barbra Salzman	Audubon Society, Marin County Chapter	(415) 924-6057

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - San Rafael Creek Marsh

2-426 -A

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
Marin	18649 Entrance to SF Bay	3 7 58	122 29

Last Page Update : 7/1/2005

CONCERNS and ADVICE to RESPONDERS:

The concern is to prevent oil from entering the creek (and oiling upstream marshes and marinas) and to protect the marshes and mudflats on for about a mile on sides of the channel. All this area has wildlife (including endangered species) and would be difficult to clean if oiled. Avoid disturbing marsh vegetation or trampling oil into muds.

HAZARDS and RESTRICTIONS:

Very shallow mud flats out side of channels

SITE STRATEGIES

Strategy 2-426.1 Objective: Exclusion from San Rafael Creek and local harbors

ACP DATE 7/1/2005

Exclude oil with harbor boom (1,000 ft) to close off San Rafael Creek Channel mouth and the yacht harbor entrance. Leave a cascaded chevron opening in the channel mouths to allow vessel passage but still exclude oil.

If heavy oil threat is theatening, contact IC for deployment of on-water recovery should be conducted with a skimmer (weir) near the mouth of the creek and in front of the mud flats north of the yacht harbor.

Strategy 2-426.2 Objective: Shoreline protection when marshy margins are threatened by severe oiling - north and south of creek mouth.

ACP DATE 7/1/2005

deploy 6,900 ft of harbor boom (2500 south of the channel the remainder to the north) to protect the mudflats and marshfront. Use swamp boom (Appox. 600 ft) to connect the harbor boom to the shoreline across shallow mudflats.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No and kinds	staff deploy	Staff tend
2-426.1	3000				8	8/22+/danforths & stakes	1	1			Very Shallow draft boom boats.	5	
2-426.2	6900	600			8	8/22+/danforths & stakes	3	2			Very Shallow draft boom boats.	12	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

From the Richmond-San Rafael Bridge, take Highway 101 north to the San Rafael Marina. Also, Loch Lomond Marina may be used as staging and deployment area: Exit Hwy 101 at 3rd St. and proceed east. 3rd becomes Pt San Pedro Rd. This site is San Rafael Creek and the bay margins and mudflats for 1 mile north and south of the channel mouth.

LAND ACCESS: some portions only foot; paved roads

WATER LOGISTICS: extremely shallow water out of channels
Limitations: depth, obstruction

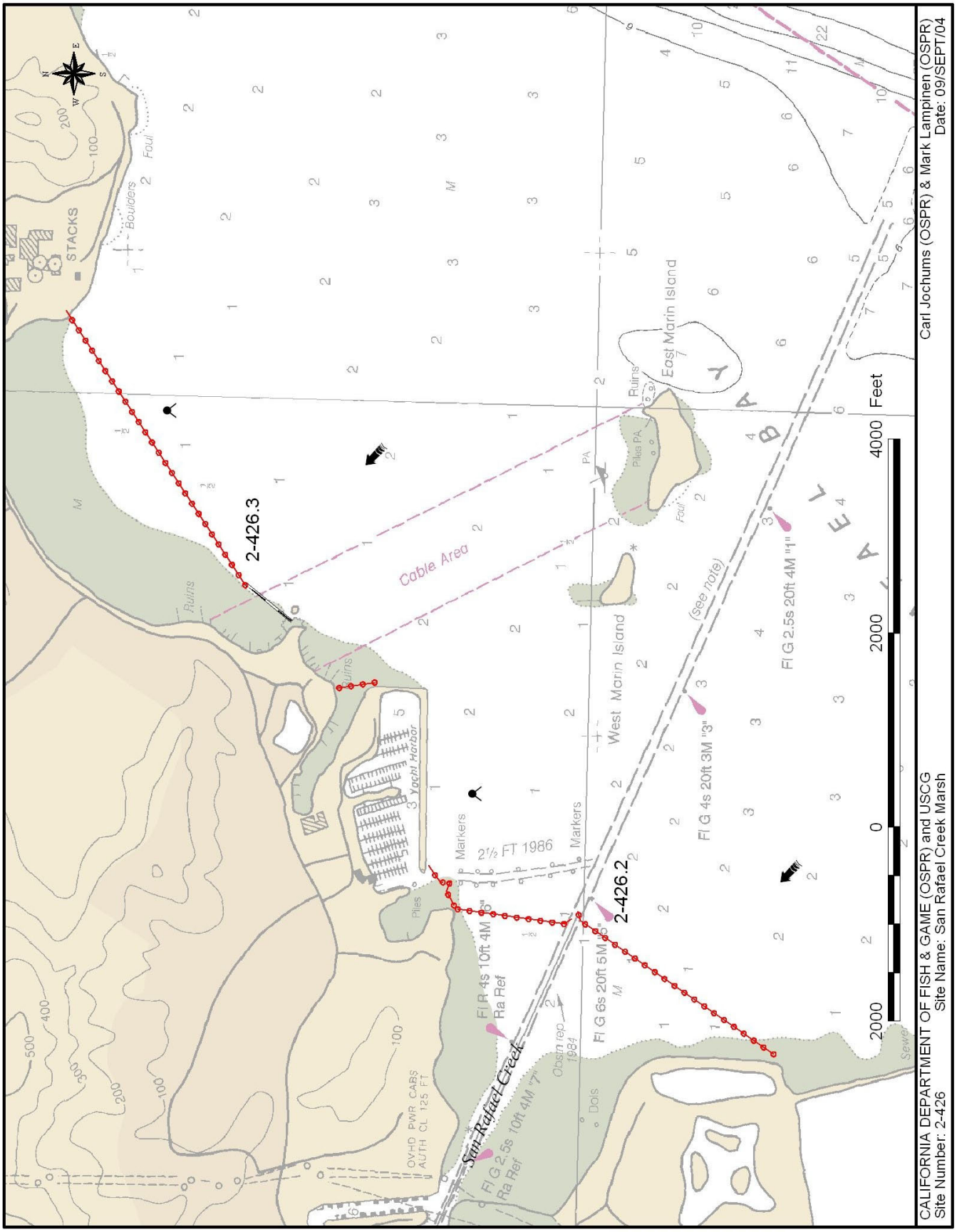
Launching, Loading, Docking and Services Available: launching, fuel, moorage at Loch Lomond Marina. More services up San Rafael Creek

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

All manner of facilities in San Rafael Creek marinas. Staging at Loch Lomond Marina. The San Rafael Rock Quarry can be used for a helicopter pad.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Marin Islands

2-427 -A

County:	Marin	Thomas Guide Location	Latitude N 3 7 58	Longitude W 122 28
USGS Quad:	San Quentin	NOAA Chart: 18649 Entrance to SF Bay		

Last Page Update : 1/1/2000

SITE DESCRIPTION:

This site includes both of Marine Islands and the surrounding waters of San Rafael Bay. This site is one of the most ecologically important and sensitive sites in the San Francisco Bay. These islands support one of the largest heron rookeries in northern California. It is the rookery for the herons and egrets of San Francisco Bay. Each island is less than one quarter mile in diameter and covered with trees. The Ciconiformes nest here, fledge their offspring, and roost in the evenings. The islands rise steeply and are cliffy. The surrounding shores are gravel, cobble, and boulder. The islands are owned by the US Fish and Wildlife Service and maintained as a wildlife preserve. The narrow channel is located south of the islands, provides access to San Rafael / San Rafael Creek boat traffic.

SEASONAL and SPECIAL RESOURCE CONCERN

The site is an A priority throughout the year due to the singular use of this site by herons in the S.F. Bay area.

RESOURCES OF PRIMARY CONCERN

These islands support one of the largest heron rookeries in northern California. The habitat risk is linked to this breeding - roosting habitat for herons and other birds. Although there are many ecological values to shore lines, the rocky, gravely shoreline here is of greatest concern as rearing habitat for fledglings.

This is the nesting and roosting site for great egret, black crowned night heron, great blue heron and snowy egrets in the SF Bay area. Black oystercatchers, western gull, mallard ducks and Canada geese have also nested here.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
B	Barbra Salzman	Audubon Society, Marin County Chapter	(415) 924-6057
BT	Jean Takakawa	US Fish & Wildlife Service, SF Bay (NWR)	(510) 792-0222
TB	John Takekawa	US Geological Survey, SF Bay Estuary Field Station	(707) 562-2000

ADDITIONAL SITE SUMMARY COMMENTS:

2-427 -A Site Strategy - Marin Islands

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
Marin	18649 Entrance to SF Bay	3 7 58	122 28

Last Page Update :

CONCERNS and ADVICE to RESPONDERS:

This site is one of the most ecologically important and sensitive sites in the San Francisco Bay. These islands support one of the largest heron rookeries in northern California. Although oil can't reach the nest sites, the disturbance of protection and cleanup could be devastating. For this reason, deploy strategy with as little disturbance and noise as practical and do not get on the islands without explicit instructions from ICS and accompanying USFWS staff.

HAZARDS and RESTRICTIONS:

This is a shallow water site. There are submerged rocks.

SITE STRATEGIES

Strategy 2-427.1 Objective: Deflect oil past islands with chevron at east end. ACP DATE 1/1/2000

Deploy a deflection chevron close to the east tip of East Marin Island: 3000' 9X9+ Harbor boom (curtin boom). Deploy as close to east tip as practical. Anchor with suitable anchors for wind and wave conditions.

Strategy 2-427.2 Objective: protective enclosure booming of both islands in the event of heavy oil threat. ACP DATE 1/1/2000

Wrap both islands completely by linking to existing chevron (see 2-427.1) Secure boom to chevron legs at least 100' back from tips and surround islands (4000' 9X9+).

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-427.1	3000				7	7/22+/danforths + chain.	3	0					9	
2-427.2	4000				7	7/22+/danforths + chain	4	0					12	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

There is no land access to this site: water access only. The islands are northwest from the San Rafael Bridge. The islands are just north of the channel from the San Rafael Creek and about one half mile offshore of the Marin Peninsula. This site includes both of Marine Islands and the surrounding waters of San Rafael Bay.

LAND ACCESS: Site only accessible from boat.

WATER LOGISTICS: Mud flats, rocks and shallow water surround these islands.
Limitations: depth, obstruction

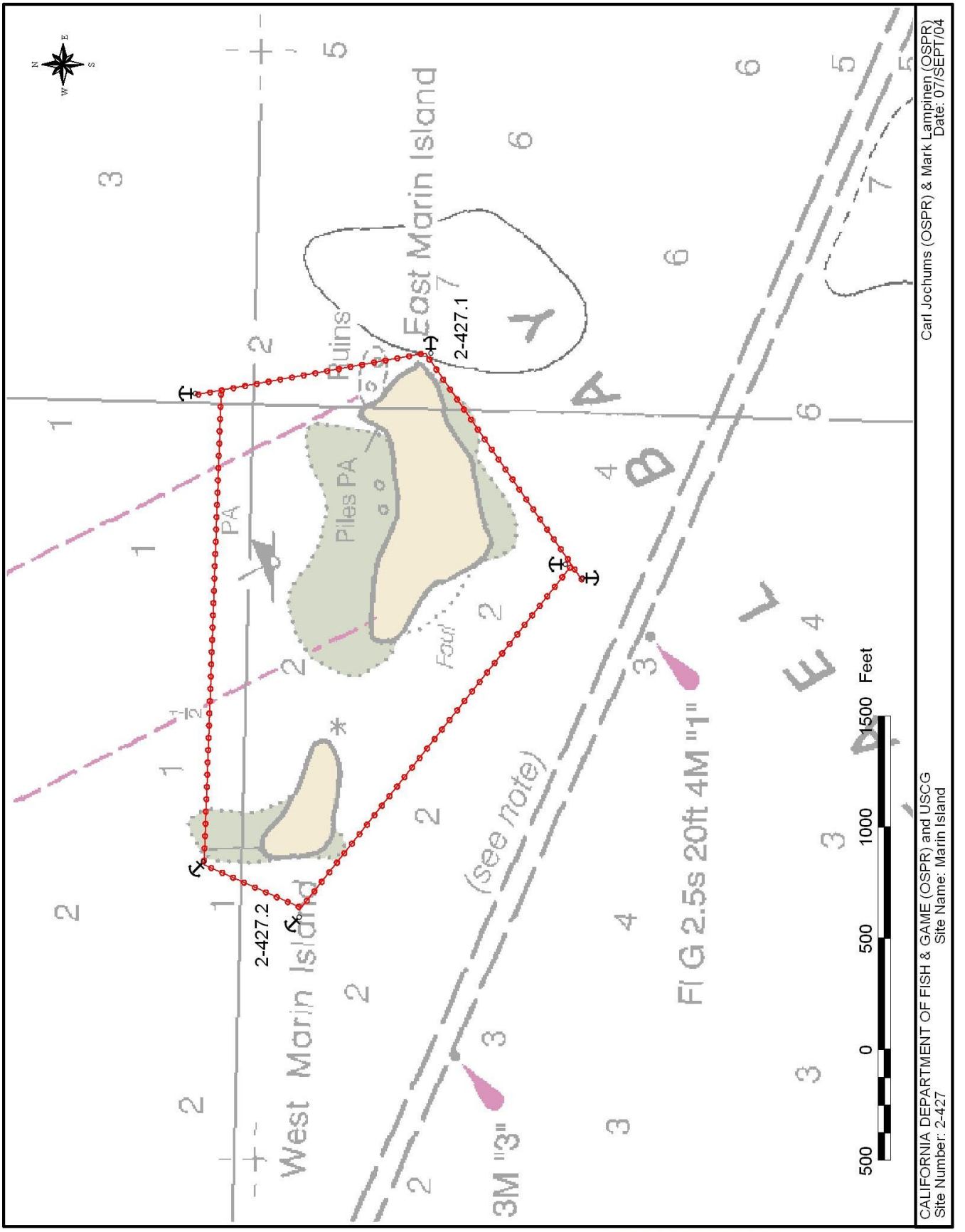
Launching, Loading, Docking and Services Available: Nearest launch is Loch Lomond Marina at 110 Loch Lomond Drive. Numerous marinas & facilities etc. are located in San Rafael.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

The staging site will depend on the spill scenario. Numerous marinas can be used as staging areas and boat launch sites is San Rafael. The Richmond Marina / Santa Fe Channel is a major staging and field post site.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Castro Rocks

2-451 -A

Thomas Guide Location	Latitude N	Longitude W
	3 7 50	122 24

County: Contra Costa

USGS Quad: San Quentin

NOAA Chart: 18649 Entrance to SF Bay

Last Page Update : 7/1/2005

SITE DESCRIPTION:

Castro Rocks is a small group of rock islands located near the east end of the Richmond-San Rafael Bridge, and just north of the Chevron Long Wharf. Their exposure is variable with the tide annual tidal cycle. During higher tides and rough conditions, the islands are exposed to aggressive wave action. This is a harbor seal rookery during the spring when the tide is less than 3 feet above mean lower low water: 30 to 60 seals use the site. 100 to 250 seals haul out at this site during the winter.

SEASONAL and SPECIAL RESOURCE CONCERN

This is an A priority during the harbor seal breeding season from 15 March to 10 June and a B priority for the remainder of the year.

RESOURCES OF PRIMARY CONCERN

This rocky exposure has intertidal biota but the prime habitat sensitivity at this site is related to harbor seal and bird use.

This is a site which is used heavily by birds, including pelicans and cormorants, for loafing.

This is a harbor seal rookery during the spring when 30 to 60 seals use the site during the period when the tide is less than 3 feet above mean lower low water. 100 to 250 seals haul out at this site during the winter.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	Sarah Allen	US National Park Service, Pt. Reyes (NS)	(415) 464-5187
	Chevron Long Wharf	Chevron Corp., Operations Control Room (24hrs.)	(510) 242-4494

ADDITIONAL SITE SUMMARY COMMENTS:

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
Contra Costa	18649 Entrance to SF Bay	3 7 50	122 24

Last Page Update : 9/15/2005

CONCERNS and ADVICE to RESPONDERS:

The concern is that these rocks will be come oiled and, in turn, will oil the harbor seals and birds which use them. This is particularly a problem in the spring when harbor seals pup here. During that time, responders must make every effort stay as clear as possible of the islands to minimize disturbance of adults and their pups.

HAZARDS and RESTRICTIONS:

There are submerged rocks near Casto Rocks.

SITE STRATEGIES

Site protection is an exclusion with booms in a N-S diamond. Depending on the path of oil, only two of the sides need be depolyed during most tidal cycles. West side of rocks is hard bottom and requires rock anchors and boom deployed on the 40 foot contours with 250 ft of scope. North, south, & east sides are soft mud and require mud anchors. Bridge piers may be good anchoring points. The strong currents coupled with the submerged rocks in the area are formidable aspects of deployment here.

Strategy 2-451.1 **Objective: Deflection/exclusion of oil from west or southwest in ebb or flood - deploy protection legs 1 (SW) and 2 (NW)** ACP DATE 7/1/2005

Deploy deflection boom in a wide angle wedge configuration on the west side of the rocks (legs 1 & 2 of a protective diamond around the rocks). Assess need for back-up deployment if waves are washing oil over the boom requiring backup 2-451.4

Strategy 2-451.2 **Objective: Deflection/protection boom for oil from south and southeast on flood currents in a chevron on the north side of the rocks - deploy protection legs 1 and 3** ACP DATE 10/2/2005

Complete a south-side chevron to deflect oil past site by deploying protection legs1 and 3 as follows: Deploy the south legs of the chevron first (legs 1 & 3 of the deflection diamond) using 6000' 9X9+ hboom. Optimally deployment should be made before flood due to difficult boat operations in flood current. Advise IC/UC if waves are washing oil over the boom necessitating back-up booming.

Strategy 2-451.3 **Objective: Deflection/exclusion for oil from north or northwest on ebb in a chevron on the north side of the rocks - protection legs 2 (NW) and 4(NE)** ACP DATE 1/1/2000

Complete a north-side chevron to deflect oil past site by deploying protection legs 2 and 4 as follows:
Leg 2: Deploy a total of 1500 ft: 1000 ft 9X9+ boom from the bridge pier to the north and 500 ft from the bridge pier south to terminate west of the rocks on the 40 ft depth contour. The north end of leg 2 should be a little west of center of rocks. Leg 4 is 1500' 9X9+ Hboom from the north apex of leg 2 to the east side of Castro Rocks. Advise IC/UC if waves are washing oil over the boom necessitating back-up booming.

Strategy 2-451.4 **Objective: Confine/deflect oil to shore for collection after completion of protection strategy** ACP DATE 1/1/2000

If the source of the spill is between the rocks and shore, divert oil to shoreline for confinement and collection after excuting appropriate protection:
from boom already deployed to protect easterly exposure of the rocks, deploy 2300 feet of 9X9+ boom to the sandy pocket beach near the bridge which can be used as an oil recovery area. Beware of submerged debris of the beach; rip rap is on either side as well. (strategy not shown in diagram.) Anchoring will require chain and scope to keep boom from moving.

Strategy 2-451.5 **Objective: Backup secondary boom when oil overwhelms initial protection strategy** ACP DATE 7/1/2005

deploy a second layer of 4X4+(6000') inside of the overwashing leg and arrange for absorption (600' of sorbents and snare).

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-451.1	3000				10	5/40+/northhill, & 5/22+/Danforth	3	0				maneuverable Bboats & 1500' line	11	
2-451.2	6000				9	5/40+/northhill, & 4/22+/Danforth	3	1				maneuverable Bboats & 1500' line	11	2
2-451.3	3000	2500			15	5/40+/northhill, & 10/22+/Danforth	3	1				maneuverable Bboats & 1500' line	11	2
2-451.4	2300				6	22#+ daforth with heavy chain	3	1					11	
2-451.5	0	6000	600 OS	0	6	22#+ anchors	2	1	0	0			8	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

Access is by boat only to this small group of rock islands located near the east end of the Richmond-San Rafael Bridge. The nearest launching sites are Richmond Harbor and Tiburon Center for Environmental Studies in Marin County. The site is visible from the platform on pier 55 or from the lower deck of the Richmond-San Rafael Bridge (Call Cal Trans Towing

Service). Castro Rocks is a small group of rock islands located near the east end of the Richmond-San Rafael Bridge, and just north of the Chevron Long Wharf.

LAND ACCESS:	Accessible only by boat
WATER LOGISTICS: Limitations: depth, obstruction	There are submerged rocks around this site
Launching, Loading, Docking and Services Available:	The nearest launching sites are Richmond Harbor and Tiburon Center for Environmental Studies in Marin County.

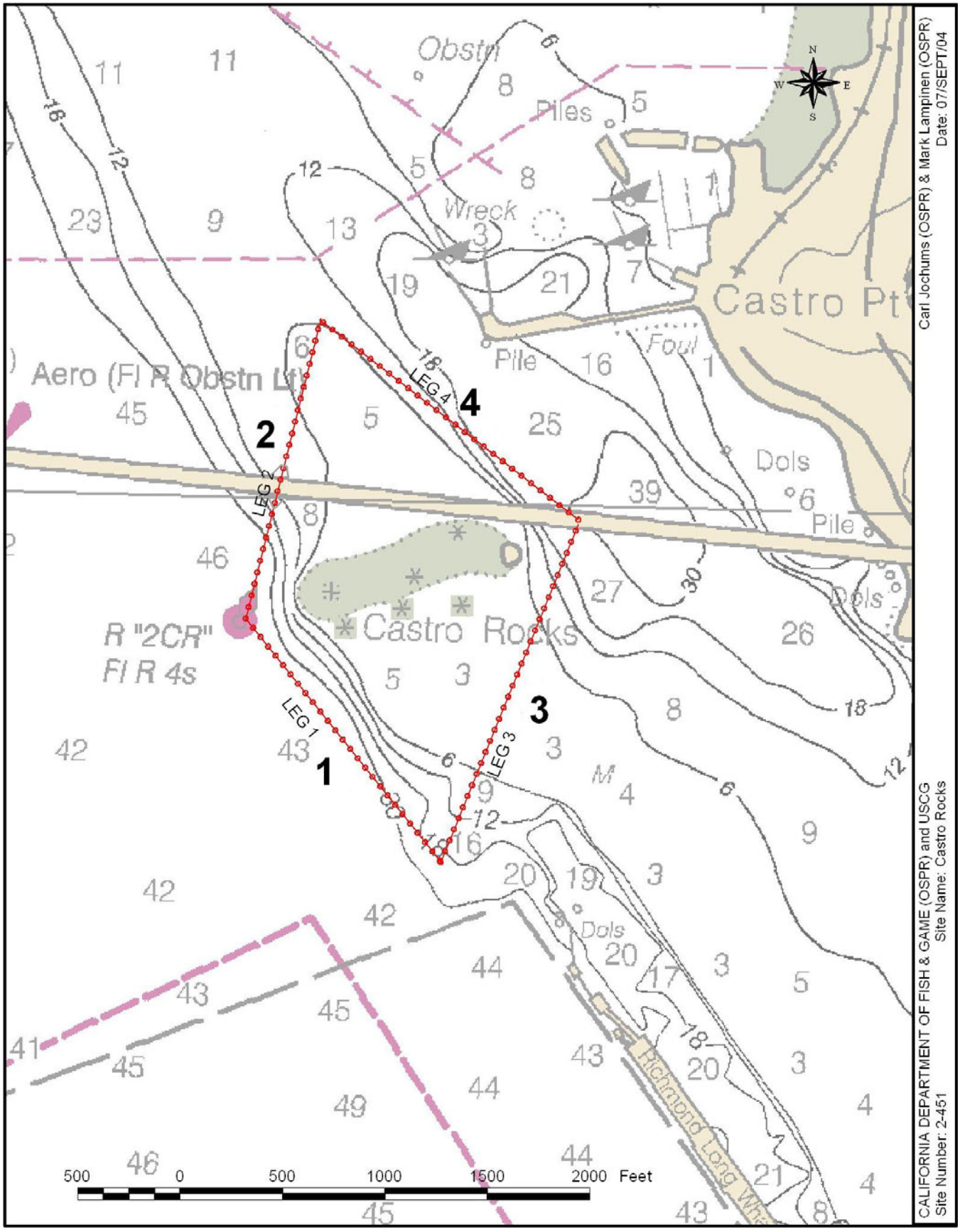
FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Nearest staging, facilities, and field outposts are at Richmond Marina and Santa Fe Channel. Staging and fuel may be available at refinery.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:

Strategy Diagram- Castro Rocks



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Richmond Eelgrass Beds

2-452 -A

County:	Contra Costa	Thomas Guide Location	AAA Richmond	Latitude N	03 7 58	Longitude W	122 24
USGS Quad:	San Quentin	NOAA Chart:	Entrance to San Francisco Bay 18649				

Last Page Update : 9/15/2005

SITE DESCRIPTION:

This site includes all shallow (<10 feet), soft bottom, areas along the east shore of San Francisco Bay from Pt. San Pablo south along the Richmond Peninsula to Pt. Richmond. The Richmond - San Rafael Bridge (highway 580) bisects the site. Most of the shoreline is in ownership of Chevron, EBRP, and Richmond. Extensive eelgrass beds are present in shallow (<10 feet) nearshore areas from Pt. San Pablo south along the Richmond Peninsula to Pt. Richmond. Six rocky headlands separate five beaches along this shoreline. The beaches south of Point Molate are of fine grained sand while those to the north are of coarse sand to pebbles and shell. Numerous pilings and pier structures exist and should be used as anchoring points for the boom.

SEASONAL and SPECIAL RESOURCE CONCERN

The eelgrass beds are most vulnerable at low tide. Waterfowl are most abundant from early fall through early spring.

RESOURCES OF PRIMARY CONCERN

This is an A priority all year. The eelgrass beds are most vulnerable to oil during the growing season of spring and summer when the leaves lay on the surface, especially at low tide. Eelgrass beds are an extremely valuable habitat in San Francisco Bay for spawning of herring in the winter, food for waterfowl in spring, and as nursery areas to fish and invertebrates throughout summer and fall.

Various species of waterfowl can be found at this site in the spring time. Large numbers of waterfowl use the coves during winter migration.

Herring have a history of spawning at this site in the winter time.

There are extensive eelgrass beds in each of the coves. Some of the beds are so shallow that some plants are totally exposed during some low tides. Location and size of eelgrass beds along the Richmond Peninsula is noted in a 1989 National Marine Fisheries Service Report.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Ohlone cultural sites may be nearby, and there are historical buildings on the former Point Molate U S Naval Fuel Depot. The entire shoreline was intensively used at one time or another, and a chinese fishing village was one of the uses.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
EL	Chevron Long Wharf	Chevron Corp., Operations Control Room (24hrs.)	(510) 242-4494
EL	Dispatch/Watch Command	Richmond, City of, Police Department	(510) 620-6643
C	Leigh Jordan	Northwest Historical Resources Information Center	(707) 664-0880
BT	Diane Watters	CA Dept. of Fish & Game	(650) 631-2535
EL	Tom Wilson	Port of Richmond	(510) 215-4605

ADDITIONAL SITE SUMMARY COMMENTS:

2-452 -A Site Strategy - Richmond Eelgrass Beds

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA Richmond Contra Costa	Entrance to San Francisco Bay 18649	03 7 58	122 24

Last Page Update : 9/15/2005

CONCERNS and ADVICE to RESPONDERS:

Should eelgrass become heavily oiled it may produce a sheen for several weeks unless removed. Surface oil can be expected to produce injury and death to waterfowl in area.

HAZARDS and RESTRICTIONS:

Hazards include shallow water with debris, wrecks, and pilings throughout the area. Areas near Pt. Molate and Castro Pt. are inside a restricted area with access under the control of Richmond PD.

SITE STRATEGIES

Strategy 2-452.1 Objective: Exclude oil from pocket marsh at Castro Pt. ACP DATE 7/1/2005

Exclude oil from small pocket marsh just north of Castro Pt using 300' of swamp boom anchored or staked to high beach. There is land access but boom delivery via land is difficult. Water delivery is recommended but must contend with submerged obstructions and shallows.

Strategy 2-452.2 Objective: exclude oil from emergent eelgrass bed in coves between Molate Pt and Pt Orient. ACP DATE 7/1/2005

Deploy 2500 feet of harbor boom from just east of Pt Molate across the mouth of both coves to north.

Strategy 2-452.3 Objective: Deflect to Collection/confinement at shoreline when oil impacts are likely to be heavy and unavoidable at this site ACP DATE 7/1/2005

Deploy deflection boom from headlands where there is access for oil recovery equipment and skimming recovery. Locations include:

a. near Castro Point, 1,500' boom from base of Richmond-San Rafael Bridge toward Castro Rocks.
c. from Point Molate, 2,000' boom in a southwesterly direction to collect and recover oil at Pt. Molate.
c. from Point Orient, 1000 feet of boom.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-452.1	0	300			2	stakes or anchors	0	1					2	
2-452.2	2500				6	22#+ with chain	2	1					6	
2-452.3	4500	500			22	22#+ w/ 10' 1" chain	3	2	3	SSS		2,500' 1/2" anchor line	11	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

Primary access by vessel. By land take Hwy 80 to Hwy 580 west. Before toll booth of the Richmond-San Rafael bridge turn right onto Western Drive. Proceed to beach areas. To access from Hwy 580 eastbound take Cutting Blvd to Garrard Blvd. South, through tunnel to Western Drive and shoreline. This site includes all shallow (<10 feet), soft bottom, areas along the east shore of San Francisco Bay from Pt. San Pablo south along the Richmond Peninsula to Pt. Richmond. The Richmond - San Rafael Bridge (highway 580) bisects the site. Most of the shoreline is in ownership of Chevron, EBRP, and Richmond.

LAND ACCESS: Good access for all vehicles along the main road (Western Drive).

WATER LOGISTICS: This is a shallow water site
Limitations: depth, obstruction

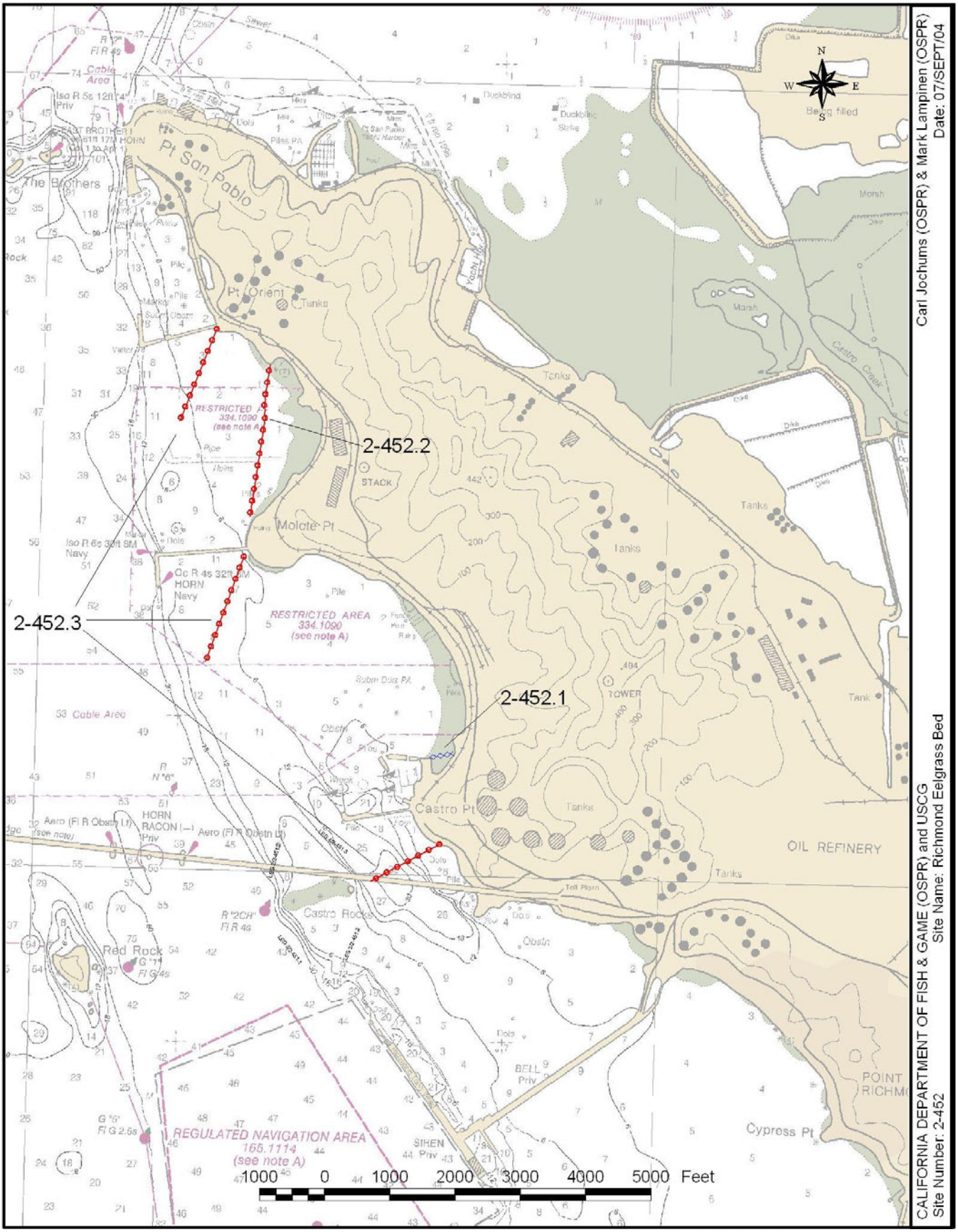
Launching, Loading, Docking and Services Available: Launch ramps are available in the Richmond Harbor and at Chevron Refinery, docking facilities are available at the Pt. San Pablo Yacht Harbor (located NW of Pt Orient) and Richmond Marina.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Numerous staging areas and locations for field posts exist along Western Drive, at the Chevron Long Wharf and in Richmond harbor and marina.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:


2-452.2
2-452.3
2-452.1
Pt San Pablo
Pt Orient
Molate Pt
Castro Pt
Castro Rocks
Red Rock
The Brothers
RESTRICTED 334.1090 (see note A)
RESTRICTED AREA 334.1090 (see note A)
REGULATED NAVIGATION AREA 165.1114 (see note A)
OIL REFINERY
Tanks
STACK
TOWER
Cable Area
Castro Creek
Being filled
Marsh
Duckblind
Carl Jochums (OSPR) & Mark Lampinen (OSPR)
Date: 07/SEPT/04
CALIFORNIA DEPARTMENT OF FISH & GAME (OSPR) and USCG
Site Name: Richmond Eelgrass Bed
Site Number: 2-452
1000 0 1000 2000 3000 4000 5000 Feet
Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Brook's Island

2-453 -A

County:	Contra Costa	Thomas Guide Location	Latitude N	Longitude W
USGS Quad:	Ricnmond	AAA Richmond	3 7 54	122 21.5'

NOAA Chart: **Entrance to San Francisco Bay 18649**

Last Page Update : 9/15/2005

SITE DESCRIPTION:

Brook's Island lies south of the Richmond Channel and at the west side of the Richmond Inner Harbor and includes the spit but not the rocky channel breakwater. It is the property of East Bay Regional Parks and no trespassing is permitted at any time because of the extreme ecologic sensitivity. This small' rocky island, 400 X 1,700 yards, consists of about 160 acres of rocky upland rising to a maximum elevation of 163 ft. Most shorelines of the island are mixed sand and gravel. A 2,300 yard long breakwater is attached to the west end of the island with a shipping channel along its north side. There is a small, 35 acre, seasonal wetland near where the breakwater connects to the island. The wetland is protected on the north by the breakwater and a sandy beach. Sand beaches and dunes have accumulated at several points along the breakwater. To the south the marsh is open to San Francisco Bay. There are tidal flats to the north, east, and south of Brook's Island and the breakwater. Eelgrass beds are present in shallow water (less than 6 feet below MLLW) south of the breakwater.

SEASONAL and SPECIAL RESOURCE CONCERN

"A" priority all year. The marsh is sensitive to oiling year-around, and the eelgrass beds are most sinsitive to oil during the growing season of spring and summer when the leaves lay on the surface, especially at low tide. Site is especially sensitive March through June when multiple ground nesting species are breeding.

RESOURCES OF PRIMARY CONCERN

The wetland is sensitive year-around; the eelgrass beds are most sensitive to oil during he growing season of spring and summer when the leaves lay on the surface, especially at low tide. Harbor seals use the islandas a haul-out site, and some birds are present throughout the year.

Several species are of special interest; the Snowy Egret, Black-crowned Night Heron, and Caspian Tern inhabit the marsh and waters surrounding the island. Terns and shorebirds nest here in large numbers.

Harbor seals haul out on the island.

A rich community of invertebrates inhabit the sand and gravel beaches of the island and the tidal flats.

There is a 35 acre wetland on the island. The eelgrass beds are an extremely valuable habitat for spawning herring in the winter and as a nursery area for fish and invertebrates throughout the summer and fall. The eelgrass beds are an extremely valuable food source for waterfowl in the spring.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

There are cultural and historic resources at this site. Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
C	Chevron Long Wharf	Chevron Corp., Operations Control Room (24hrs.)	(510) 242-4494
	Joseph Didonato	East Bay Regional Park District	(510) 635-0135
	EBRP Dispatch EBRP	East Bay Regional Park District	(510) 881-1833
B	Niall F. McCarten, Ph.D.	Jones & Stokes Associates, Inc.	(916) 737-3000
	Port of Richmond	Port of Richmond	(510) 215-4600
L	Tom Wilson	Port of Richmond	(510) 215-4605

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - Brook's Island

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA Richmond Contra Costa	Entrance to San Francisco Bay 18649	3 7 54	122 21.5'

Last Page Update : 9/15/2005

CONCERNS and ADVICE to RESPONDERS:

This site has heavy bird nesting activity which is concentrated on the spit. No foot traffic is permitted on the Island except with biologist supervising. Even activity nearby can be destructive to nesting success. There are marshy areas at the northwest corner of the island and along north margin of the spit.

HAZARDS and RESTRICTIONS:

Shallow water, debris, and pilings may be present throughout area south and east of island and breakwater. No foot traffic on shore without first notifing East Bay Regional Park District.

SITE STRATEGIES

Waters are shallow on both sides but workable. Response staff should stay off and away from shores except to anchor to shoreline. There are rocks at north tip of Island.

Strategy 2-453.1 Objective: PRIMARY: Exclusion Booming on south side of spit: exclude oil from high marsh and break in spit

ACP DATE 7/1/2005

On the south of the Brooks Island spit (on west end),
a. deploy 1800 ft of Harbor boom across the cove at the northern corner between the spit and the main island mass. Boom should be anchored on shore, but foot traffic must be kept to absolute minimum to avoid disturbing ground nesting birds and marsh life. Probably only minimal mid-boom anchoring will be necessary.
b. exclude oil from break in spit. Deploy 500 ft harbor boom in chevron (flattened). Anchor on shore with minimal foot traffic.

Strategy 2-453.2 Objective: North shore exclusion for north-side threat to shoreline, jetty breech, marsh entry (Sante Fe Channel and Richmond Channel side & threat sources)

ACP DATE 7/1/2005

On the north of the Brooks Island spit (on west end), deploy 3200 ft of swamp boom from the rocky point at northeast tip to west of the jetty breech. Probably only minimal mid-boom anchoring will be necessary. For the opening to the interior marsh, a small length of boom of boom may be staked across the shallow entry in a chevron formation.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-453.1	2300	0	0	0	7	22#+ danforths	1	1	0		0		4	
2-453.2	0	3200	0	0	8	5/22#+ danforths+ 3 stakes	1	1	0		0		4	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

Access by vessel only. Launch at Richmond Marina. Island is managed by East Bay Regional Park District and all activity on or near the island must be coordinated with them. Brook's Island lies south of the Richmond Channel and at the west side of the Richmond Inner Harbor and includes the spit but not the rocky channel breakwater. It is the property of East Bay Regional Parks and no trespassing is permitted at any time because of the extreme ecologic sensitivity.

LAND ACCESS: none

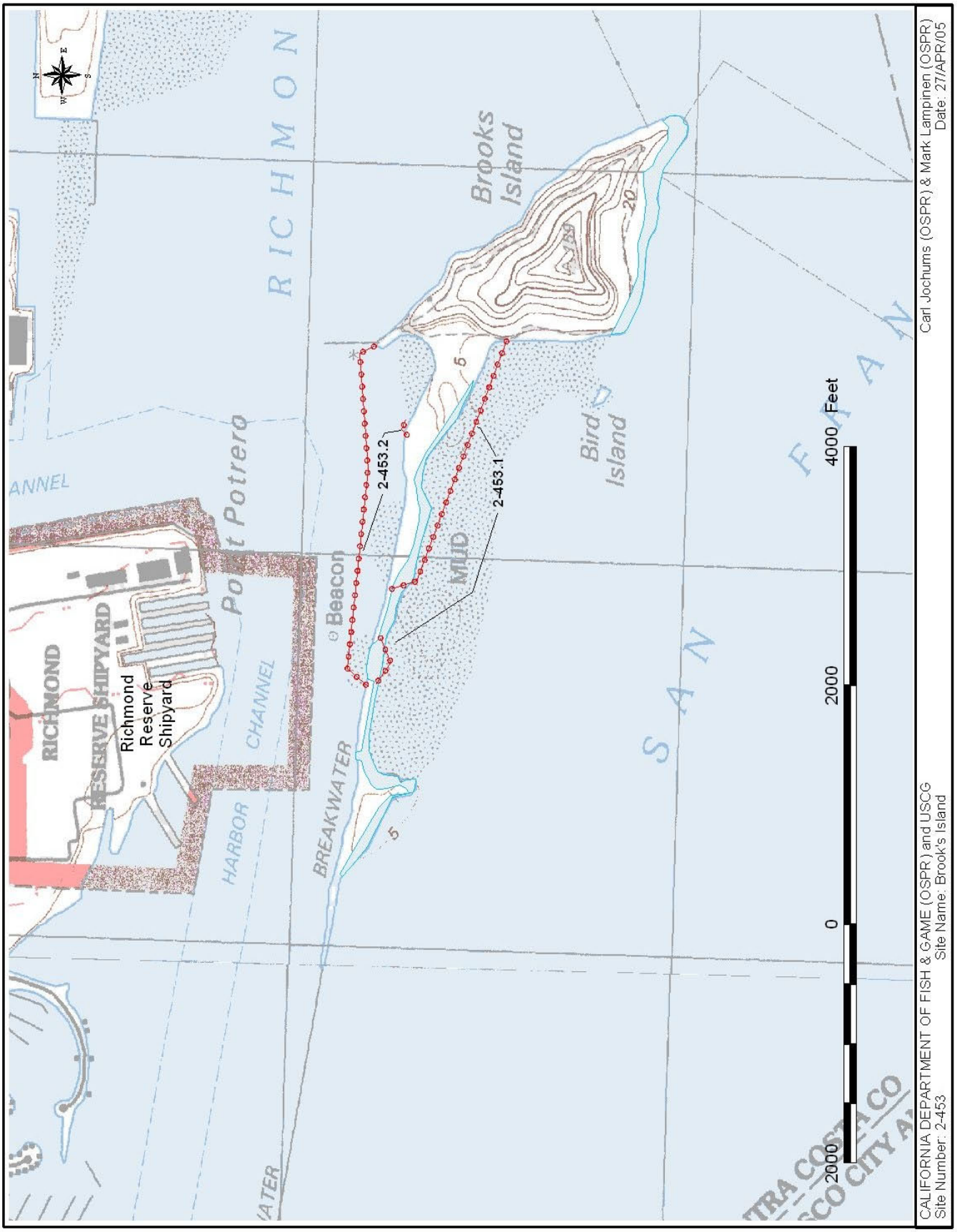
WATER LOGISTICS:
Limitations: depth, obstruction: Very shallow water
Launching, Loading, Docking and Services Available: Launch ramp at Richmond Marina

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Large staging area available at MSRC in Richmond Harbor or at the Richmond Marina. Possible field posts at any of the several marine terminals along Santa Fe channel in Richmond Harbor.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Richmond Inner Harbor/Hoffman Marsh

County:	Contra Costa	Thomas Guide Location	AAA Richmond	Latitude N	37 54.5	Longitude W	122 20
USGS Quad:	Richmond	NOAA Chart:	Entrance to San Francisco Bay 18649				

Last Page Update : 7/1/2005

SITE DESCRIPTION:

This site lies near the southern boundary of the city of Richmond and is bounded on the north by the residential / business area east of the Richmond Marina, on the east by Highway 580, on the south by Central Ave and on the west by Brooks Island (no tresspassing is permitted on Brooks Island). Hoffman Marsh and most of the land bayward is owned by East Bay Regional Parks (Pt. Isabel Regional Park). This shallow bay surrounded by marshes is biologically rich and very vulnerable to oiling. Most of the marshes are tidally influenced and support pickleweed and other salt marsh vegetation. Hoffman Marsh is separated from the bay by an old railroad grade and is connected to the Bay by a narrow channel, lined with rip rap, which opens to the Bay at Point Isabel. The Inner Harbor marshes are protected by approximately two miles of rip rap, with two openings to the Richmond Inner Harbor, each about a 300 yards across. There are extensive intertidal mudflat and shallows both in front and behind the riprap.

SEASONAL and SPECIAL RESOURCE CONCERN

"A" Priority all year

RESOURCES OF PRIMARY CONCERN

There are three major habitats at risk: the Hoffman and other surronding marshes, the protected surface waters are resting habitat for birds, and extensive mudflats and shallow waters are important foraging areas for shorebirds, migratory waterfowl, and fish.

The California clapper rail and migratory waterfowl are at risk here. Large concentrations of migratory waterfowl and waterbirds use the protected waters of Richmond Inner Harbor during the wintering period. The endangered California clapper rail lives and nests in the marshes.

Saltmarsh harvest mouse inhabits saltmarshes such as Hoffman.

There is an eelgrass bed at the northerly mouth of the marsh just south of the breakwater.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	Dee Tilson	East Bay Regional Park District	(510) 233-8051

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - Richmond Inner Harbor/Hoffman Marsh

2-454 -A

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA Richmond Contra Costa	Entrance to San Francisco Bay 18649	37 54.5	122 20

Last Page Update : 7/1/2005

CONCERNS and ADVICE to RESPONDERS:

Should oil enter the marsh, injury and death of vegetation and wildlife can be expected. Keep oil from entering the channels and embayments. Endangered species live in the marshes year-round and may be injured by foot traffic. Oil is also a threat to the many birds which use the open water. Avoid tramping oil into marsh and sediments. Most of the property belongs to East Bay Regional Parks.

HAZARDS and RESTRICTIONS:

Navigational hazards include shallow water, a submerged pipeline and debris. The bottom type is soft mud.

SITE STRATEGIES

Strategy 2-454.1 Objective: Exclude oil from marsh entry channels

ACP DATE 7/1/2005

Exclude oil from two major enterances to the marshes and embayments:
a) the southerly enterance is at Pt Isabel Regional Park (Central Avenue off of I-580) and includes two channel openings: first, a long narrow channel which leads about 2000 feet back to a marsh behind the railroad grade (Hoffman Marsh) and second, an opening to a large shallow embayment at the bayfront between the riprap shoreline (north of the channel to Hoffman Marsh) to a riprap breakwater about 100 yds offshore; (Use 1000 feet of 9X9+ exclusion boom from Pt Isabel to the breakwater tip in a shallow chevron formation, and back the harbor boom with 1100 ft of small boom; also, place a small chevron of boom backed with sorbent at the mouth of the long channel.)
b) the northerly enterance is a wide gap in an east-west riprap levee at the north end of the embayment; (Exclude oil with 1100 ft 9X9+ harbor boom in a long chevron formation.)
c) there may also be small breeches in the riprap levees which are not show on maps or strategy diagrams. Deployboom in chevron formation at such openings (no diagram shown).

Strategy 2-454.2 Objective: protection for splash-over or porous breakwater

ACP DATE

Breakwater can be topped by waves at high tide. Strategy may require boom on either side to prevent seepage through or splash over the breakwater when large concentrations of oil are present.

Strategy 2-454.3 Objective: Protection booming

ACP DATE

If it appears that the initial response strategy will be unsuccessful, it is recommended that 5000 feet of harbor boom be deployed along the outer edge of the mud flat outside the breakwater in the northeast corner of Richmond Inner Harbor. An example of this strategy is described in "Potential Oil-Spill Protection Strategies for San Francisco Bay, California (Hayes and Montello, 1994)

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-454.1	2500	1100		200	8	6-8 25# danforth, 15' 1/2 chain	2	2	1			Shallow draft boom boat.	8	
2-454.2	0	0	0	0	0		0	0	0	0				
2-454.3	5000	0	0	0	11	22# danforth, 15' 1/2 chain	3	1	0	0		very shallow water boom boats	12	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

From Coast Guard Island, take Highway 80 north and exit at Central Avenue. Turn left and proceed to the rear of the Costco Warehouse. If necessary, small boats can be launched over the beach from Point Isabel, but the nearest marina with a launch ramp is Richmond just to the north. Vehicles may also access the area through Point Isabel Regional Park Shoreline. Turn right on Rydin from Central Ave. Contact East Bay Regional Park Dist. For access through locked gate. This site lies near the southern boundary of the city of Richmond and is bounded on the north by the residential / business area east of the Richmond Marina, on the east by Highway 580, on the south by Central Ave and on the west by Brooks Island (no tresspassing is permitted on Brooks Island). Hoffman Marsh and most of the land bayward is owned by East Bay Regional Parks (Pt. Isabel Regional Park).

LAND ACCESS: Good vehicle access

WATER LOGISTICS: very shallow water
Limitations: depth, obstruction

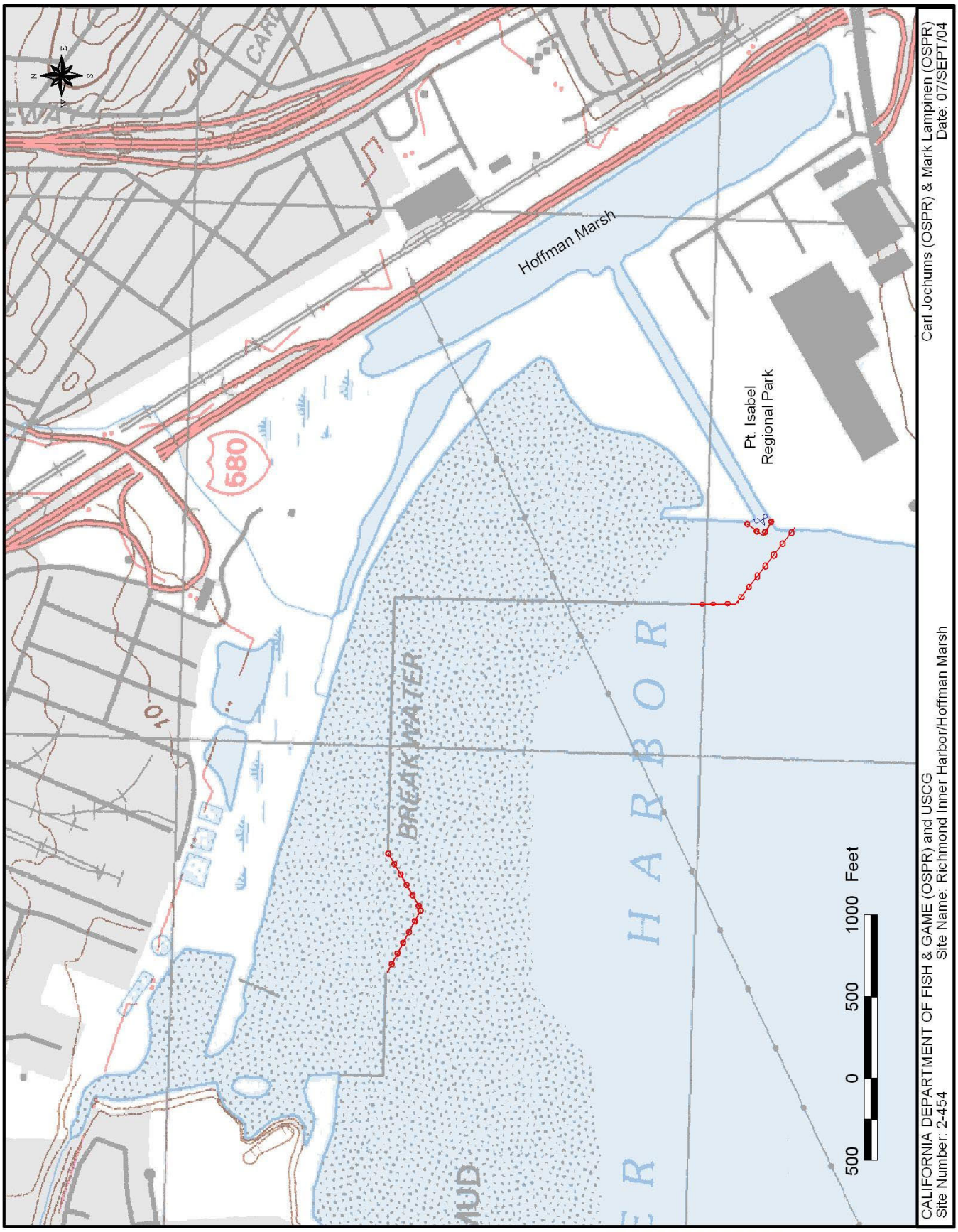
Launching, Loading, Docking and Services Available: Richmond Marina, and Berkeley Marina

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Good staging and field post space at Richmond harbor and marina and MSRC Docks. Limited staging and field post opportunities at Point Isabel Regional Shoreline.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

County:	Contra Costa	Thomas Guide Location	Latitude N	Longitude W
USGS Quad:	Richmond	AAA West Contra	37 55'	122 22'
		NOAA Chart: S Francisco Bay-Angel I - P S Pedro		

Last Page Update : 1/1/2000

SITE DESCRIPTION:

The Santa Fe Channel is the main shipping channel of Richmond Harbor. It lies south of Cutting Blvd and highway 580 between Pt. Richmond and the city of Richmond and Richmond Marina Bay. Santa Fe Channel is a shipping channel. The shorelines are of man made materials, riprap, pier pilings, and seawalls. There are small patches of mixed sand and gravel beaches and wetland vegetation. Currents are generally weak, less than 1 knot. The waters of the channel are generally protected from strong wind and seas larger than a few inches are generally absent.

SEASONAL and SPECIAL RESOURCE CONCERN

This is an industrial area with high risk of spills. It is an excellent site to collect, contain, and recover oil. Oil that escapes this area will present a greater threat to highly sensitive areas nearby.

RESOURCES OF PRIMARY CONCERN

This is degraded habitat and has continual impacts from commercial use. Pilings, bulkheads, riprap provide structural habitat for organisms living here. Gravel and mud beachs and flats support biota which is forage for shore birds. This embayment provides habitat for fish and waterbirds.

Birds feeding and resting in the Santa Fe Channel can be expected to be most abundant during the fall and spring.

Fish and other organisms living in the water column will be present in all seasons.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	EBRP Dispatch EBRP	East Bay Regional Park District	(510) 881-1833
	Andrew Galvin	Ohlone Nation	(510) 810-9701
E	Port of Richmond	Port of Richmond	(510) 215-4600
E L O	Tom Wilson	Port of Richmond	(510) 215-4605

ADDITIONAL SITE SUMMARY COMMENTS:

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA West Contra Contra Costa	S Francisco Bay-Angel I - P S Pedro	37 55'	122 22'

Last Page Update :

CONCERNS and ADVICE to RESPONDERS:

This is an industrial area with high risk of spills. It is an excellent site to collect, contain, and recover oil. Oil that escapes this area will present a greater threat to highly sensitive areas nearby. While plants and animals living on rip rap, seawalls and pilings, in the water column, and birds resting on the water in Santa Fe Channel may be senstive and vulnerable to oil, the total impact upon wildlife, and the cost of cleanup and restoration can be limited by the containment and recovery of oil in the channel.

HAZARDS and RESTRICTIONS:

This is an industrial area. Be aware of truck traffic on the roads. People working on the water, particularly those in small craft must be aware of ship traffic and the potential for objects to fall from docks. Currents are light and the water generally deep.

SITE STRATEGIES

Strategy 2-455.1 **Objective: Contain/collect oil within Channel and prevent oil from leaving the channel and threatening sensitive sites immediately outside of the channel. Divert oil to shore side skimming.**

ACP DATE 1/1/2000

Contain the Channel by closing the mouth with repeated boom layers and divert to shore side skimming (SSS). Deploy 2000 feet of boom from Sheridan Point Park to Potrero Point. Collect and recover oil at Potrero Point on the ebb tide. Deploy another 2,000 feet of boom parallel to and 2,000 feet north of the first. Collect and recover oil along the west side of the channel on the ebb tide. Deploy 1000 feet of boom in a north south direction from the west side of the confluence of the Lauritzen Canal and the Santa Fe Channel to the opposite side of Santa Fe Channel. Collect oil in Lauritzen Canal on the flood tide. Oil could also be collected in the Parr-Rich Canal on the flood tide using a similar deployment, however, this site would require 2,000 feet of boom. The former dry docks immediately west of Potrero Point should be used to collect and recover oil. Collection can be enhanced by deploying a 600 foot length of boom from the southwest corner of a dry dock in a east southeast direction and anchoring it there. At least two such collection systems should be set up. Sorbent boom should be available to back up and catch any oil that might escape the collection sites.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-455.1	6200			500	10	10	5						10	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

Take highway 580 to Richmond. To reach the Richmond Marina launch ramp, take the Harbor way exit. Turn south onto Harbor Way South. Turn left on Hall and proceed to the Richmond Marina. To reach the oil terminals on the west side of the Santa Fe Channel, take the Canal Blvd. Exit. Turn south onto Canal Blvd and proceed to the appropriate terminal. The Santa Fe Channel is the main shipping channel of Richmond Harbor. It lies south of Cutting Blvd and highway 580 between Pt. Richmond and the city of Richmond and Richmond Marina Bay.

LAND ACCESS: Good access for trucks and other heavy equipment along most shorelines

WATER LOGISTICS: Good access throughout channel
Limitations: depth, obstruction

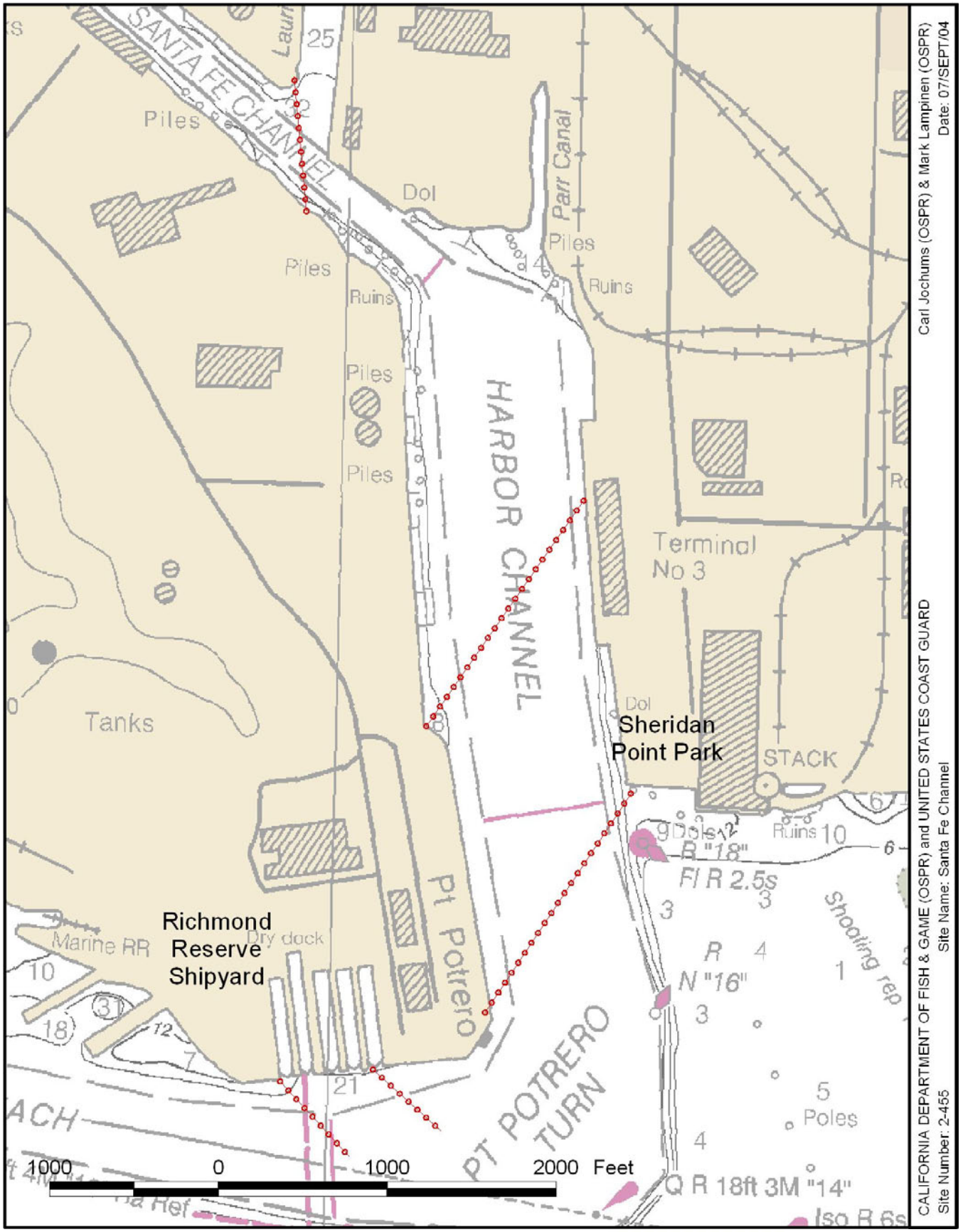
Launching, Loading, Docking and Services Available: Boat launching at Richmond Marina Bay

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Potential staging areas at most oil terminals along the channel, at MSRC at the end of Canal Blvd., and at Richmond Marina Bay. Most oil terminals can set up small command posts.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Albany Marsh

2-480 -A

County:	Contra Costa	Thomas Guide Location	Latitude N 3 7 54	Longitude W 122 19
USGS Quad:	Richmond	NOAA Chart: 18649/18650 Entrance to SF Bay		

Last Page Update : 1/1/2000

SITE DESCRIPTION:

This site includes the embayment and tributary marshes between the Pt. Isabel peninsula and the Golden Gate Fields peninsula. Both peninsulas are largely fill and ripped along most of their margins. The two peninsulas roughly form a rectangle with the back marsh making the shore end. The back bay marsh is pickleweed marsh fronted with a sheltered tidal flat extending and very gradually deepening bayward and around the south side toward the mouth. Over half the bay is exposed tidal flat at low tide. There is almost no wave action at the marsh margin and very little past the mouth. The extensive tidal flats are used by shorebirds for foraging and water birds shelter in the calm of this bay. The back bay marsh is the property of the Calif. Dept. Fish and Game.

SEASONAL and SPECIAL RESOURCE CONCERN

This is an A-priority site all year due to the extensive marshes. Several Special Status Species occur here including two endangered species. These marshes and the adjacent tidal flats are heavily used my migratory shorebirds and waterfowl from September through April.

RESOURCES OF PRIMARY CONCERN

The primary habitats of concern are the pickleweed marsh and the fronting sheltered tidal flats. Both are natural collection sites and both would be exceedingly difficult to cleanup or rehabilitate. The flats and the becalmed bay are important habitat for birds for foraging and resting particularly during the wintering period.

The flats are feeding habitat for shore birds. and embayment is resting habitat for waterbirds (particularly during rough weather), including ducks, loons, grebes and gulls. The marsh is habitat for marsh birds including the endangered California clapper rail.

Endangered saltmarsh harvest mouse inhabits the pickleweed marsh.

The mudflats have an extensive infauna and a wide variety of fish forage here during high tides.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	Region 3 DFG Office	CA Dept. of Fish & Game	(707) 944-4400
	Joseph Didonato	East Bay Regional Park District	(510) 635-0135
	EBRP Dispatch EBRP	East Bay Regional Park District	(510) 881-1833

ADDITIONAL SITE SUMMARY COMMENTS:

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
Contra Costa	18649/18650 Entrance to SF Bay	3 7 54	122 19

Last Page Update : 7/1/2005

CONCERNS and ADVICE to RESPONDERS:

The concern here is the back bay which has extensive shallow mudflats and pickleweed marshes which have endangered species and lots of bird use. The habitat is very sensitive and almost impossible to cleanup. Keep oil from entering the mouth of the bay and/or to divert it to shore near the mouth for collection. Please stay off the marsh and mudflats and avoid trampling vegetation or oil into muds.

HAZARDS and RESTRICTIONS:

The water is reasonably deep at the mouth, but becomes progressively shallower as you proceed inward to shore. Beware of possible obstructions.

SITE STRATEGIES

As with several other shallow embayments in SF Bay, there is little tidal flow into this bay and simple exclusion booming is possible. In general flood flow tends to favor the Pt Isabel side and result in a slight outflow on the south side. There is an abrupt shallowing shelf inside as indicated in charts: operations inside may not be possible during low water. There are skimming opportunities at each shore depending on wind direction and boom set.

Strategy 2-480.1 **Objective: Primary: Exclude oil from embayment on northwesterly winds by directing oil to collection.** ACP DATE 7/1/2005

Deploy boom from the southerly tip of Pt. Isabel at a diagonal to midpoint of the cove on the south shore: 2500' 9X9+ Hboom. Leave loose boom at each shoreline anchorage to maintain boom seal and prevent bridging and oil shortcircuiting around when tide is low. Potential for collection on south margin with shallow water skimmer and vac truck: advise Incident Command.

Strategy 2-480.2 **Objective: Exclude oil from embayment on west or southwesterly winds.** ACP DATE 7/1/2005

Deploy boom from the southerly peninsula tip to Pt. Isabel: 1500' 9X9+ Hboom. Leave loose boom at each shoreline anchorage to maintain boom seal and prevent bridging and oil shortcircuiting around when tide is low. Potential for collection on Pt. Isabel with shallow water skimmer and vac truck: advise Incident Command.

Strategy 2-480.3 **Objective: Backup initial exclusion strategy when strong winds or wave conditions are likely to move oil past initial exclusion deployment.** ACP DATE 7/1/2005

Repeat the deployment with a second deployment (2,500 ft for 2-456.1 or 1,500 ft for 2-2456.2) of swamp boom. Front the deployment with sorbent (1500-2300' sorbent).

Strategy 2-480.4 **Objective: Skimming when skimmable thicknesses of oil are present.** ACP DATE 7/1/2005

A skimming pocket will be necessary to keep oil from getting behind exclusion and to ensure that collection oil is focused to skimmer. Back the skimming pocket with sorbents (or Oil Snare if oil is group 4 or 5). Shallow water skimming head will be needed. Whether skimming with 2-456.1 or 2-456.2 exclusion, in both situations the backup exclusion is advisable (2-456.3).

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-480.1	2500				6	22#+ /danforths	3	2				very shallow Bboats	11	
2-480.2	1500			100	8	22#+ /danforths	2	1	1	shallow			8	
2-480.3		2500		2500	6	22#+ /danforths	1	1				very shallow draft vessels	5	
2-480.4	0	200	0	200	3	6#+ anchors	0	1	1	SSS	0		2	2

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

There is access to this area from Pt. Isabel Regional Park: From I-80 or I-580 just south of Richmond, exit on Central Ave and drive bayward to Pt. Isabel. (There is also access on the south shore though Golden Gate Fields at Buchannon St exit.) By water, the inlet is 2 miles north of Berkeley Marina or Richmond Marina about a mile north of Pt. Isabel. This site includes the embayment and tributary marshes between the Pt. Isabel peninsula and the Golden Gate Fields peninsula.

LAND ACCESS: access good all types except on marshy margin

WATER LOGISTICS: Limitations: depth, obstruction — Very shallow particularly toward back. Beware, obstructions

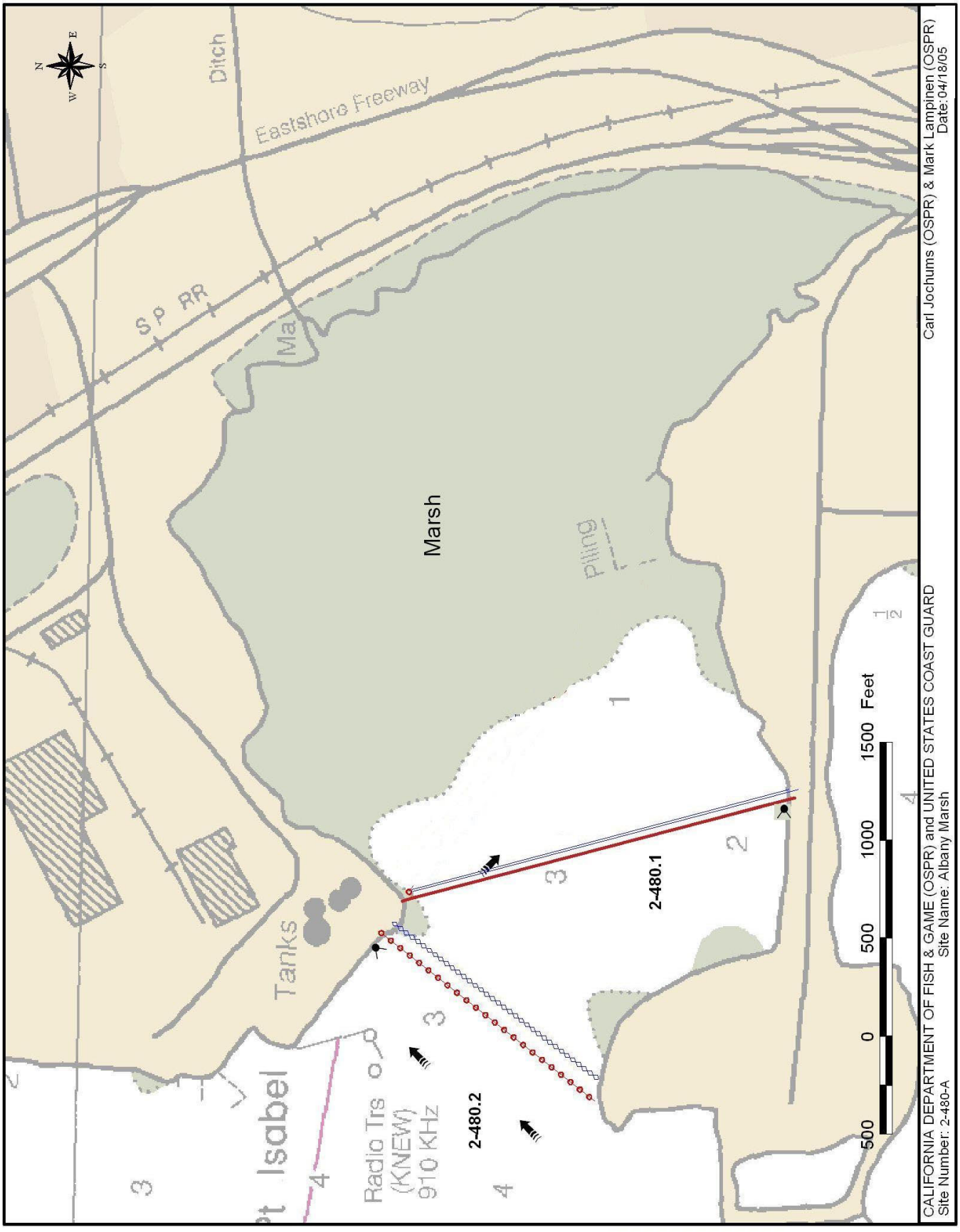
Launching, Loading, Docking and Services Available: Launching, gas, and moorage at Richmond Marina and Berkeley Marina.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Full facilities and staging both Richmond and Berkeley. Boom can be delivered to shoreline for deployment at Pt. Isabel or south side point.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

County:	Alameda	Thomas Guide Location	AAA Oakland	Latitude N	03 7 51	Longitude W	122 19
USGS Quad:	Oakland West	NOAA Chart:	Entrance to San Francisco Bay 18649				

Last Page Update : 7/1/2005

SITE DESCRIPTION:

The eelgrass bed is centered on the shallow bar just north of the Emeryville channel (west and north of channel marker Green "3") and extends from the channel, north about half way to the Berkeley pier. This eelgrass bed, like all eelgrass beds can vary in distribution, density, and height from year to year. Because the most of the bed is deeper than 8 feet (MLLW), it is rarely exposed to oil, only when tides are so low that the eelgrass tops are exposed on the surface (hence the sliding sensitivity).

SEASONAL and SPECIAL RESOURCE CONCERN

The eelgrass beds are an A priority whenever exposed to oil on the surface.

RESOURCES OF PRIMARY CONCERN

Eelgrass beds are an important habitat for numerous species. Oil readily sticks to eelgrass when it makes contact.

Eelgrass is important cover and substrate for organisms. Although herring spawn on eelgrass, this is not a site where herring tend to prefer to spawn.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

This is submerge site and is unlikely to have cultural sites vulnerable to oil or response activities. However, contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	Peter Baye, Ph.D. Coastal Plant Ecologist		(415) 310-5109
	Mike Josselyn	NOAA, National Marine Fisheries Service	(415) 454-8868
ELO	Clif Marccetti Marina Manager	Berkeley, City of, Dept. of Parks	(510) 981-6737
	Diane Watters	CA Dept. of Fish & Game	(650) 631-2535

ADDITIONAL SITE SUMMARY COMMENTS:

2-490 -C/A Site Strategy - Berkeley Eelgrass Beds and Cove

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
AAA Oakland Alameda	Entrance to San Francisco Bay 18649	03 7 51	122 19

Last Page Update : 9/15/2005

CONCERNS and ADVICE to RESPONDERS:

When eelgrass is exposed (at low tides), oil quickly attaches and clings to eelgrass strands. Once eelgrass gets fouled with oil, oil becomes a subsurface threat to fish and other organisms which thrive in this cover

HAZARDS and RESTRICTIONS:

Navigational hazards include shallow water, a submerged pipeline and debris. The bottom type is soft mud.

SITE STRATEGIES

There is very little current in this area.

Strategy 2-490.1 **Objective: Assess need for protective booming: Eelgrass is only vulnerable at very low tides when eelgrass tops are exposed to floating oil.** ACP DATE

Biological staff must assess this site to determine if eelgrass is at risk. Because this bed is fairly deep, eelgrass tops are rarely, if ever, exposed to floating oil, and then only at very low tides. Oil readily sticks to floating eelgrass tops, and once eelgrass gets fouled with oil, oil becomes a subsurface threat to fish and other organisms which thrive in this cover. Scientific staff must review tidal information to see if minus tides less than -0.5 may result in eelgrass exposure, and must conduct on-site evaluation as necessary. Any booming recommendations should be expedited though ICS to operations.

Strategy 2-490.2 **Objective: Exclusion / deflective booming when oil coming from the west** ACP DATE 4/1/2001

Consider applying dispersants to oil open waters before it comes into the vicinity of the eelgrass bed. When oil is approaching from the westerly direction, attempt to deflect it away from the eelgrass bed. Deploy deflection boom by cascading several 600 foot sections of harbor boom between the Emeryville Marina to about half way to the Berkeley pier. Overlap each section of boom. Oil will probably be wind driven. Set each section of boom at a shallow angle to the wind. Set each section as straight and taunt as possible so that oil does not collect anywhere on the boom, but moves continuously along the boom until it falls off the end and is caught by the next section of boom.

Strategy 2-490.3 **Objective: Exclusion / deflective / protective booming for oil from the west low wind conditions** ACP DATE 4/1/2001

When winds are low, oil will tend to move north-south and can be kept away from the Berkeley flats, particularly in fall months when waterfowl concentrations are high. Deploy deflection boom by cascading several 600 foot sections of harbor boom between the Berkeley pier to about half way to the Emeryville Marina to link-up with southerly deployment (2-490.2). Overlap each section of boom. Set each section of boom at a shallow angle to the windward. Set each section as straight and taunt as possible so that oil does not collect anywhere on the boom, but moves continuously along the boom until it falls off the end and is caught by the next section of boom.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-490.1	0	0	0	0	0		0	0	0		0	none	1	
2-490.2	5000			2000	14	20#+ w/ 10' 1" chain	5	2					19	
2-490.3	5000	0	0	0	14	20#+ w/ 10' 1" chain	5	2	0		0		17	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

From Coast Guard Island take Hwy 880 north to Hwy 80 north. Exit at Powell Avenue and proceed west. Make a right on Frontage Road and proceed north to the Berkeley Yacht Harbor. The eelgrass bed is centered on the shallow bar just north of the Emeryville channel (west and north of channel marker Green "3") and extends from the channel, north about half way to the Berkeley pier.

LAND ACCESS: none

WATER LOGISTICS: waters are good except in shallows of the eelgrass bed
Limitations: depth, obstruction

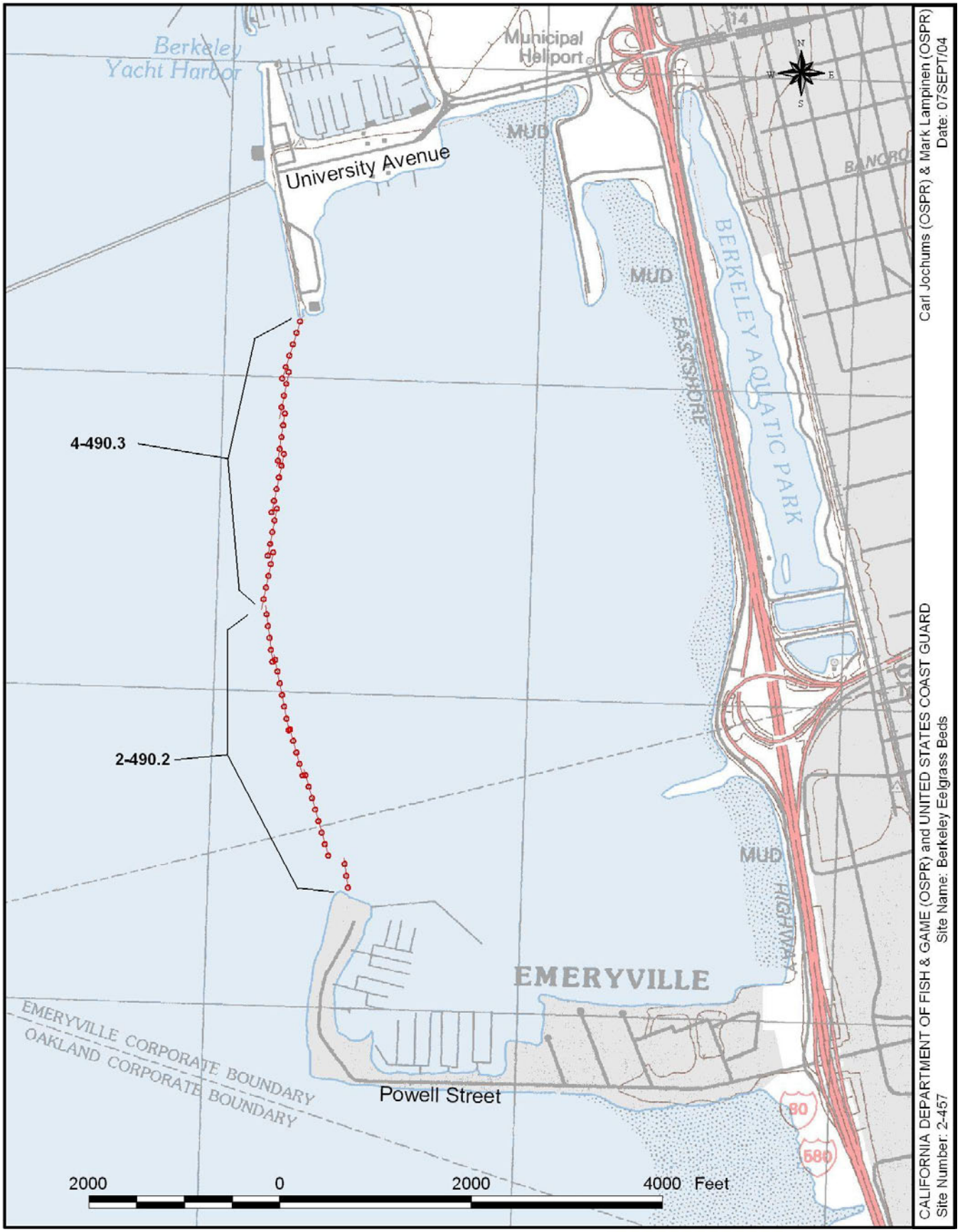
Launching, Loading, Docking and Services Available: Emeryville marina is an excellent staging and launching site. Berkeley is similarly well siturated. Both have fuel.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Both Berkeley and Emeryville have excellent services and facilities for staging. Emeryville may have slightly better opportunities for secruity.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

Site Summary- Emeryville Lagoon/Mudflats

2-495 -A

		Thomas Guide Location	Latitude N	Longitude W
County:	Alameda		3 7 50	122 29
USGS Quad:	Oakland West	NOAA Chart:	18649/18650 Entrance to SF Bay	

Last Page Update : 7/1/2005

SITE DESCRIPTION:

The site is the embayment just north of the Oakland Bay Bridge Toll plaza and includes the waters and marsh easterly from the radio towers (south) to the opposite breakwater tip (north) at Emeryville. This west facing bay transitions from open water to shallows and mudflats to a southerly and easterly pickleweed marsh perimeter. The northerly margin is ripped fill. A tidal channel drains to the lagoon at the easterly tip from the adjacent urban area east of I-80.

SEASONAL and SPECIAL RESOURCE CONCERN

The marshes are an A priority year around. Site sensitivity is heightened during winter months when it is heavily used by migratory birds. Sensitive species occur here.

RESOURCES OF PRIMARY CONCERN

This habitat is ecologically rich and sensitive. An extensive pickleweed saltmarsh extends along the east and southern margin and is fronted with extensive mudflats; mudflats and open water are heavily used by ducks, shorebirds, and sea birds year around and particularly in the winter.

The marshes are habitat for endangered California clapper rail. The marsh and exposed mudflats are used heavily by shorebirds and wading birds. Waterfowl and seabirds use the area and large rafts of ducks congregate here in winter months.

The pickleweed marsh probably supports the endangered saltmarsh harvest mouse.

The rare plant, north coast bird's beak, Cordylanthus maritimus ssp. Palustris, has been identified from this site.

CULTURAL, HISTORIC, and ARCHEOLOGICAL SENSITIVITIES

Contact the California Dept of Parks and Recreation - Office of Historic Preservation (Eric Allison -(916) 653-9125), and the Northwest Information Center, (Leigh Jordan, Sonoma State College ((707) 664-0880)) for specific information on historic or cultural resources in this area.

KEY CONTACTS: Trustee (T); Entry/Owner/Access (E); Cultural (C); or Other Assistance (O)

Type	Name / Title	Organization	Phone
	State Water Project Ops C	CA Dept. of Water Resources	(916) 574-2714
B	Peter Baye, Ph.D. Coastal Plant Ecologist		(415) 310-5109
TB	Mike Josselyn	NOAA, National Marine Fisheries Service	(415) 454-8868

ADDITIONAL SITE SUMMARY COMMENTS:

Site Strategy - Emeryville Lagoon/Mudflats

2-495 -A

County and Thomas Guide Location	NOAA CHART	Latitude N	Longitude W
Alameda	18649/18650 Entrance to SF Bay	3 7 50	122 29

Last Page Update : 7/1/2005

CONCERNS and ADVICE to RESPONDERS:

The prime concern is to exclude oil from entering this bay and impacting birds and marshy margins. Cleanup of the marshy margins would be extremely difficult or not possible, and natural resource injuries would be very great. Responders should stay out of marshes and mudflats unless specifically directed though the IC/UC: activity should be confined to the mouth of the lagoon.

HAZARDS and RESTRICTIONS:

Very shallow water at the southern and eastern margins. Possible submerged obstructions inside the bay- mid to east end. Air traffic beware of radio towers.

SITE STRATEGIES

There is little current into this bay and that is mostly along the north edge. Extreme shallows on the south side can make booming to shore challenging, and may require wading or monkey fist to secure to shore. Inside the southern spit (radio towers) there are obstructions and extreme shallows which continue all around the south and east margins. Depths are not so limiting at the mouth and along north shore.

Strategy 2-495.1 Objective: Exclude/Deflect oil past the site and exclude it from entering lagoon by winds, waves and very light tidal current

ACP DATE 10/1/2005

Deploy a continuous line of harbor boom (3600' 8X8+ Hboom) across the bay from the radio towers north to the Emeryville riprap. A collection may be successful at the Emeryville shore about 200 ft inland from mouth. If oil collects in skimable quantities (contact IC).

Strategy 2-495.2 Objective: Exclude/Deflect oil when there are aggressive waves.

ACP DATE 7/1/2005

Set cascading boom across the mouth according to the prevailing winds (diagram shows deployment for typical NW winds - adjust if other wind/wave conditions prevail). Deploy 4500' 8X8+ Hboom in 600-1200' lengths at an angle to the prevailing winds and waves. Divert oil to sandy beach west of radio towers on W to NW winds, or to Emeryville spit on S to SW winds, for shore recovery with shore-based skimmers. Link boom ends with sorbent to insure against oil eddying around boom. If oil is threatening to overwhelm the strategy, execute strategy .1 as a backup.

Strategy 2-495.3 Objective: Collection at shoreline favored by prevailing currents

ACP DATE 7/1/2005

Collection sites are available at either north shore (Emeryville) or south shore (radio towers). Best location on Emeryville shore is inside mouth about 80 yards. Best location near radio towers in on sand spit (this area may become mudflat at some low tides) and may require site modification. Small amount of light boom and sorbents will be necessary to construct skimming pocket. Shoreside skimming system (SSS) for collectable oil quantities, else use pompoms or other sorbents.

Table of Response Resources

strategy number	harbor boom	swamp boom	Other boom type	sorb boom	Anchoring no	Anchoring type and gear	Boom boat	Skiffs punts	Skimmers No	Skimmers Type	Special Equipment No	Special Equipment and kinds	staff deploy	Staff tend
2-495.1	3600				7	7/22+/danforths + chain	3	2				Bboat: very shallow draft at south side	11	
2-495.2	4500			2000	28	28/22+/danforth + 15' chain	3	3	1	SSS		Bboat: 1 very shallow draft	15	
2-495.3	0	100	50 OS	200	0		0	0	1	SSS	0		2	

LOGISTICS

DIRECTIONS: to site (by land and/or by water, to nearest launch ramp and are access permits required.)

The site is the embayment just north of the Oakland Bay Bridge Toll plaza. The South side is accessible from the I-80 exist just before the toll plaza. Powell Street (exist from I-80 at Emeryville) borders the north margin. By boat, the nearest launch facility is at the Emeryville Marina at the end of Powell Street. The site is the embayment just north of the Oakland Bay Bridge Toll plaza and includes the waters and marsh easterly from the radio towers (south) to the opposite breakwater tip (north) at Emeryville.

LAND ACCESS: All vehicles, all seasons on north and south access

WATER LOGISTICS: Very shallow on south half occasional obstruction thru out.
Limitations: depth, obstruction

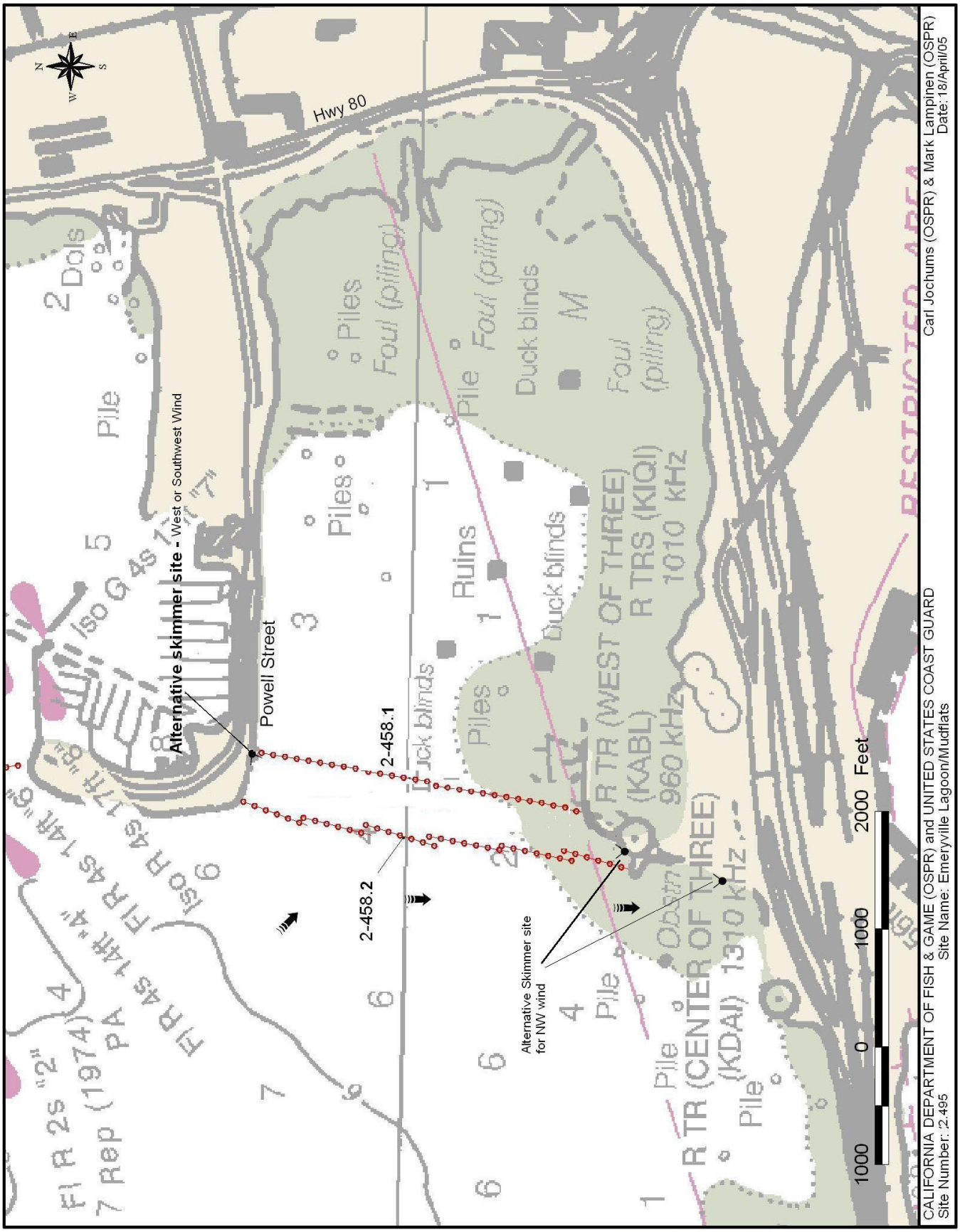
Launching, Loading, Docking and Services Available: The nearest lunch, gas, moorage and service is located at the Emeryville marina on the north side of Emeryville spit.

FACLITIES, STAGING AREAS, POSSIBLE FIELD POSTS AND EQUIPMENT AVAILABLE:

Stage at Emeryville Marina. Good service availability and security capability. Boom could be deployed directly from land to water from this local. Emeryville PD and Fire are nearby. Berkeley Marina is 3 miles to the north and provides similar capabilities.

COMMUNICATIONS PROBLEMS: none known

ADDITIONAL OPERATIONAL COMMENTS:



Harbor Boom
Swamp Boom
sss / sfs
Sorbent Boom
Other Boom
tsa / sps
Dike or Berm
Excellcior Fence
tba/voo

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9844.2 Cultural and Other Resources at Risk

9844.21 Cultural Resources, Historic and Archeological Resources – see
Section 9802.1,
Section 9840 for contact table, and
individual Site Summaries

9844.22 Essential Fish Habitat – see Section 9802.2

9844.23 Other Resources at Risk - This section is reserved for specialized information regarding natural resources that occur in this particular geographic area; such as: seasonal migratory waterfowl and shorebird locations and densities; salmonid fish migration periods; or special considerations for eelgrass beds.

Migratory Waterfowl and Shorebirds
Large numbers of migratory waterfowl and shorebirds winter in the Bay and Delta and in GRA 4 in particular. Large numbers of waterfowl tend to raft and feed in the shallow protected areas around Central Bay (GRA 4). Aggregates up to 10,000 may be found in Richmond Inner Harbor, Richardson Bay, Berkeley Flats, and 100's elsewhere.

Eelgrass

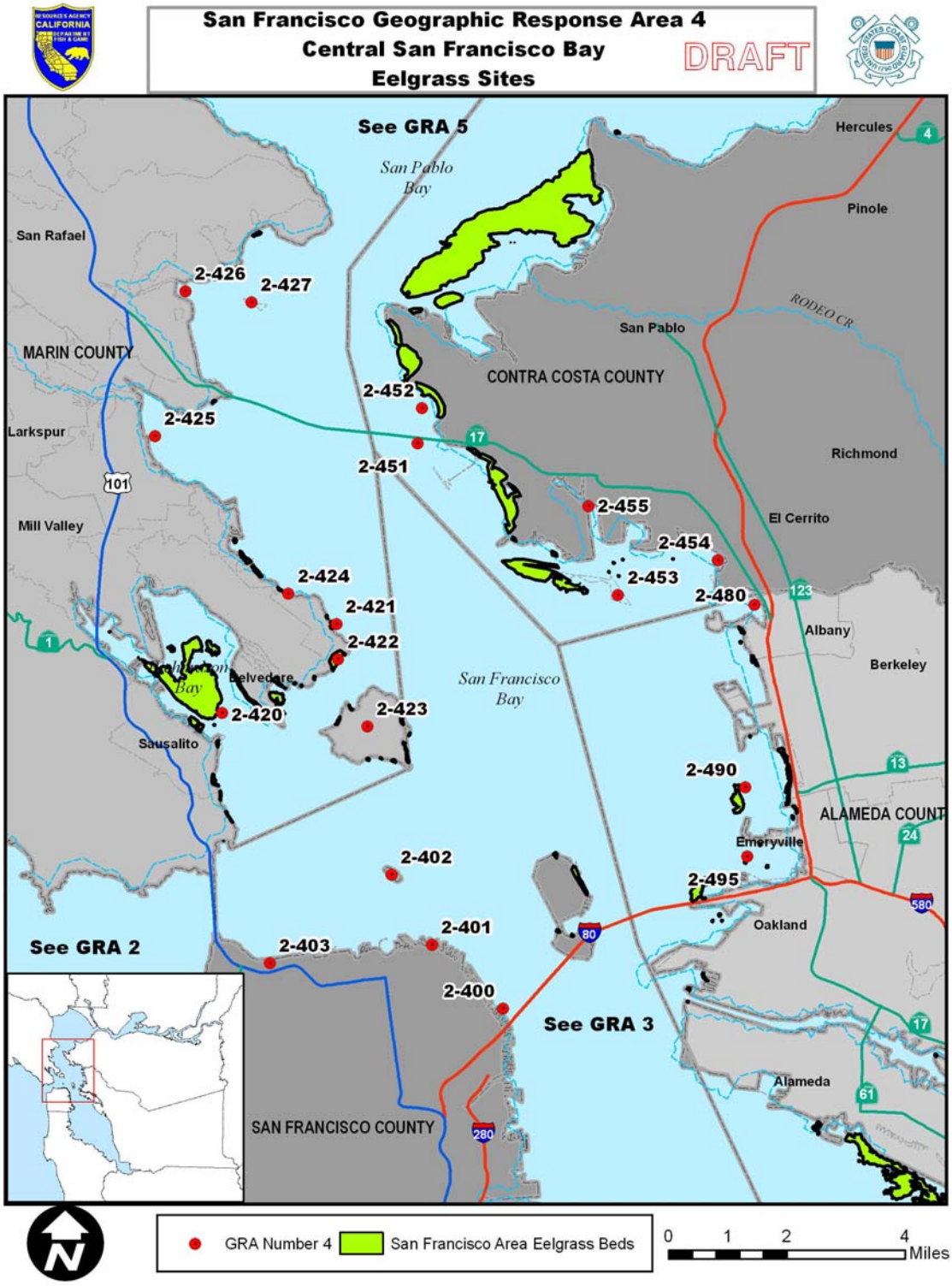
The shallow subtidal areas and tidal flats of the San Francisco Bay and Delta region support relatively few plant communities. Eelgrass (Zostera marina) is currently the only seagrass found in San Francisco Bay. Eelgrass beds create a valuable shallow-water habitat, providing shelter, feeding, and/or breeding habitat for many species of invertebrates, fishes, and waterfowl. The current eelgrass populations may be the last remnants in San Francisco Bay and are extremely vulnerable to local extinction. Eelgrass beds can vary in distribution, density, and height from year to year. Eelgrass is vulnerable to oil based on its location and physiology.

Eelgrass is more vulnerable to oil than most marine and aquatic plants. Eelgrass leaves are rough and do not have a mucous layer like many seaweeds, therefore oil will readily attach. Eelgrass occurs in shallow water and often forms a canopy layer on the water surface, presenting an increased risk of oiling. Oil sticks to the floating eelgrass tops. Once eelgrass gets fouled with oil, oil becomes a subsurface threat to fish and other organisms which thrive in this cover and the leaves will continue to sheen, prolonging oil exposures.

Site specific areas containing eelgrass beds have been identified in this GRA subsection and in some instances as an individual Sensitive Site. Protective strategies for eelgrass are based on its location and surface exposure in the intertidal and subtidal zones. Eelgrass would be exposed to oil and is at greatest risk in areas where it is found in the intertidal zone, but oiling can also occur with subtidal eelgrass beds when eelgrass leaves are at the surface during spring tides, particularly in the summer months.

A Sensitive Site with eelgrass as its sensitive resource is given a Category "A" resource sensitivity when eelgrass leaves are exposed at the surface during the spill and a Category "C" when the leaves stay submerged. If a spill occurs, an OSPR Resources At Risk Technical Specialist must assess the site to determine if eelgrass is at risk based on density, location and tidal exposure. Specific Site Strategies for protection of eelgrass beds are found in the individual GRA's Sensitive Site Strategy and include assessment and booming recommendations.

A map of eelgrass distribution in GRA 4 follows.


San Francisco Geographic Response Area 4
Central San Francisco Bay
Eelgrass Sites
DRAFT
See GRA 5
San Pablo Bay
Hercules
Pinole
San Rafael
2-426
2-427
RODEO CR
San Pablo
MARIN COUNTY
CONTRA COSTA COUNTY
2-452
2-425
Larkspur
2-451
Richmond
Mill Valley
2-455
El Cerrito
2-454
2-424
2-453
2-480
2-421
Albany
2-422
Berkeley
Belvedere
San Francisco Bay
2-420
2-423
Sausalito
2-490
ALAMEDA COUNT
Emeryville
2-402
2-495
Oakland
2-401
See GRA 2
2-403
2-400
See GRA 3
Alameda
SAN FRANCISCO COUNTY
GRA Number 4
San Francisco Area Eelgrass Beds
0 1 2 4 Miles

9844.3 Economic Sites

Strictly economic resources are designated as the third priority for dedication of oil spill response resources, following human health and safety and environmental resources. The economic sites are ranked using a continuation of the environmental scale with D, E, and F categories. Economic resources that have a greater potential for long-term damages receive a higher rank or priority for emergency response.

The following criteria or definitions are used to categorize economic resources in terms of priority for response:

D = Economic activities and resources which require high water quality for their operations or existence. Resources that fall into this category would face severe, long-term economic impacts from a spill.

E = Facilities, businesses, or resources which directly use coastal or bay waters within their economic activity and which are at risk of oiling from a spill in marine waters. The resources falling into this category would face significant disruption of their activity, but shorter term potential damages from oiling that resources “D” category.

F = This category contains marine associated facilities, businesses and resources. These resources would face economic impacts from a marine spill, but do not depend directly on marine water for their economic base. Resources in this category will tend to face less severe damages than those identified in categories D or E.

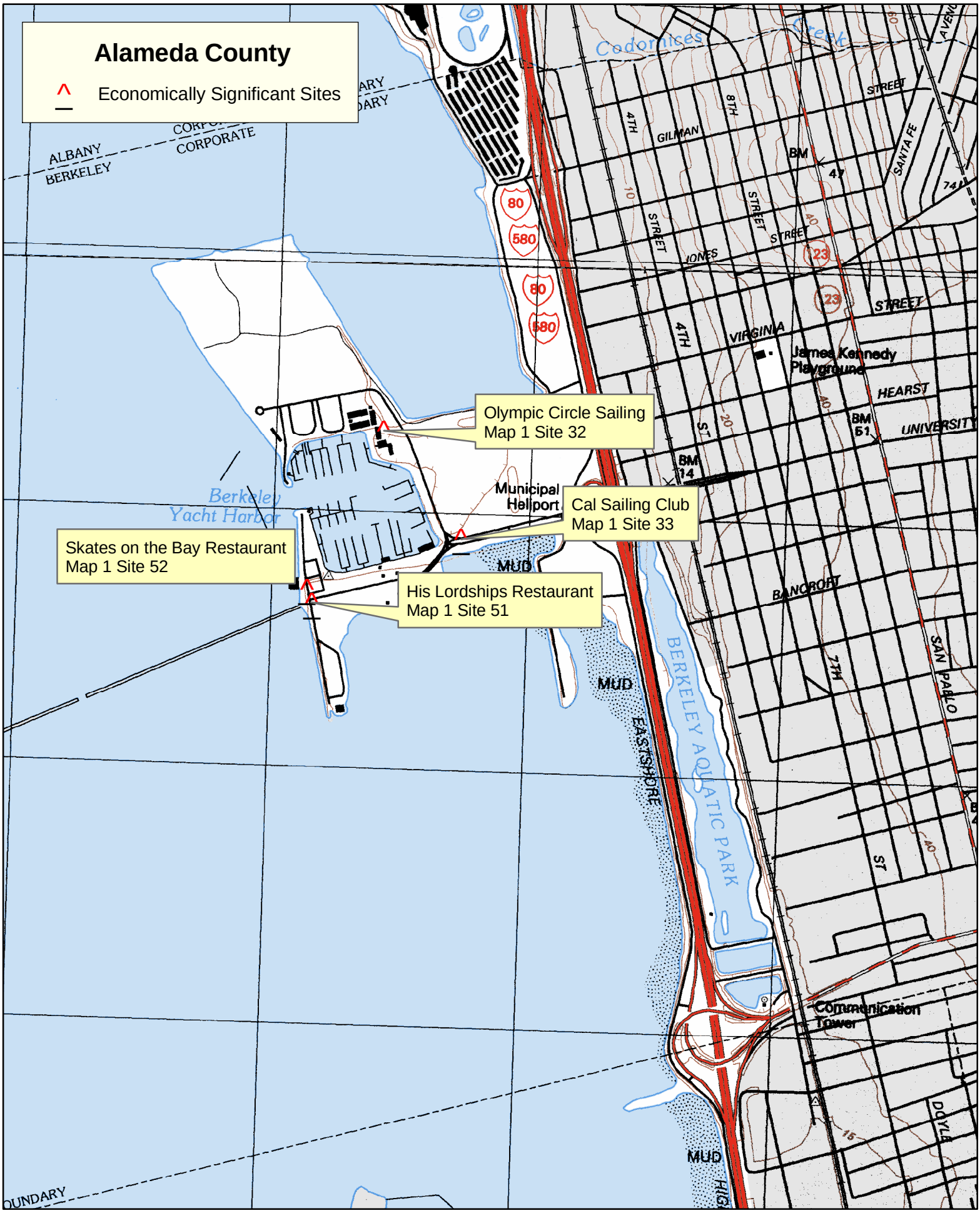
In the following section, economic sites found within the GRA are listed in table format, which contain information such as latitude, longitude, economic sensitivity, etc. Following the table are diagrams denoting the location of an economically sensitive site(s). Diagrams are organized alphabetically by county, then numerically by map and site number.

Economic Sites in GRA 4

Line No.	Map Description	Site Name	Site Description	Latitude	Longitude	Economic Sensitivity	Site Function	Site Address	GIS Site No.
1	Map 1 Site 32 Alameda County	Olympic Circle Sailing		37.87	-122.31	E	Sailing School/Charter	1 Spinnaker Way, Berkeley	1023
2	Map 1 Site 33 Alameda County	Cal Sailing Club		37.87	-122.31	E	Sailing School/Charter	225 University Blvd., Berkeley	1024
3	Map 1 Site 36 Alameda County	Emeryville Sport Fishing		37.84	-122.31	E	Charter Fishing	3310 Powell Street, Emeryville	1025
4	Map 1 Site 48 Alameda County	Hong Kong East Ocean Restaurant		37.84	-122.31	F	Restaurant	3199 Powell Street, Emeryville	1033
5	Map 1 Site 49 Alameda County	Trader Vic's Restaurant		37.84	-122.31	F	Restaurant	9 Anchor Drive, Emerville	1034
6	Map 1 Site 50 Alameda County	Charlie Brown's Restaurant		37.84	-122.30	F	Restaurant	1890 Powell Street, Emeryville	1035
7	Map 1 Site 51 Alameda County	His Lordship's Restaurant		37.86	-122.32	F	Restaurant	199 Seawall Drive, Berkeley	1036
8	Map 1 Site 52 Alameda County	Skate's on the Bay Restaurant		37.86	-122.32	F	Restaurant	100 Seawall Drive, Berkeley	1037
9	Map 1 Site 4 Contra Costa County	Metropolitan California	Shipping Terminal, Stevedore Company 1411 Harbour Way, So. Richmond	37.91	-122.36	E	Shipping Terminal, Stevedore Company 1411 Harbour Way, So. Richmond	Stevedore Company 1411 Harbour Way, So. Richmond	13002
10	Map 1 Site 5 Contra Costa County	California Oils Corporation		37.91	-122.36	E	Petroleum Products	1145 Harbour Way, So. Richmond	13003
11	Map 1 Site 6 Contra Costa County	Time Oil Company		37.92	-122.37	E	Petroleum Products	488 Wright Avenue, Richmond	13004
12	Map 1 Site 7 Contra Costa County	Levin-Richmond		37.92	-122.37	E	Shipping Terminal	402 Wright Avenue, Richmond	13005
13	Map 1 Site 8 Contra Costa County	Riedel Environmental		37.93	-122.37	E	Pollution Response Services Inc.	230 Cutting Blvd, Richmond	13006
14	Map 1 Site 11 Contra Costa County	Gold Bond Building Products		37.91	-122.37	E	Gypsum Receiving, Barge Mooring	1040 Canal Blvd, Richmond	13007
15	Map 1 Site 12 Contra Costa County	Unocal Refining		37.91	-122.36	E	Petroleum Product Marketing Division	1300 Canal Blvd. Richmond	13008
16	Map 1 Site 13 Contra Costa County	ARCO Products Company		37.91	-122.36	E	Petroleum Product Transfer Facility	1306 Canal Blvd., Richmond	13009
17	Map 1 Site 14 Contra Costa County	Pasha Maritime Services		37.91	-122.36	E	Automobile Shipping	1301 Canal Blvd., Richmond	13010
18	Map 1 Site 15 Contra Costa County	Manson Construction		37.91	-122.36	E	Marine Engineering	1312 Canal Blvd., Richmond	13011
19	Map 1 Site 17 Contra Costa County	Marin Tug & Barge Company		37.91	-122.36	E	Towboat Services	1316 Canal Blvd., Richmond	13012
20	Map 1 Site 19 Contra Costa County	Paktank Corporation		37.94	-122.41	E	Petroleum Product	2101 Western Blvd, Hercules	13013
21	Map 1 Site 34 Contra Costa County	Brickyard Cove Marina		37.91	-122.38	E	Small Craft Harbor	1120 Brickyard Cove Road, Richmond	13027
22	Map 1 Site 35 Contra Costa County	Richmond Yacht Club		37.91	-122.38	E	Small Craft Harbor	351 Brickyard Cove Road, Richmond	13028
23	Map 1 Site 36 Contra Costa County	Channel Marina Yacht Harbor		37.93	-122.37	E	Small Craft Harbor	233 W. Cutting Blvd., Richmond	13029
24	Map 1 Site 38 Contra Costa County	Marina Bay Boathouse		37.91	-122.35	E	Small Craft Harbor	1341 Marina Way, Richmond	13031
25	Map 1 Site 39 Contra Costa County	Sanford Wood Marine and Boat Yard	(Site 79 duplicate)	37.93	-122.37	E	Small Craft Harbor	530 W. Cutting Blvd., Richmond	13032
26	Map 1 Site 77 Contra Costa County	Bay Ship & Yacht Repair		37.93	-122.37	E	Small Craft Repair	310 W. Cutting Blvd., Rochmond	13065
27	Map 1 Site 78 Contra Costa County	Richmond Boat Works		37.93	-122.37	E	Small Craft Repair	616 W. Cutting Blvd., Richmond	13066
28	Map 1 Site 102 Contra Costa County	Point Isabel Regional Park	c/o East Bay Regional Park District	37.90	-122.32	F	Park/Recreation Area	2950 Peralta Oaks Ct., Oakland	13078
29	Map 1 Site 103 Contra Costa County	Brooks Island Regional Park	c/o East Bay Regional Park District	37.90	-122.36	D	Park/Recreation Area	2950 Peralta Oaks Ct., Oakland	13079
30	Map 1 Site 104 Contra Costa County	George Miller Junior Memorial Regional Shoreline	Nothing found for George Miller Regional Park (need more information)	37.92	-122.38	D			13080
31	Map 1 Site 9 Marin County	Loch Lomond Marina	San Pedro Road	37.97	-122.48	E	250 Berths		41009
32	Map 1 Site 10 Marin County	Marin Yacht Club	San Pedro Road	37.97	-122.49	E	150 Berths		41010
33	Map 2 Site 1 Marin County	Lowrie Yacht Harbor	San Pedro Road	37.97	-122.51	E	150 Berths		41011
34	Map 2 Site 2 Marin County	San Rafael Yacht Harbor	Francisco Blvd.	37.97	-122.51	E	150 Berths		41012
35	Map 2 Site 3 Marin County	Pickleweed Park		37.97	-122.49	E	150 Berths		41013
36	Map 2 Site 4 Marin County	Remillard Park	Sir Francis Drake Blvd.	37.94	-122.50	E	1 Acre Park w/Pond and Windsurfing Access		41014
37	Map 2 Site 5 Marin County	Larkspur Landing Ferry Terminal	Sir Francis Drake Blvd.	37.94	-122.51	E	12 Acre, 1300 Car Parking Area and Commuter Ferry Facility		41015
38	Map 2 Site 6 Marin County	Greenbrae Public Access	Barry Way	37.94	-122.52	E	Rowing Club Dock		41016
39	Map 2 Site 7 Marin County	Bon Air Landing	South Elisio	37.94	-122.53	E	1 third Acre Park with Dock		41017
40	Map 2 Site 8 Marin County	Hamilton Park	South Elisio	37.94	-122.54	E	1 third Acre Park		41018
41	Map 2 Site 9 Marin County	Creekside Park	Bon Air Road	37.95	-122.54	E	Hiking, Exercise Area, Wetland		41019
42	Map 2 Site 10 Marin County	Piper Park	Doherty Drive	37.94	-122.53	E	22 Acre Park with Sport Fields		41020
43	Map 2 Site 11 Marin County	Corte Madera State Ecological Reserve	Corta Madera	37.93	-122.50	E	Wetland, Wildlife Habitat		41021
44	Map 2 Site 12 Marin County	San Clemente Creek	140 Waterfront Homes	37.93	-122.50	E	140 Waterfront Homes		41022
45	Map 3 Site 1 Marin County	Tiburon Yacht Club	Paradise Drive	37.91	-122.47	E	300 Berth Marina with Waterfront Homes on Cay		41023
46	Map 3 Site 2 Marin County	Paradise Beach Park	19 Paridise Drive	37.89	-122.46	E	Acre Recreation Area with Fishing Pier and Anchor Out Area		41024
47	Map 3 Site 3 Marin County	Romberg Tiburon Lab San Francisco		37.89	-122.45	D	State University and National Marine Fisheries Marine Research Lab		41025
48	Map 3 Site 4 Marin County	Angel Island		37.87	-122.43	D	Public Recreation Area		41026
49	Map 3 Site 5 Marin County	Tiburon Ferry	Tiburon Blvd.	37.87	-122.46	E	Commuter Ferry		41027
50	Map 3 Site 6 Marin County	Corinthian Yacht Club	Tiburon	37.87	-122.46	E	Private Recreational Marina		41028
51	Map 3 Site 7 Marin County	San Francisco Yacht Club	Beach Road, Tiburon	37.87	-122.46	E	176 Berths, Private Recreational Marina		41029

Economic Sites in GRA 4

Line No.	Map Description	Site Name	Site Description	Latitude	Longitude	Economic Sensitivity	Site Function	Site Address	GIS Site No.
52	Map 3 Site 8 Marin County	Belvedere Lagoon	Tide gates	37.88	-122.47	E	260 Waterfront Homes on 66 Acre Lagoon. Two Closed Tidal Inflow Gates	2 San Rafael Ave.	41030
53	Map 3 Site 9 Marin County	Strawberry Point Tidal Area		37.89	-122.51	E	Wetland/Wildlife Habitat		41031
54	Map 3 Site 10 Marin County	Corinthian Villas, Richardson Bay Apts		37.89	-122.52	E	Waterfront Residential Community		41032
55	Map 3 Site 11 Marin County	Bayfront Park		37.90	-122.52	E	Community Waterfront Park		41033
56	Map 3 Site 12 Marin County	Bothin Marsh Open Space Preserve		37.89	-122.52	E	Biking/Hiking Trail		41034
57	Map 3 Site 13 Marin County	Racoon Strait		37.88	-122.45	E	Waterfront Homes		41035
58	Map 3 Site 14 Marin County	Belvedere Island		37.87	-122.47	E	Waterfront Homes		41036
59	Map 3 Site 15 Marin County	Army Corp of Engineers		37.86	-122.50	E	Bay Model, Historical Vessels		41037
60	Map 4 Site 1 Marin County	Commodore Harbor		37.88	-122.51	E	11 Houseboat Berths		41038
61	Map 4 Site 2 Marin County	Gate 6 & 6		37.88	-122.51	E	117 Houseboat Berths		41039
62	Map 4 Site 3 Marin County	Kappas Yacht Harbor		37.88	-122.50	E	200 Houseboat Berths and Rec Boat Berths, approximate		41040
63	Map 4 Site 4 Marin County	Yellow Ferry Harbor		37.87	-122.50	E	22 Houseboat Berths		41041
64	Map 4 Site 5 Marin County	Waldo Point Harbor		37.87	-122.50	E	245 Houseboat Berths		41042
65	Map 4 Site 6 Marin County	Clipper Yacht		37.87	-122.50	E	640 Berths Harbor 2, 3, 4, approximate		41043
66	Map 4 Site 7 Marin County	Fuel Dock		37.87	-122.50	E	Major Fuel Source for Sausalito Waterfront		41044
67	Map 4 Site 8 Marin County	Jerry's Yacht Harbor		37.87	-122.50	E	40 Recreational Boat Berths		41045
68	Map 4 Site 9 Marin County	Marina Plaza		37.87	-122.49	E	150 Recreational Boat Berths		41046
69	Map 4 Site 10 Marin County	Clipper Y Harbor #1		37.86	-122.49	E	60 Recreational Boat Berths		41047
70	Map 4 Site 11 Marin County	Schoonmaker Marina		37.86	-122.49	E	250 Recreational Boat Berths		41048
71	Map 4 Site 12 Marin County	Galilee Harbor		37.86	-122.49	E	36 Houseboats		41049
72	Map 4 Site 13 Marin County	Sausalito Marineways		37.86	-122.48	E	100 Recreational Boat Berths and Vacant Boat Repair Yard		41050
73	Map 4 Site 14 Marin County	Pelican Yacht Harbor		37.86	-122.48	E	100 Recreational Boat Berths		41051
74	Map 4 Site 15 Marin County	Sausalito Yacht Harbor		37.86	-122.48	E	700 Recreational Boat Berths		41052
75	Map 4 Site 16 Marin County	Sausalito Yacht Club, Sausalito Fire		37.86	-122.48	E	Club Facility on Piers		41053
76	Map 4 Site 17 Marin County	Sausalito Ferry		37.86	-122.48	E	Golden Gate Transit		41054
77	Map 4 Site 18 Marin County	Downtown Business		37.85	-122.48	E	Commercial Buildings on Piers		41055
78	Map 4 Site 19 Marin County	Bayfront Residential District		37.84	-122.48	E	Single and Multi-Family Homes, w/Limited Beaches		41056
79	Map 4 Site 20 Marin County	East Fort Baker		37.84	-122.48	E	Presidio Yacht Harbor		41057
80	Map 4 Site 22 Marin County	Dunphy Park		37.86	-122.49	E	Recreational Area		41058
81	Map 1 Site 8 San Francisco County	Fort Point NHS		37.81	-122.48	F	Recreation, History		75008
82	Map 1 Site 9 San Francisco County	Fort Point Fishing Pier		37.81	-122.47	E	Fishing, Crabbing		75009
83	Map 1 Site 10 San Francisco County	Crissy Field Beach		37.80	-122.46	E	Recreation, Scenic		75010
84	Map 1 Site 11 San Francisco County	Marina Yacht Harbor		37.81	-122.44	D	Berths for 691 Boats, Restaurants		75011
85	Map 1 Site 12 San Francisco County	Lower Fort Mason		37.81	-122.43	F	Business, Arts and Special Events		75012
86	Map 1 Site 13 San Francisco County	Greens Restaurant	Fort Mason Building A, Restaurant, Scenic	37.81	-122.43	F	Restaurant		75013
87	Map 1 Site 14 San Francisco County	Pier One		37.81	-122.43	F	National Park Service Maintenance Facility		75014
88	Map 1 Site 15 San Francisco County	Municipal Pier, Aquatic Park, Hyde Street Pier		37.81	-122.42	F	Fishing, Boating, Swimming, Historic Ships		75015
89	Map 1 Site 16 San Francisco County	Dolphin Club		37.81	-122.42	E	Swimming Club, Gym		75016
90	Map 1 Site 17 San Francisco County	South End Rowing Club		37.81	-122.42	E	Swimming, Rowing, Gym		75017
91	Map 1 Site 18 San Francisco County	Sea Scouts		37.81	-122.42	E	Boating, Swimming		75018
92	Map 1 Site 19 San Francisco County	Pier 45, Fisherman's Wharf		37.81	-122.42	E	Fishing Boats, Docks, Fuel		75019
93	Map 1 Site 20 San Francisco County	Pier 43		37.81	-122.41	E/F	Red and White Ferry, Public Pier, Restaurants		75020
94	Map 1 Site 21 San Francisco County	Pier 39 Marina		37.81	-122.41	E/F	Moderate Size Marina (350+ Slips), Docks, Sea Lions on Docks		75021
95	Map 1 Site 22 San Francisco County	Ferry Building		37.80	-122.39	E/F	Ferry Terminal, Public Pier, Restaurants		75022



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California Department of Fish and Game
Office of Spill Prevention and Response
Alameda County Layout 007

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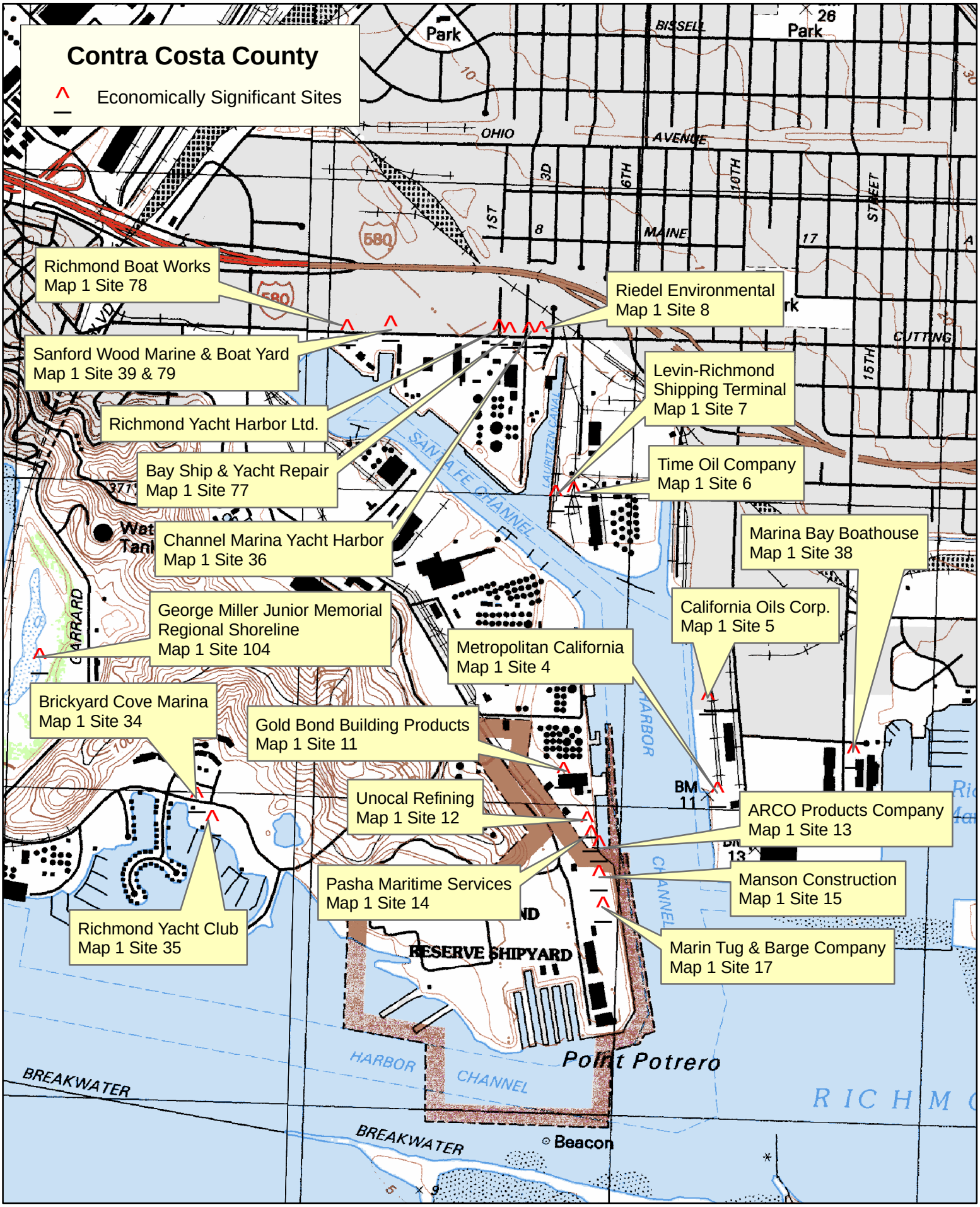
California Department of Fish and Game
Office of Spill Prevention and Response
Alameda County Layout 008



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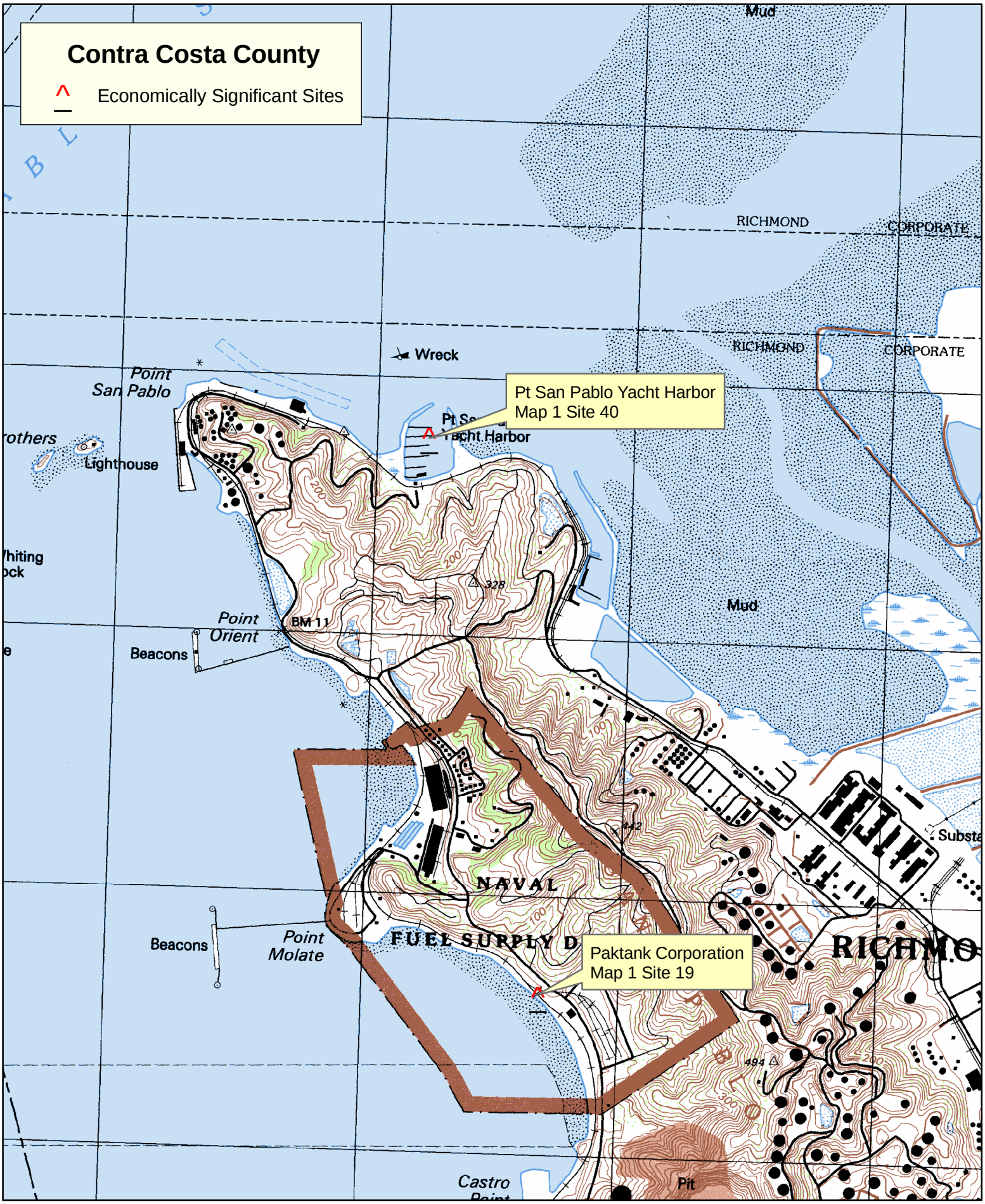
California Department of Fish and Game
Office of Spill Prevention and Response
Contra Costa County Layout 002



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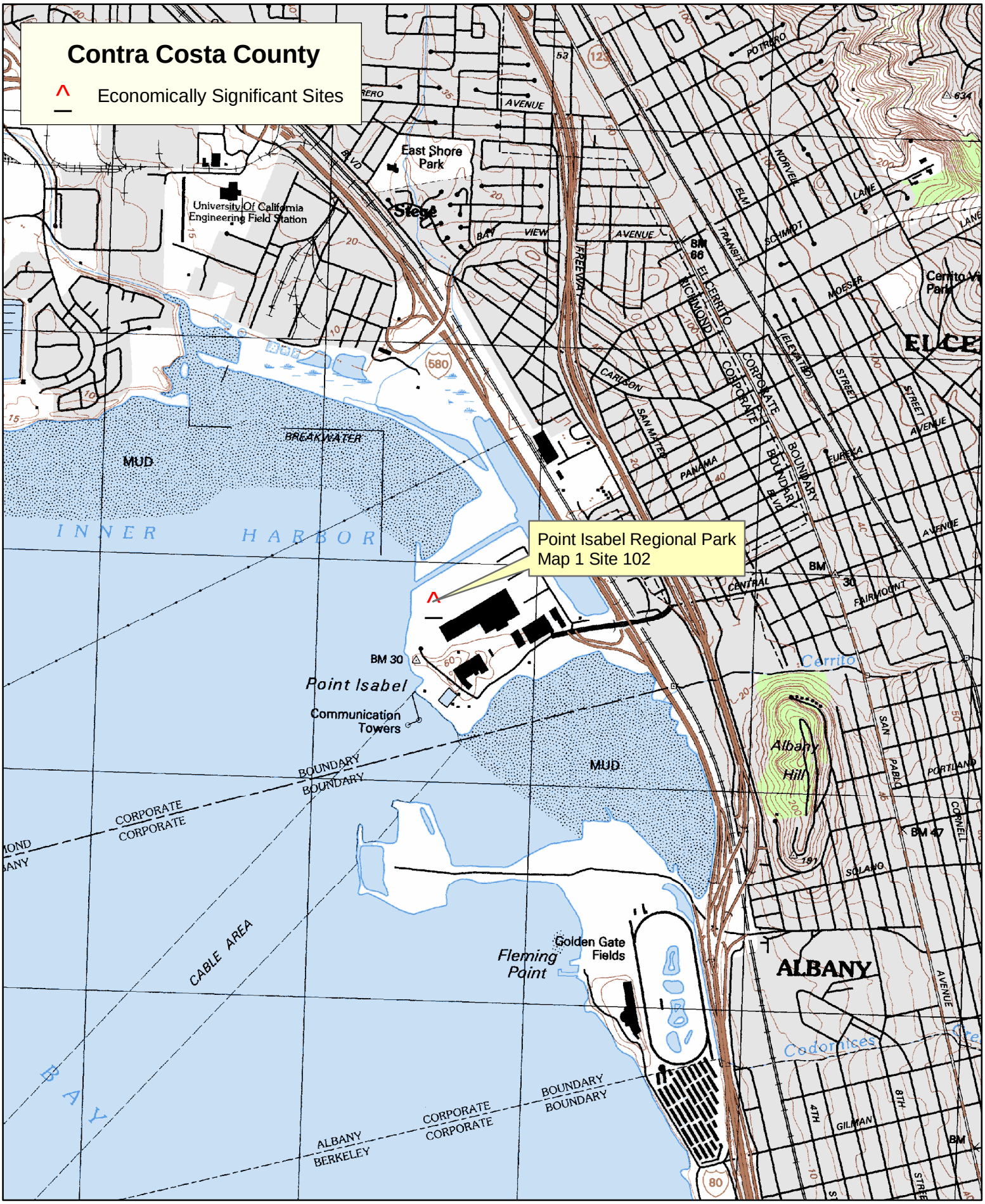
Office of Spill Prevention and Response
Contra Costa County Layout 019



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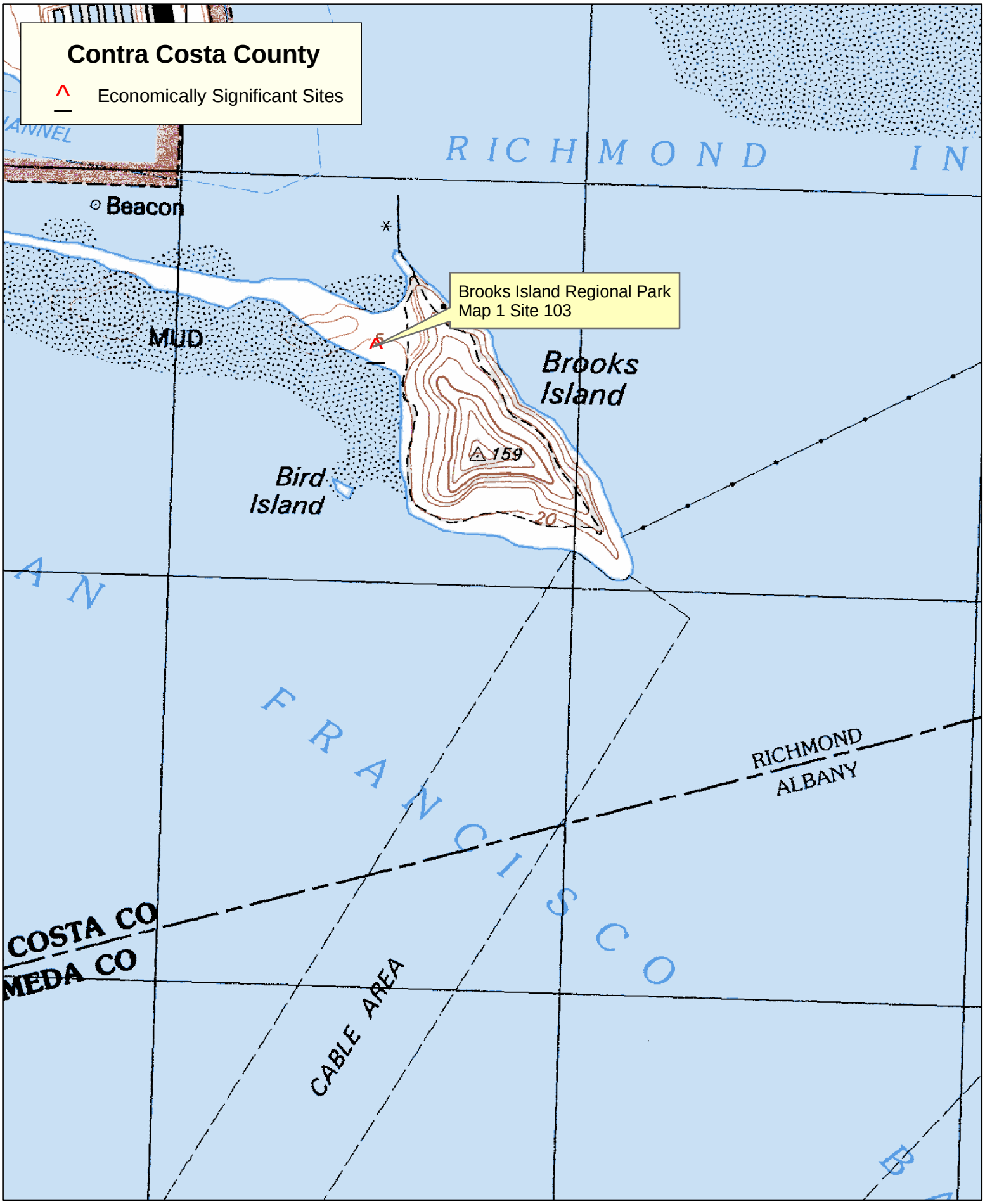
Office of Spill Prevention and Response
Contra Costa County Layout 021



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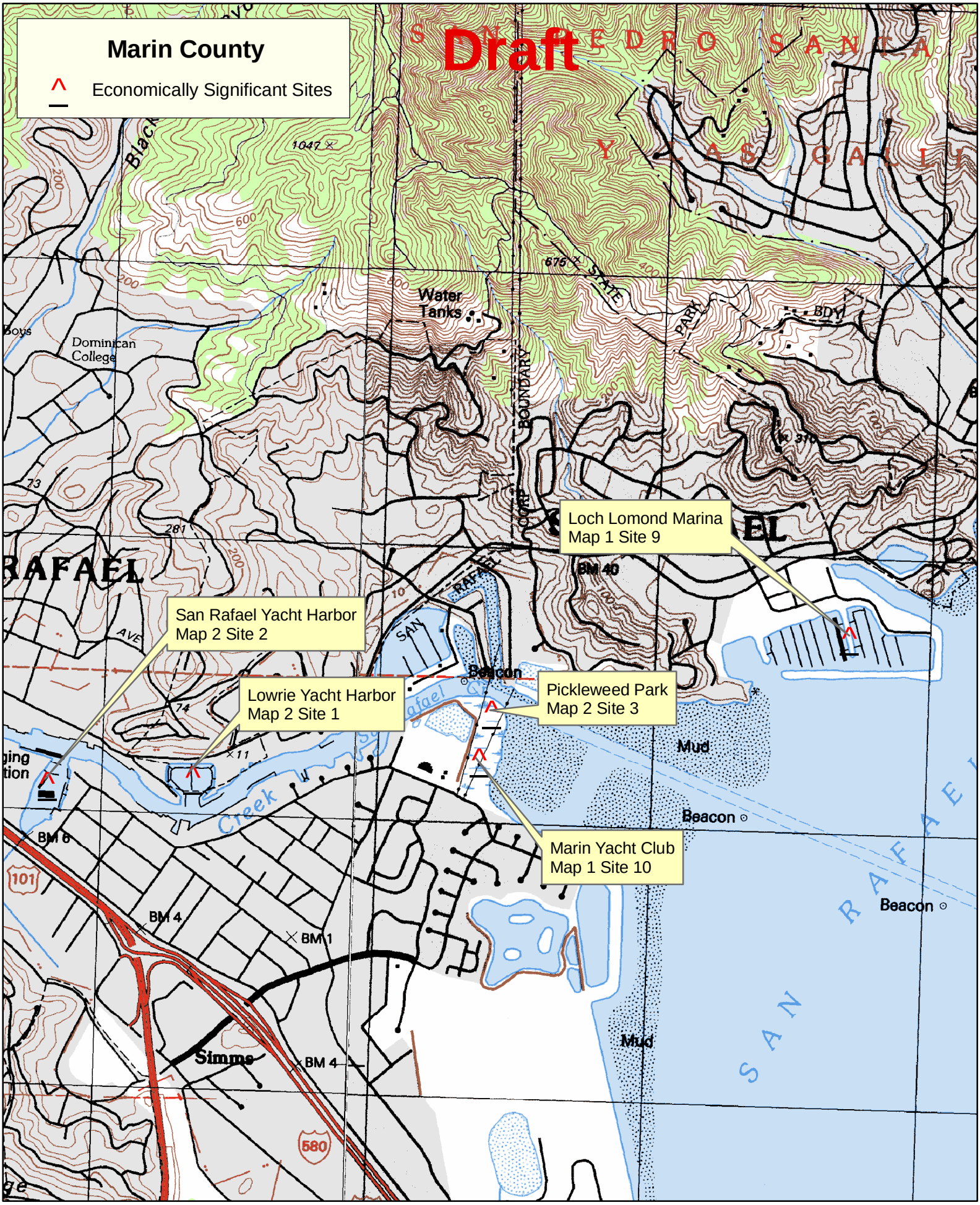
California Department of Fish and Game
Office of Spill Prevention and Response
Contra Costa County Layout 022



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California Department of Fish and Game
Office of Spill Prevention and Response
Marin County Layout 006

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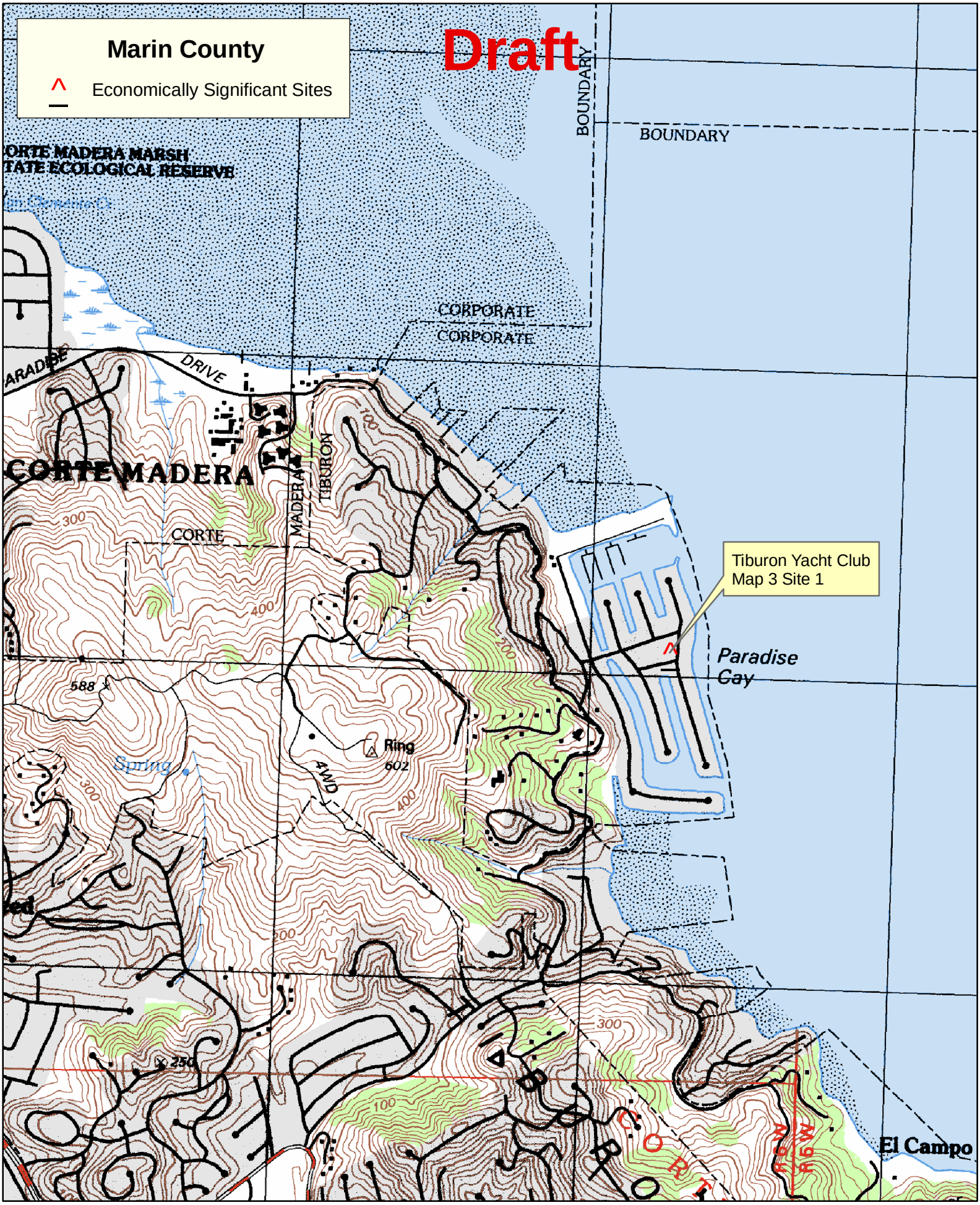
California Department of Fish and Game
Office of Spill Prevention and Response
Marin County Layout 007



California Department of Fish and Game
Office of Spill Prevention and Response
Marin County Layout 008

California Department of Fish and Game
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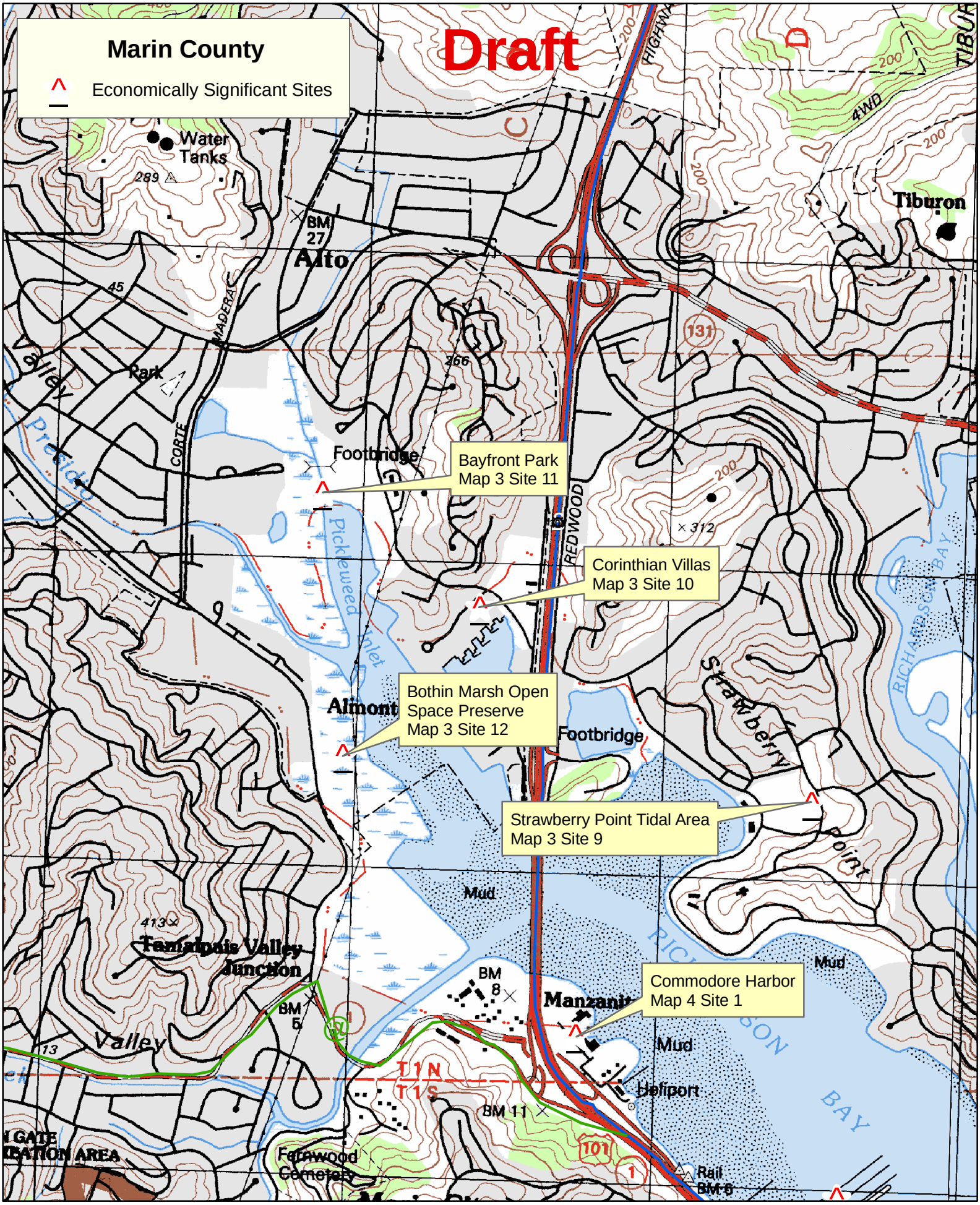

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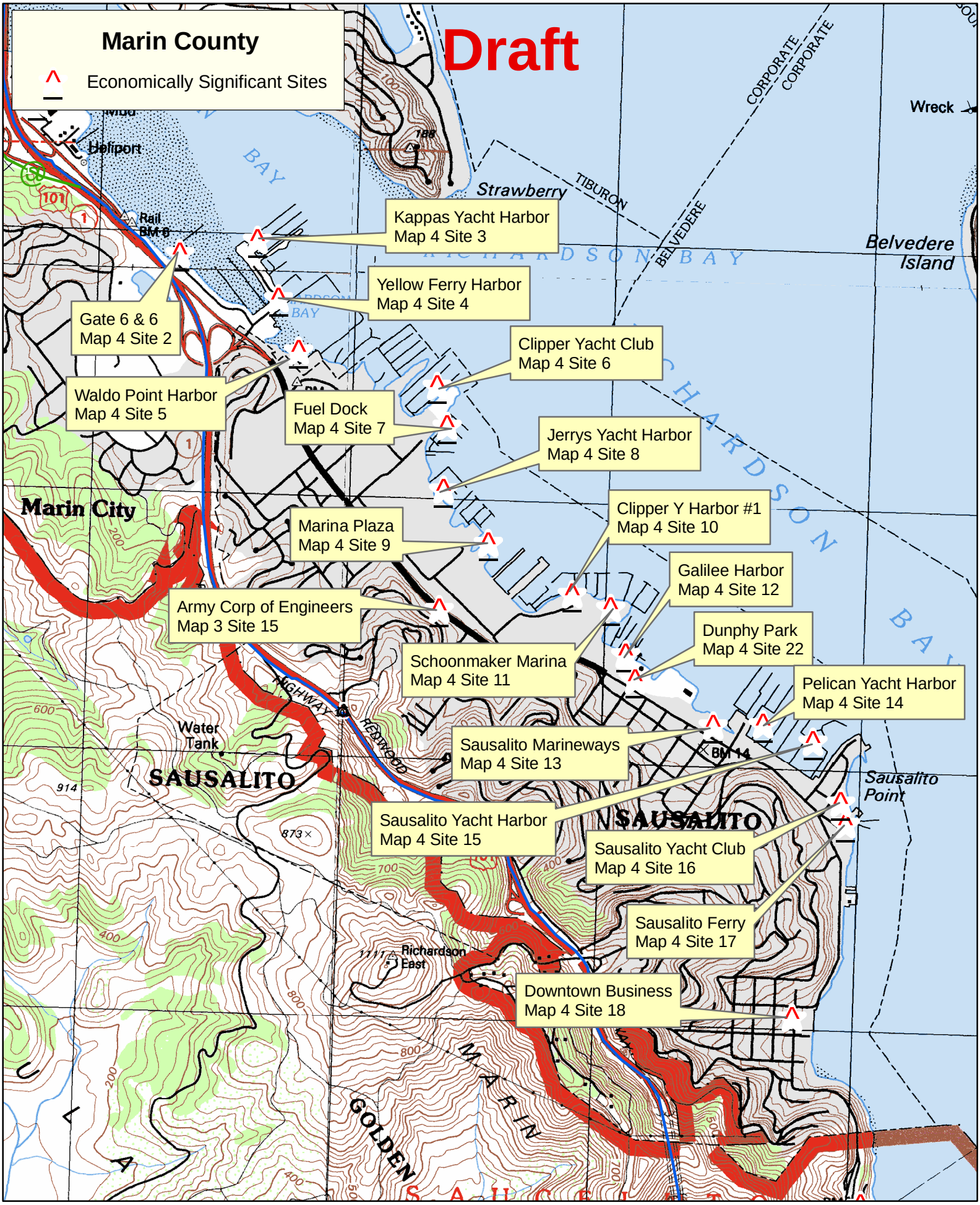
California Department of Fish and Game
Office of Spill Prevention and Response
Marin County Layout 011



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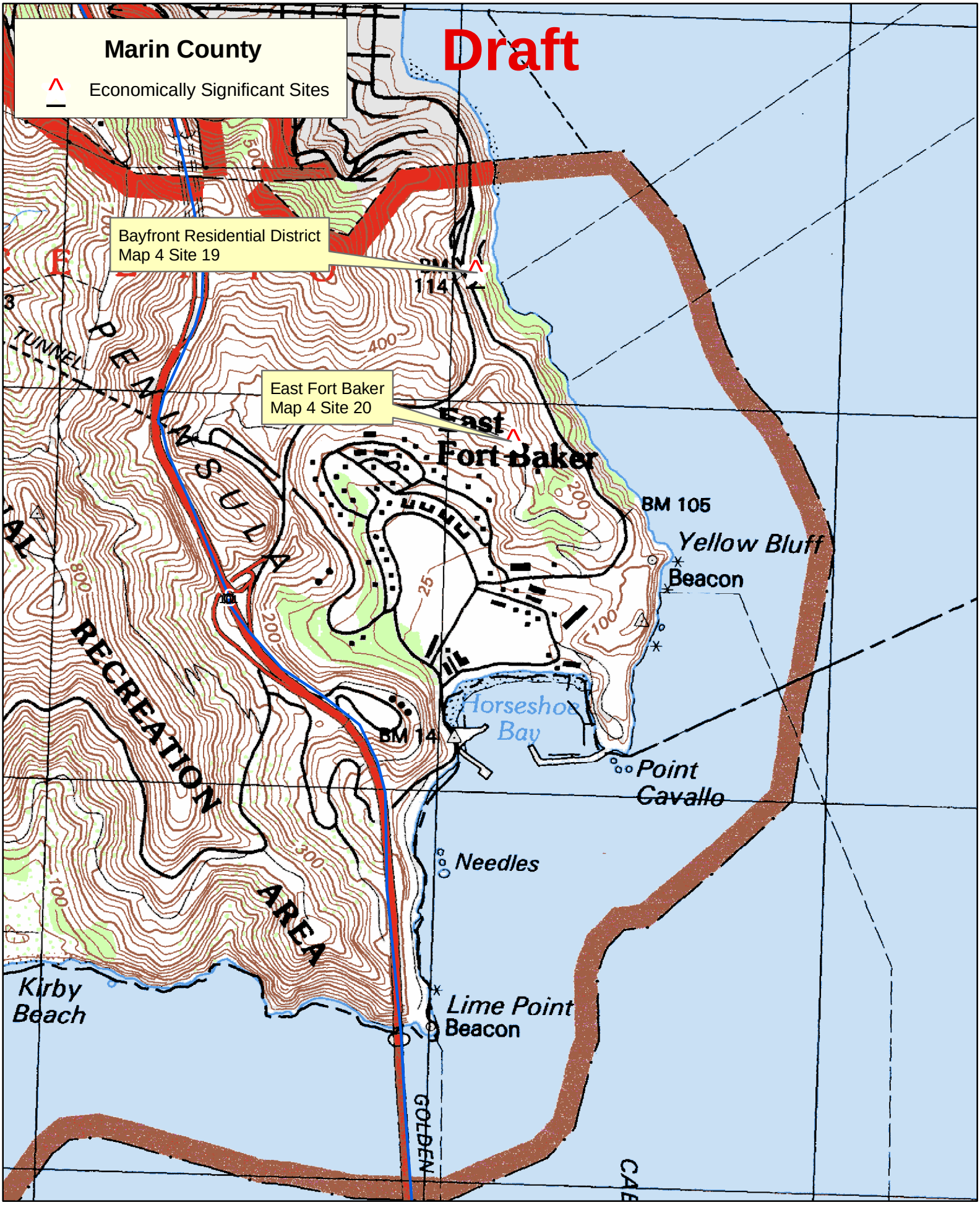

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California Department of Fish and Game
Office of Spill Prevention and Response
Marin County Layout 013

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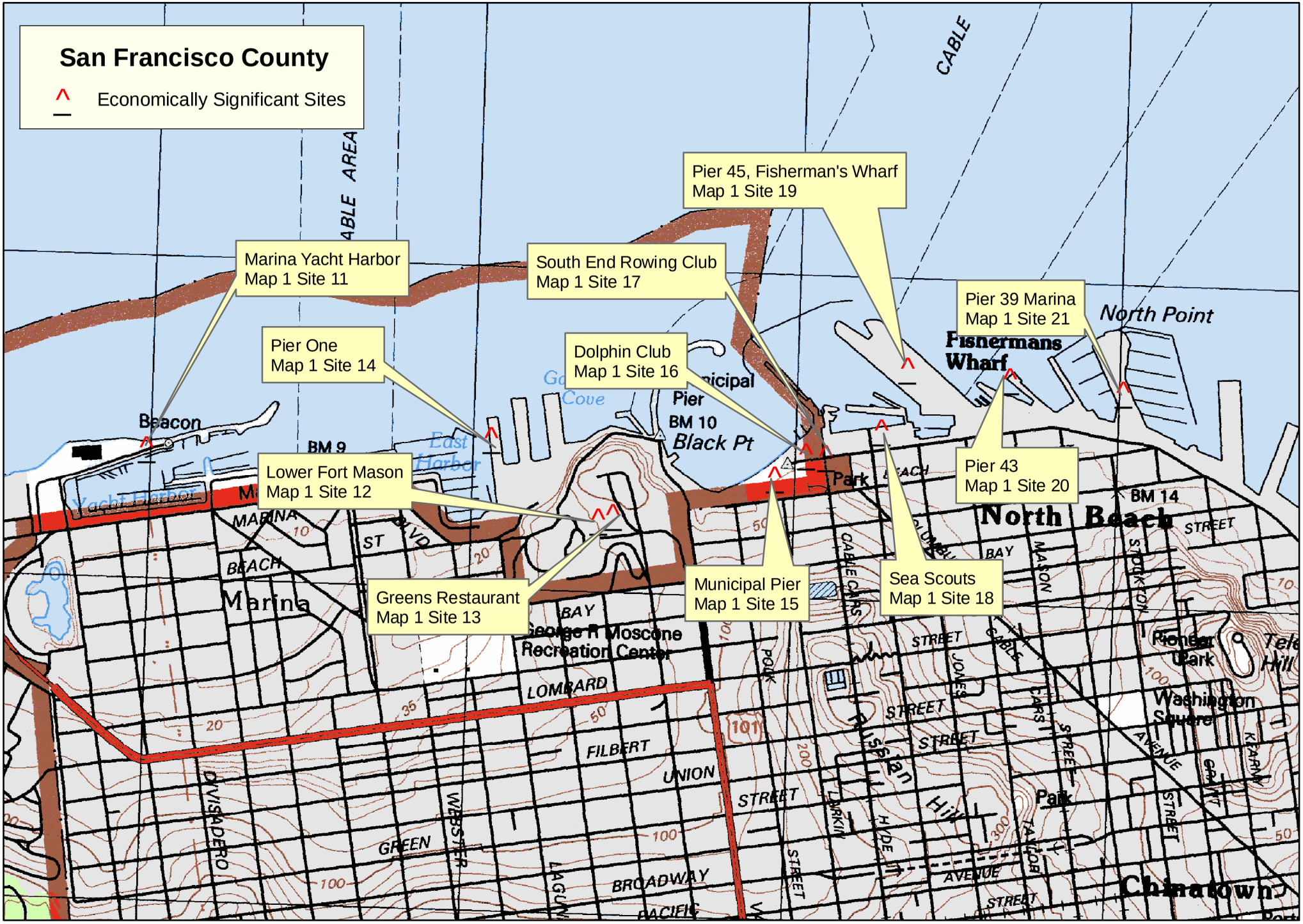
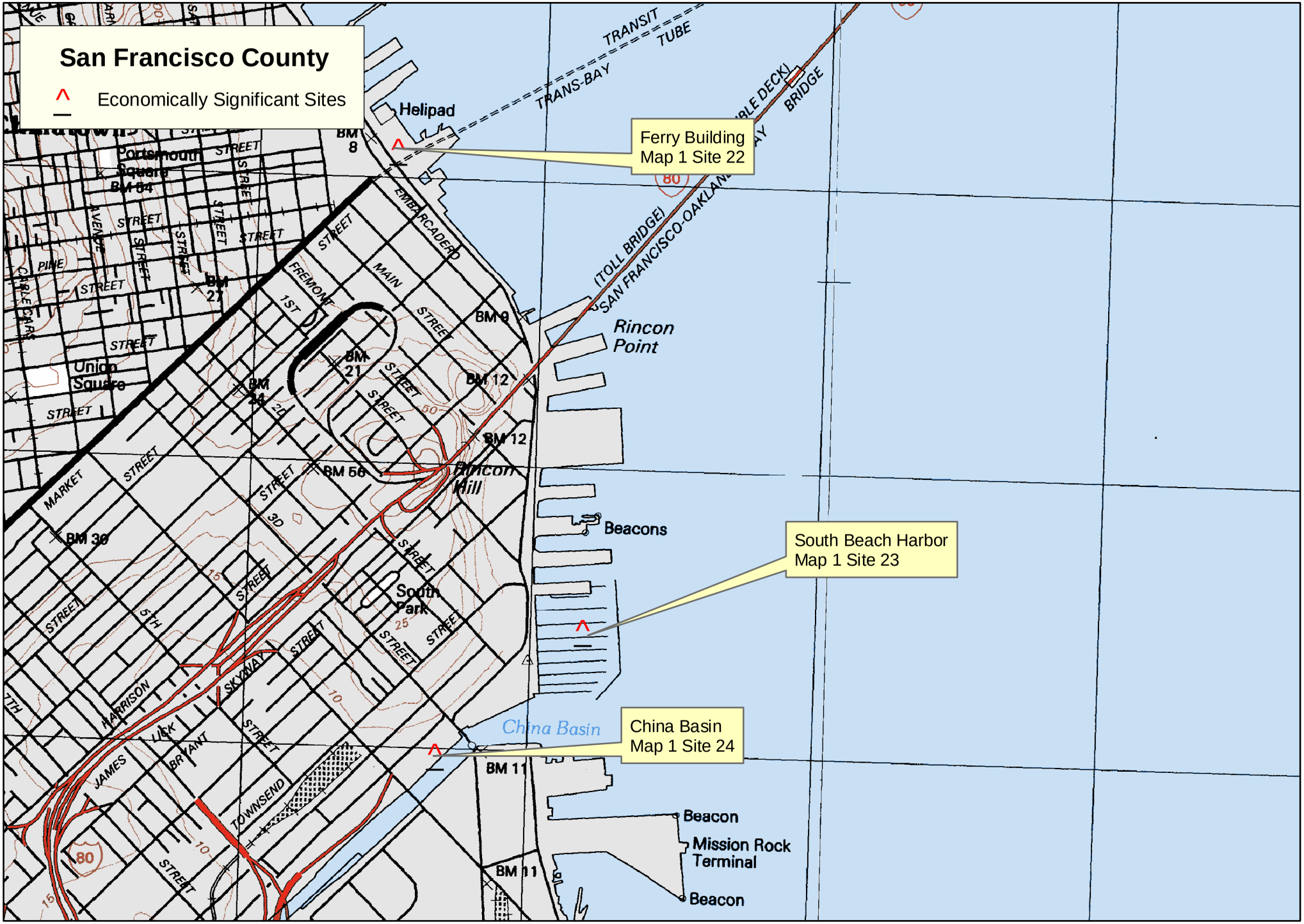
California Department of Fish and Game
Office of Spill Prevention and Response
San Francisco County Layout 004



California Department of Fish and Game
Office of Spill Prevention and Response
San Francisco County Layout 005



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California Department of Fish and Game
Office of Spill Prevention and Response
San Francisco County Layout 006

9850.4 Shoreline Operational Divisions

Shoreline Operational Divisions are presented in the ACP as front-loaded information to assist in rapid response planning to provide for quickly organized operational objectives and assignments along affected shorelines. The operational divisions have been developed in conjunction with the US Coast Guard, California Fish and Game OSPR, and various Oil Spill Response Organizations. Experience has demonstrated that in the earliest stages of spill response having organizational issues such as this prepared in advance is very useful to the response team.

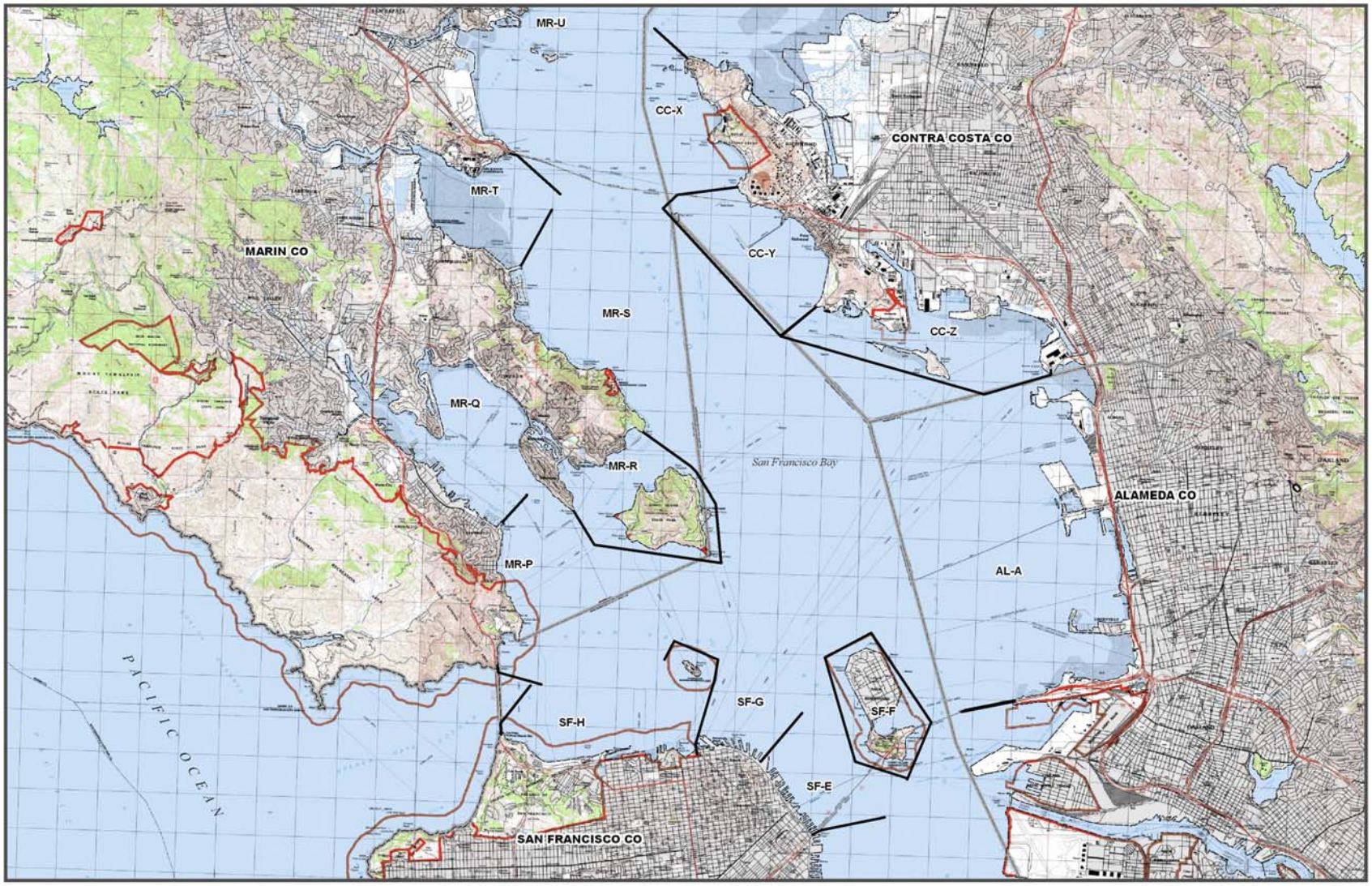
The shoreline operational divisions are organized and named according to County boundaries. Within county domains, divisions are boundaries are guided by logical geo-political features such as coastal physical characteristics and land ownership/management issues, shoreline cleanup logistical considerations, and manageable sized coastline segments (generally not longer than about ten miles although some variation occurs.) Logistics, access, and manageability were driving considerations in this effort, particularly as it relates to types of cleanup operations required and problems likely to be present.

In ACP areas having more than one county, Shoreline Operational Divisions will utilize county codes followed by a single alpha character (A to Z). Shoreline operational divisions are labeled from north to south in each county. For example, the north-most operational division in Los Angles County is “LA-A.” In large bays (i.e. San Diego), the labeling will progress in a clockwise direction to accommodate changing coastline angles. Divisions can be easily subdivided (as necessary) by the Operations Section management to provide for appropriate work assignment effort.

Double digit alpha characters (AA to ZZ) will be used for all offshore operational areas and any other special operational areas needed during response.

The following diagram shows the tentative Shoreline Operational Divisions for GRA 4 (the area committee is still reviewing this at the time of this publication.)

GRA - 4 Shoreline Operational Divisions



Legend

Division Line

DRAFT

Source: C. Jochums

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Miles

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