DREDGING AND DISPOSAL ROAD MAP

August 19, 1993

San Francisco Bay Conservation and Development Commission

United States Army Corps of Engineers
San Francisco District

San Francisco Bay Conservation and Development Commission
Thirty Van Ness Avenue, Suite 2011
San Francisco, California 94102
(415) 557-3686

United States Army Corps of Engineers
San Francisco District
211 Main Street
San Francisco, California 94105
(415) 744-3020

Dredging and Disposal Road Map

Summary of 1993 Dredging and Disposal Activities

1. **In-Bay Disposal**. Project sponsors estimate that approximately 11.2 million cubic yards (cyds) of material will be dredged from San Francisco Bay in 1993 (see Table 1). Most of the material, almost 7.7 million cyds, will be disposed in the Bay, with about 6.1 million cyds going to the disposal site near Alcatraz Island (see Chart 1). Consequently, the annual four million cyds disposal target for the Alcatraz site could be exceeded. Approximately 1.4 million cyds—almost 13 percent of the total amount dredged—are projected to be disposed at non-tidal sites near the Bay (see Chart 2). If these estimates are correct, the amount of material disposed at non-tidal sites in 1993 will be almost double the volume disposed at such sites in 1992.

Historically, dredging estimates have often been significantly higher than actual volumes dredged. For instance, in 1992 the amount of material dredged was only 35 percent of the almost 11 million cyds originally estimated to be dredged. As a result, disposal site targets were not exceeded as originally anticipated. The 1993 dredging volume estimates are comparable to 1992 estimates. Dredging volumes to date indicate that dredging estimates for 1993 will again exceed actual volumes dredged, and disposal site targets will not likely be exceeded.

2. **Upland Disposal**. The relatively small amount of material proposed for non-tidal disposal is partly a result of the limited number of such sites. Progress is being made toward increasing the number and capacity of these sites. For example, in June, 1993 the U.S. Army Corps of Engineers (Corps) issued a Public Notice for the Sonoma Baylands Tidal Restoration Project in Sonoma County, and the San Francisco Regional Water Quality Control Board (Regional Board) issued a permit for the project. In addition, environmental review and documentation is being prepared for the Montezuma Wetlands restoration project in Solano County (see Table 2).

As part of the Long Term Management Strategy (LTMS) Reuse/Upland studies, about 80 non-tidal sites around the Bay and Delta have been analyzed for their disposal and reuse potential. Further, draft preliminary engineering plans have been prepared for three out of ten sites, that were determined to be "highly feasible" for dredged material reuse and/or disposal projects. These plans evaluate: (1) use of dredged material to restore wetlands at Skaggs Island in Sonoma County and at the Cargill North Bay evaporator ponds in Napa and Solano Counties; (2) containment of dredged material at the Cargill North Bay crystallizer ponds in Napa and Solano Counties; and (3) establishment of dredged material rehandling facilities at Leonard Ranch in Sonoma County and the Cargill North Bay crystallizer ponds. In addition, a report was recently issued that analyzes the regulatory, planning, and funding structures affecting non-tidal disposal and reuse projects, and identifies ways to facilitate implementation of such projects. Furthermore, other LTMS Reuse/Upland studies are addressing a variety of environmental issues regarding reuse of dredged material. The data collected through these technical studies will be used to assess the feasibility of implementing non-tidal/reuse projects, develop policies for implementing such projects, and ultimately increase opportunities for disposal of dredged material at non-tidal sites. Beyond this work, little progress has been made to bring the sites identified in the *Interim Disposal Policy Road Map*, dated April 4, 1992, on-line. As a result, the dates when these sites will be available for disposal will be later than shown in the original *Road Map*.

3. **Ocean Disposal**. In a few months, the U.S. Environmental Protection Agency (U.S. EPA) will release a final environmental impact statement for designation of a dredged material disposal site, located in deep ocean waters about fifty miles from the Golden Gate. A portion of

the site is currently being used by the U.S. Navy to dispose of 1.2 million cyds of material dredged from the Bay. In 1993, the San Francisco Bay Conservation and Development Commission (Commission) found the Navy's dredging to be consistent with its laws and policies. No determination was made regarding the disposal site because it is located outside the Commission's jurisdiction. The ocean site is expected to be designated in January 1994.

Road Map

The Commission and the Corps produced an *Interim Disposal Policy Road Map*, dated April 4, 1992, to advise permit applicants about dredging and disposal activities and to guide regulatory decisions while the LTMS is being prepared. In addition to providing information about dredging and disposal activities in the region, the *Road Map* contains information on existing and potential disposal sites. The agencies intend to update the *Road Map* bi-annually.

Table 1 lists: (1) the amount of material proposed for dredging in 1992, 1993, and 1994; (2) sites proposed for disposal of the dredged material; (3) schedules for these activities; and (4) actual amount of material dredged, where this information is available. Map 1 shows the locations of major dredging projects in San Francisco Bay. Chart 1 shows the amount of material projected for disposal in 1993. Chart 2 shows the percentage of dredged material projected for disposal at various disposal sites in 1993. Table 2 provides the following: (1) existing and potential disposal sites for dredged material; (2) information about these sites; (3) assessment of the feasibility of the sites for disposal; and (4) updated information about non-tidal sites and assesses the feasibility of using the sites for disposal. Map 2 depicts disposal sites in the San Francisco Bay region.

Background

1. **The In-Bay Dredging and Disposal Problem.** Historically, high sedimentation rates in San Francisco Bay have made it necessary to regularly dredge navigation and flood control channels. Most material dredged from the Bay is disposed at the Alcatraz disposal site. The accumulation of a dredged material "mound" at the Alcatraz site and allegations that dredging and disposal adversely impact the Bay's natural resources have drawn attention to dredging and disposal activities.

Originally the Alcatraz disposal site was approximately 100 feet deep. In the late 1980's, it ranged between 40 and 50 feet deep. It is now about 30 feet deep. Federal and state regulatory agencies are trying to address this mounding problem by imposing volume and timing restrictions on disposal activities. But because these responses will provide only short-term relief, a long-term regional management plan is needed.

2. **LTMS.** On July 19, 1990 the Commission voted to participate in the LTMS with the Corps, the U.S. EPA, and the Regional Board. Over 40 other concerned agencies and groups are also participating in developing this plan for managing dredging and disposal in an economically- and environmentally-sound manner over the next 50 years. The LTMS plan will be based on a series of technical studies, which are currently underway. Studies of the impacts and feasibility of disposal and beneficial reuse of dredged material at non-tidal and Delta sites are managed by the Commission. Disposal options in the ocean and in-Bay locations are managed, respectively, by the U.S. EPA and the Regional Board. The LTMS is scheduled for completion in August 1994.

3. **Road Map.** The Commission and the Corps produced the *Interim Disposal Policy Road Map,* dated April 4, 1992, partly to guide regulatory decisions while the LTMS is being prepared. Based in part on the *Road Map* the Commission concluded that:

- Capacity at in-Bay disposal sites is limited and cannot accommodate future dredging and disposal needs. Overuse of the Alcatraz disposal site could result in its closure.

- In-Bay disposal is controversial because of its possible environmental impacts.

- There is continuing need to dispose of dredged material from projects essential to maritime commerce, national security, and recreational use of the Bay.

- Presently there are few alternatives to in-Bay disposal.

- In the future, it appears that alternatives to in-Bay disposal will be feasible and available. Dredged material can be used as a resource, but only if this alternative is aggressively pursued.

- To achieve broad support for solutions to Bay dredging problems both environmental and economic concerns must be addressed.

- There is need for an interim disposal policy pending adoption of the LTMS plan.

4. **San Francisco Bay Plan Amendments**. On May 21, 1992, the Commission amended the dredging findings and policies in the *San Francisco Bay Plan (Bay Plan)* based partly on information from the April 4, 1992 *Road Map* (see attached *Bay Plan* Amendment No. 3-91). The *Bay Plan* amendment recognized that regular dredging is likely to continue, capacity of existing disposal sites is limited, and ocean and non-tidal disposal sites are necessary to accommodate future dredging projects. To develop such solutions, the *Bay Plan* was also amended to establish the policy basis for the Commission's involvement in the LTMS. This Commission action was consistent with the San Francisco Bay Dredging Act of 1991, which directed and funded the Commission's involvement in the LTMS, and which became effective on January 1, 1992.

TABLE 1
Dredging and Disposal Projects [1]

Dredging Project	Projected Volume Dredged (cubic yards)	Actual Volume Dredged (cubic yards)	Disposal Site	Schedule/Frequency
CALENDAR YEAR 1992				
NAS Alameda (U.S. Navy) [2]	350,000	0	Ocean 103	3rd qtr
NSC Oakland (U.S. Navy) [2]	850,000	0	Ocean 103	3rd qtr
San Francisco Harbor Main Ship Channel [3]	900,000	440,000	Ocean 102 (SF-8)	2nd qtr
Richmond Harbor				
• Inner/Outer & Southampton Shoal [3]	700,000	379,000	Alcatraz (SF-11)	2nd qtr
• Port of Richmond (Berths)	325,000	0	Alcatraz (SF-11)	2nd qtr
San Rafael Creek [3]				
• Inner Channel	60,000	15,000	Alcatraz (SF-11)	1st qtr /7th yr
• Channel Across the Flats	250,000	0	Alcatraz (SF-11)	3rd qtr /7th yr
Redwood City Harbor [3]	240,000	251,000	Alcatraz (SF-11)	1st & 2nd qtr
NAS Alameda (U.S. Navy)	900,000	900,000	Alcatraz (SF-11)	1st, 2nd, & 4th qtr
Redwood City Yacht Harbor	75,000	0	Alcatraz (SF-11)	2nd qtr
Port of San Francisco (Berths)	330,000	51,000	Alcatraz (SF-11)	2nd & 4th qtr
Treasure Island (U.S. Navy)	400,000	0	Alcatraz (SF-11)	3rd qtr
Point Molate (U.S. Navy)	150,000	152,000	Alcatraz (SF-11)	3rd qtr
Golden Gate Transit (Larkspur Ferry Terminal)	225,000	0	Alcatraz (SF-11)	2nd- 4th qtr
Strawberry Recreation District	185,000	137,000	Alcatraz (SF-11)	3rd qtr
Southwest Marine	90,000	89,000	Alcatraz (SF-11)	4th qtr
NAS Moffett (U.S. Navy)	100,000	2,000	Alcatraz (SF-11)	2nd qtr
NSC Oakland (U.S. Navy)	250,000	0	Alcatraz (SF-11)	4th qtr
Coyote Point Marina	150,000	0	Alcatraz (SF-11)	
Ballena Isle Marina (Alameda)	50,000	0	Alcatraz (SF-11)	3rd qtr
Berkeley Marina	60,000	12,000	Alcatraz (SF-11)	4th qtr
Newport Boating Ass. (San Rafael Creek)	28,000	9,500	Alcatraz (SF-11)	3rd qtr
Paradise Cay (Tiburon)	20,000	0	Alcatraz (SF-11)	2nd qtr
Brickyard Cove	25,000	0	Alcatraz (SF-11)	2nd qtr
Misc. Projects (<20,000 cyds)	65,000	69,500	Alcatraz (SF-11)	Year-round
Oakland Harbor				
• Inner/Outer Harbor (Fed. Channel) [3]	400,000	25,000	Alcatraz (SF-11)	3rd qtr/yr
• Port Maintenance [4]	260,000	136,000	Alcatraz (SF-11)	1st qtr/yr
	20,000	20,000	Non-tidal	
• Berths 30 & 35 Deepening	145,000	80,000	Non-tidal	
	30,000	20,000	Alcatraz (SF-11)	
• Inner Harbor 38' Deepening [2]	543,000	497,000	Alcatraz (SF-11)	3rd qtr
	22,000	20,000	Non-tidal	3rd qtr
Marin Yacht Club	48,000	0	San Pablo (SF-10)	3rd qtr

1 Table 1 is for planning purposes. Projections contained herein are estimates only.
2 New work project.
3 Maintained by U.S. Army Corps of Engineers.
4 A portion of total amount dredged qualifies as new work.

TABLE 1 (cont.)

Dredging Project	Projected Volume Dredged (cubic yards)	Actual Volume Dredged (cubic yards)	Disposal Site	Schedule/Frequency
CALENDAR YEAR 1992				
Petaluma River (Federal Channel) [3]				
• Channel Across the Flats	300,000	0	San Pablo (SF-10)	2nd qtr/3rd yr
• River Channel	250,000	115,000	Non-tidal	3rd 92/4th yr
San Rafael Yacht Harbor	12,000	9,690	San Pablo (SF-10)	1st-4th qtr
Point San Pablo Yacht Harbor	8,000	0	San Pablo (SF-10)	1st & 2nd qtr
Suisun (Slough) Channel [3]	150,000	0	Non-tidal	Infrequent
NSY Mare Island (U.S. Navy) [4]	1,030,000	0	Non-tidal	Year round
Mare Island Strait (Federal Channel) [3]	500,000	289,000	Carquinez (SF-9)	1st qtr
City of Benecia	30,000	39,000	Carquinez (SF-9)	1st qtr
Exxon	40,000	40,000	Carquinez (SF-9)	4th qtr
Benicia Port Terminal	45,000	45,000	Carquinez (SF-9)	4th qtr
PG&E	100,000	16,000	Carquinez (SF-9)	1st qtr
Suisun Bay Main Channel [3]	200,000	55,000	Suisun Bay	3rd qtr
TOTAL 1992				
	2,100,000	440,000	***Ocean***	
	5,911,000	2,745,000	***Alcatraz (SF-11)***	
	368,000	9,690	***San Pablo (SF-10)***	
	715,000	429,000	***Carquinez (SF-9)***	
	1,617,000	235,000	***Non-tidal***	
	200,000	55,000	***Suisun Bay***	
TOTAL 1992 Dredging & Disposal Volumes	10,911,000	3,913,690		

TABLE 1 (cont.)

Dredging Project	Projected Volume Dredged (cubic yards)	Actual Volume Dredged to Date (cubic yards)	Disposal Site	Schedule/Frequency
CALENDAR YEAR 1993				
NAS Alameda (U.S. Navy) [2]	350,000	45,919	Ocean 103	2nd-3rd qtr
NSC Oakland (U.S. Navy) [2]	850,000	166,899	Ocean 103	2nd-3rd qtr
San Francisco Harbor Main Ship Channel [3]	900,000	311,949	Ocean 102 (SF-8)	2nd qtr
Redwood City Hrbr Entrance Ch., Turn Basins[3]	900,000	308,499	Alcatraz (SF-11)	2nd qtr/3rd yr
Richmond Harbor				
• Inner/Outer & Southampton Shoal [3]	900,000	313,801	Alcatraz (SF-11)	2nd qtr
• Port of Richmond (Berths)	43,000	0	Alcatraz (SF-11)	2nd qtr
Oakland Harbor				
• Inner/Outer Harbor (Fed. Channel) [3]	500,000	0	Alcatraz (SF-11)	3rd qtr
• Port Maintenance	230,000	7,000	Alcatraz (SF-11)	2nd qtr/yr
• Berth 30	40,000	0	Non-tidal	
San Rafael Creek Channel Across the Flats [3]	300,000	0	Alcatraz (SF-11)	3rd qtr /7th yr
NAS Alameda (U.S. Navy) [4]	1,200,000	0	Alcatraz (SF-11)	3rd & 4th qtr
Redwood City Yacht Harbor	75,000	0	Alcatraz (SF-11)	2nd qtr
Chevron	300,000	0	Alcatraz (SF-11)	2nd qtr
Red Rock Marina	80,000	0	Alcatraz (SF-11)	1st qtr
Port of San Francisco (Berths)	100,000	0	Alcatraz (SF-11)	4th qtr
NSC Oakland (U.S. Navy)	250,000	0	Alcatraz (SF-11)	4th qtr
Coyote Point Marina	150,000	0	Alcatraz (SF-11)	
Treasure Island (U.S. Navy)	400,000	0	Alcatraz (SF-11)	3rd qtr
Point Molate (U.S. Navy)	150,000	0	Alcatraz (SF-11)	4th qtr
Golden Gate Transit (Larkspur Ferry Terminal)	239,000	167,707	Alcatraz (SF-11)	2nd qtr
Brickyard Cove	25,000	0	Alcatraz (SF-11)	2nd qtr
Greenbrae Marina (Larkspur)	70,000	0	Alcatraz (SF-11) or SF-10	3rd qtr
Waterfront Property Owners (Paradise Cay)	75,000	0	Alcatraz (SF-11)	3rd qtr
Berkeley Marina	26,000	17,218	Alcatraz (SF-11)	1st-3rd qtr
Strawberry Cove	15,200	53,735	Alcatraz (SF-11)	1st-3rd qtr
Misc. Projects (<20,000 cyds)	75,000	3,000	Alcatraz (SF-11)	Year-round
Pinole Shoal (Federal Channel) [3]	500,000	in-progress	San Pablo (SF-10)	3rd qtr/2nd yr
Marin Yacht Club (West) [4]	57,000	16,575	San Pablo (SF-10)	2nd qtr
San Rafael Yacht Club	12,000	1120	San Pablo (SF-10)	2nd qtr
Misc. Projects (<20,000 cyds)	12,000	0	San Pablo (SF-10)	3rd qtr
Mare Island Strait (Federal Channel) [3]	500,000	in-progress	Carquinez (SF-9)	3rd qtr
City of Vallejo	50,000	0	Carquinez (SF-9)	2nd qtr
Shell Oil	50,000	0	Carquinez (SF-9)	3rd qtr
Exxon	40,000	0	Carquinez (SF-9)	1st qtr
Benicia Port Terminal	90,000	0	Carquinez (SF-9)	2nd qtr
Unocal	90,000	0	Carquinez (SF-9)	3rd qtr

TABLE 1 (cont.)

Dredging Project	Projected Volume Dredged (cubic yards)	Actual Volume Dredged to Date (cubic yards)	Disposal Site	Schedule/Frequency
CALENDAR YEAR 1993				
NSY Mare Island (U.S. Navy) [4]	1,030,000	in-progress	Non-tidal	Year round
San Leandro Harbor [3]	300,000	0	Non-tidal	Variable/4th yr
City of Corte Madera	29,500	in-progress	Non-tidal	2nd qtr
City and County of S.F. (Marina)	13,000	in-progress	Non-tidal	3rd qtr
Suisun Bay Main Channel [3]	200,000	45,000	Suisun Bay	3rd qtr
TOTAL 1993				
	2,100,000	524,767	*Ocean*	
	6,103,200	870,960	*Alcatraz (SF-11)*	
	581,000	17,695	*San Pablo (SF-10)*	
	820,000	0	*Carquinez (SF-9)*	
	1,412,500	0	*Non-tidal*	
	200,000	45,000	*Suisun Bay*	
TOTAL 1993 Dredging & Disposal Volumes	11,216,700	1,458,422		

TABLE 1 (cont.)

Dredging Project	Projected Volume Dredged (cubic yards)	Actual Volume Dredged (cubic yards)	Disposal Site	Schedule/Frequency
CALENDAR YEAR 1994				
John F. Baldwin (Federal Channel) [2]	9,000,000		Ocean 102 (new site)	3rd qtr/yr (1994-1997)
Oakland Harbor 42' Deepening [2]	6,500,000		Ocean 102 (new site)	3rd qtr
San Francisco Harbor Main Ship Channel [3]	900,000		Ocean 102 (SF-8)	2nd qtr
Richmond Harbor				
• Inner/Outer & Southampton Shoal [3]	900,000		Alcatraz (SF-11)	2nd qtr/yr
• Port of Richmond (Berths)	43,000		Alcatraz (SF-11)	2nd qtr/yr
Oakland Harbor				
• Inner/Outer Harbor (Fed. Channel.) [3]	500,000		Alcatraz (SF-11)	3rd qtr
• Port Maintenance	150,000		Alcatraz (SF-11)	1st qtr/yr
Port of San Francisco	100,000		Alcatraz (SF-11)	3rd qtr
Arco	50,000		Alcatraz (SF-11)	2nd qtr
NAS Alameda (U.S. Navy)	900,000		Alcatraz (SF-11)	3rd & 4th qtr
NSC Oakland (U.S. Navy)	100,000		Alcatraz (SF-11)	4th qtr
Point Molate (U.S. Navy)	150,000		Alcatraz (SF-11)	4th qtr
City & County of San Francisco (Marina)	25,000		Alcatraz (SF-11)	2nd qtr
Golden Gate Transit (Larkspur Ferry Terminal)	450,000		Alcatraz (SF-11)	2nd qtr
Brickyard Cove	25,000		Alcatraz (SF-11)	2nd qtr
NAS Moffett (U.S. Navy)	300,000		Alcatraz (SF-11)	4th qtr
Misc. Projects (<20,000 cyds)	75,000		Alcatraz (SF-11)	Year-round
Misc. Projects (<20,000 cyds)	12,000		San Pablo (SF-10)	3rd qtr
Petaluma River (Channel Across the Flats) [3]	300,000		San Pablo (SF-10)/Non-tidal	2nd qtr/3rd yr
Mare Island Strait (Federal Channel) [3]	500,000		Carquinez (SF-9)	1st qtr
City of Benicia	20,000		Carquinez (SF-9)	2nd qtr
Unocal	100,000		Carquinez (SF-9)	3rd qtr
NSY Mare Island (U.S. Navy)	600,000		Non-tidal	Year round
Napa River (Federal Channel) [3]	400,000		Non-tidal	3rd qtr/6th yr
New York Slough (Federal Channel) [3]	100,000		Non-tidal/Suisun Bay	2nd qtr/4th yr
Suisun Bay Main Channel [3]	200,000		Suisun Bay	3rd qtr
TOTAL 1994				
	16,400,000		*Ocean*	
	3,768,000		*Alcatraz (SF-11)*	
	312,000		*San Pablo (SF-10)*	
	620,000		*Carquinez (SF-9)*	
	1,100,000		*Non-tidal*	
	200,000		*Suisun Bay*	
TOTAL 1994 Dredging & Disposal Volumes	22,400,000			

Map 1

SOURCE: LTMS, 1993

Major Dredging Areas

1	New York Slough	7	Napa River	13	San Rafael Creek	19	Alameda NAS
2	Suisun Bay Channel	8	Petaluma River	14	Treasure Island NS	20	Redwood City
3	Concord NWS	9	Pinole Shoal	15	Port of San Francisco	21	Hunters Point NSY
4	Suisun (Slough) Channel	10	Richmond Harbor	16	San Francisco Bar	22	San Leandro Marina
5	Mare Island Strait	11	Point Molate NFD	17	USCG, Yerba Buena Island	23	Moffett Field NAS
6	Mare Island NSY	12	Chevron	18	Oakland Harbor	24	Oakland NSC

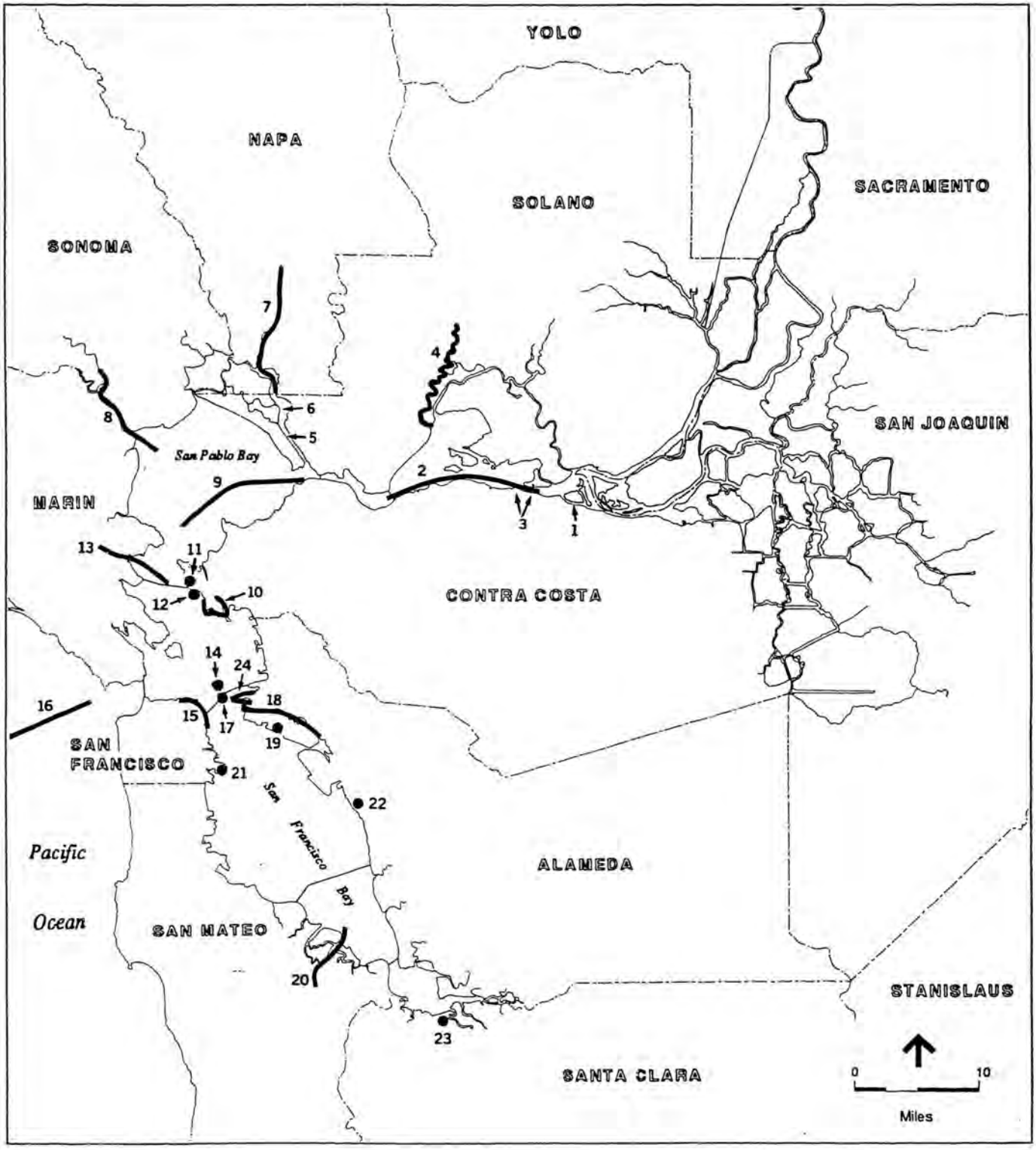


Chart 1: Projected Disposal Volumes for 1993

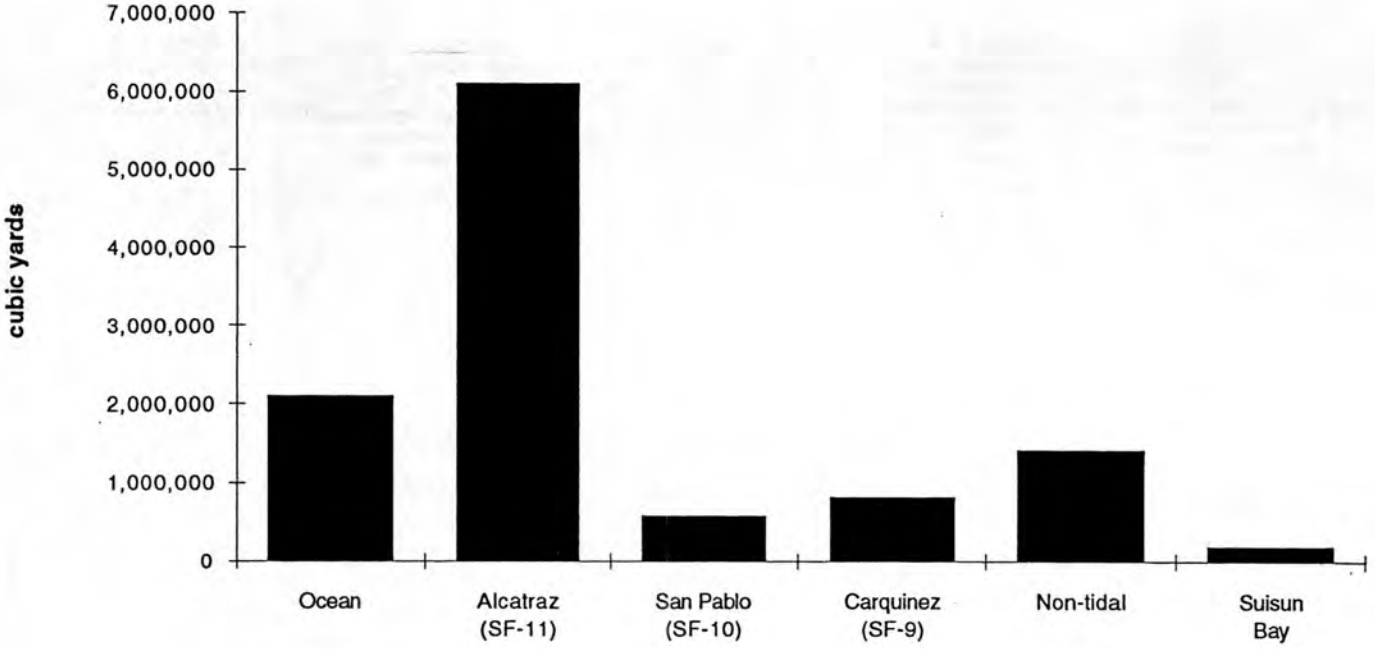


Chart 2: Projected Disposal Site Usage in 1993

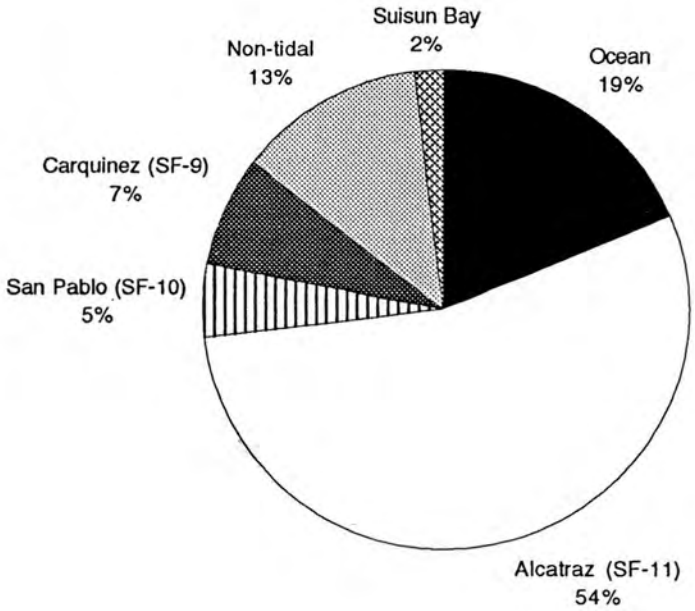


TABLE 2
Dredged Material Reuse/Disposal Options [1]

Disposal Site [2]	Site Status [3]	Implementation Costs (million dollars) [4]	Disposal Costs (dollars) Per Cubic Yard [5]	Site Capacity	Feasibility of Site Use	Comments
In-Bay						
1) Alcatraz (SF-11)	In use	0	2-3	4 million cubic yards (mcyds)/yr	High	Site use constraints: limited capacity; seasonal restrictions.
2) Carquinez Strait (SF-9)	In use	0	5-6	2-3 mcyds/yr	High	Site use constraints: capacity limited.
3) San Pablo Bay (SF-10)	In use	0	4-5	0.5 mcyds/yr	High	Site use constraints: capacity limited.
4) Suisun Bay	In use	0	Not applicable	0.2 mcyds/yr	High	Site limited to Corps maintenance projects of sandy material.
5) Bay Farm Island Borrow Pit	Corps studying as part of Port of Oakland -42' deepening project. Estimated availability: 1st qtr, '95.	1.0	2-3	10-15 mcyds	Low	Near-term designation unlikely due to lack of data regarding site use and habitat impact.
Ocean						
6) Channel Bar Site	Used to dispose material dredged at entrance to Bay.	0	Not applicable	Not applicable	High	Used for clean sand only, not for in-Bay material (primarily mud).
7) B1B Site	Inactive	1.5	8	50+ mcyds	Low	Port of Oakland used in '88. Located in Monterey Bay Marine Sanctuary.
8) U.S. Navy 103 Site	In use	3.5	6-8	1.2 mcyds	High	Former chemical munitions site. Located 57 statute mi. west of Golden Gate, off continental shelf.
9) 102 General Use Site	EPA's FEIS for site designation to be issued Fall, '93. Estimated site designation 1st qtr '94	5.0	6-8	6 mcyds/yr	High	Same general location as Navy 103 site (see above).
10) 100-Fathom Site	Inactive	2.0	9	100+ mcyds	Low	Located in Farallones Natl. Marine Sanctuary.
Reuse/Non-tidal						
11) Port Sonoma-Marin	Presently used to rehandle material (reused at Redwood Sanitary Landfill). LTMS identified as "highly feasible" for rehandling facility option.	0	12	60,000 cyds/yr throughput (for use at Redwood Landfill) [6, 7]	High	Existing capacity limits site's potential to rehandle volume of reuse material needed at Redwood, if landfill expansion permitted.

1 Table 2 is for planning purposes; figures contained herein are preliminary estimates.
2 Locations of disposal sites are shown on Map 2.
3 Site availability based on assumption that project sponsor exists and planning and engineering work begins by 4th quarter, 1993.
4 Cost estimates include planning and engineering studies only, unless otherwise noted.
5 Cost estimates based on Central Bay dredging projects.
6 Rehandling projection based on assumption that all material removed annually; subject to change depending upon disposal site size and specific needs of end-user.
7 Redwood needs up to 14 mcyds of wet material, if landfill expansion permitted; if not permitted, only 1.6 mcyds of wet material needed.

TABLE 2 (cont.)

Disposal Site [2]	Site Status [3]	Implementation Costs (million dollars) [4]	Disposal Costs (dollars) Per Cubic Yard [5]	Site Capacity	Feasibility of Site Use	Comments
Reuse/Non-tidal						
12) Leonard Ranch	LTMS identified as "highly feasible" for rehandling facility option. LTMS draft preliminary engineering rehandling facility study currently circulating for review. Corps also directed to study by Congress, and Port of Oakland studying as part of -42' deepening project. Available to use 2nd qtr, '94.	2.3 [8]	7-16 [9]	Up to 806,000 cyds/yr throughput (possibly reused at Redwood Landfill, which estimates it needs 440,000 cyds/yr from 1993-1997) [6, 7]	High	Rehandling facility construction would likely require mitigation. Funding needed (Port of Oakland possible funding source). Coastal Conservancy potential project sponsor.
13) Praxis-Pacheco	LTMS identified site as "highly feasible" for confined disposal and/or rehandling facility. LTMS draft preliminary engineering study of rehandling facility completed Dec., '92. Available to use 3rd qtr, '94.	15.5 (for rehandling) [8]	7-16 (for rehandling) [9]	465,500 cyds/yr throughput for rehandling, or 2.5 mcyds for confined disposal. [6, 10]	High	On-site sewer easement limits site capacity; project sponsor not identified; site privately-owned. Funding needed.
14) Sonoma Baylands 330-acre project	LTMS identified site as "highly feasible" for dredged material habitat creation project. Congress directed Corps to construct project. Corps issued Public Notice June, '93. SF RWQCB permit issued July '93. Available to use 1st qtr, '94.	1.5 (site improvements); up to 15 (total costs).	6-9	2.5 mcyds	High	Corps preparing final project design. Also, local project sponsor funding needed.
15) Sonoma Baylands 30-acre project	Coastal America project. Available for use 4th qtr, '93.	$140,000 (local sponsor cost)	Not applicable	.3 mcyds	High	Local project sponsor funds secured, additional funding may be needed.
16) Hamilton Field: Antennae Field	LTMS identified as "highly feasible" for habitat restoration option. Available for use: 3rd qtr, '95.	1	12	2.7 mcyds	High	Publicly-owned site. Corps & DFG potential project sponsors. Corps has partial funding for planning. Funds needed.
17) Hamilton Field: Habitat Creation	Available for use 3rd qtr, '96	1	12	5-6 mcyds	Low/ Medium	Shallow water access.
18) Hamilton Field: Rehandling Project	Available for use 3rd qtr, '97	1.50	10	1-2 mcyds	Low	Project constraint: land transportation access tied up in base closure.

8 Includes costs for site acquisition, engineering, utility relocation, construction, administration; mitigation and monitoring not included.
9 Includes costs for mobilization, dredging ($16/cyd based on cost of small dredging project of approximately 50,000 cyds), transport, and placement at reuse site.
10 Confined disposal projection based on assumption that multiple disposal events and an average 40 percent compaction rate for in-place, dry material will occur; subject to change depending upon size of disposal site.

TABLE 2 (cont.)

Disposal Site [2]	Site Status [3]	Implementation Costs (million dollars) [4]	Disposal Costs (dollars) Per Cubic Yard [5]	Site Capacity	Feasibility of Site Use	Comments
Reuse/Non-tidal						
19) Montezuma Wetlands	LTMS identified as "highly feasible" for dredged material habitat creation, confined disposal, and/or rehandling options. EIS/R under preparation. Available for use 3rd qtr, '94.	To be borne by project applicant.	10	20 mcyds for habitat creation or confined disposal. [10]	High	Potential impact to on-site and surrounding habitat.
20) Skaggs Island	LTMS identified as "highly feasible" for use as confined disposal and/or habitat creation options. LTMS draft conceptual habitat creation plan issued May, '93. Available for use 3rd qtr, '94	39.9 for habitat creation [8]	5.2 [11]	16.1 mcyds for habitat creation, or 72 mcyds for confined disposal. [10]	High	Site owned by U.S. Navy, but slated for base closure. Project sponsor and funding required to undertake project.
21) Cargill Salt Division 1 (west evaporator ponds)	LTMS identified as "highly feasible" for habitat creation option. LTMS draft conceptual habitat creation plan completed May, '93. Available for use 2nd qtr, '95	38.2 [8]	5 [11]	7-11.4 mcyds	High	Option signed for public acquisition of site in June, '93. If finalized, funding needed if dredged material is used.
22) Cargill Salt Div. 1 (east crystallizer ponds)	LTMS identified as "highly feasible" for rehandling and confined disposal projects. LTMS draft conceptual engineering plans for confined disposal completed May, '93. LTMS draft preliminary engineering study for rehandling facility currently circulating for review. Available for use 2nd qtr, '95.	5.7 for rehandling [8] 14-65 for confined disposal [12]	7-16 for rehandling.[9] 5 for confined disposal. [11]	Up to 1.5 mcyds/yr throughput for rehandling [6] 5-9 mcyds for confined disposal [13]	High	Site privately-owned.
23) Cullinan Ranch	LTMS identified as "highly feasible" for habitat creation option. US FWS conducting preliminary planning for project. Available 2nd qtr, '95.	To be determined.	9	7.2 mcyds for habitat creation.	High	FWS, project sponsor, unsure whether they will use dredged material. Shell Oil Trust & LTMS have partial funds for planning. Funds needed.
24) Lower Jones Tract	Inactive.	not available	not available	.8 mcyds for levee maintenance	Medium	Disposal restrictions for saline material.
25) Twitchell Island	Used for pilot project using dried material.	not available	not available	1 mcyds for levee maintenance	Medium	Disposal restrictions for saline material.

11 Includes costs for transport, pump-out and placement at reuse site; dredging costs not included. Add 2.20/cyd for small projects.
12 $65 million includes cost of capping, lining, and leachate collection system comparable to hazardous waste facility.
13 Assumes consolidation of fill back to 50 percent pre-dredge volume.

TABLE 2 (cont.)

Disposal Site [2]	Site Status [3]	Implementation Costs (million dollars) [4]	Disposal Costs (dollars) Per Cubic Yard [5]	Site Capacity	Feasibility of Site Use	Comments
Reuse/Non-tidal						
26) Jersey Island	Inactive. Candidate for LTMS demonstration project in '94 for material dredged at federally-maintained Channel in Suisun Bay.	15.5 [14] (over two-year period)	10 [15]	1.6 mcyds for levee maintenance	Medium	Disposal restrictions for saline material.
27) Sherman Island	Inactive	17 [14] (annually)	13 [15]	830,000 cyds/yr for rehandling [6]	Medium	Disposal restrictions for saline material.
28) Sherman Island	Used as levee rehabilitation demonstration project by Corps and DWR.	not available	not available	1.8 mcyds for levee maintenance	Medium	Disposal restrictions for saline material.
29) Chipps Island	Inactive. Available for use: 3rd qtr, '95.	not available	not available	2.0 mcyds for levee maintenance	Medium	Located in Suisun Marsh (BCDC jurisdiction).
30) Other Sacramento-San Joaquin Delta Sites	Inactive. LTMS and DWR analyzing for levee enhancement potential.	not available	not available	up to 47 mcyds for levee maintenance	Medium	Disposal restrictions for saline material.
31) Mare Island	Available for specific project use only.	Not applicable	Not applicable	Not applicable	High	Mare Island Naval Shipyard maintenance
32) Pierce Island	Available for specific project use only.	Not applicable	Not applicable	Not applicable	High	City of Suisun
33) Winter Island	Available for specific project use only.	Not applicable	Not applicable	Not applicable	High	John F. Baldwin channel disposal site
34) San Leandro	Available for specific project use only.	Not applicable	Not applicable	Not applicable	High	City's site for San Leandro Marina

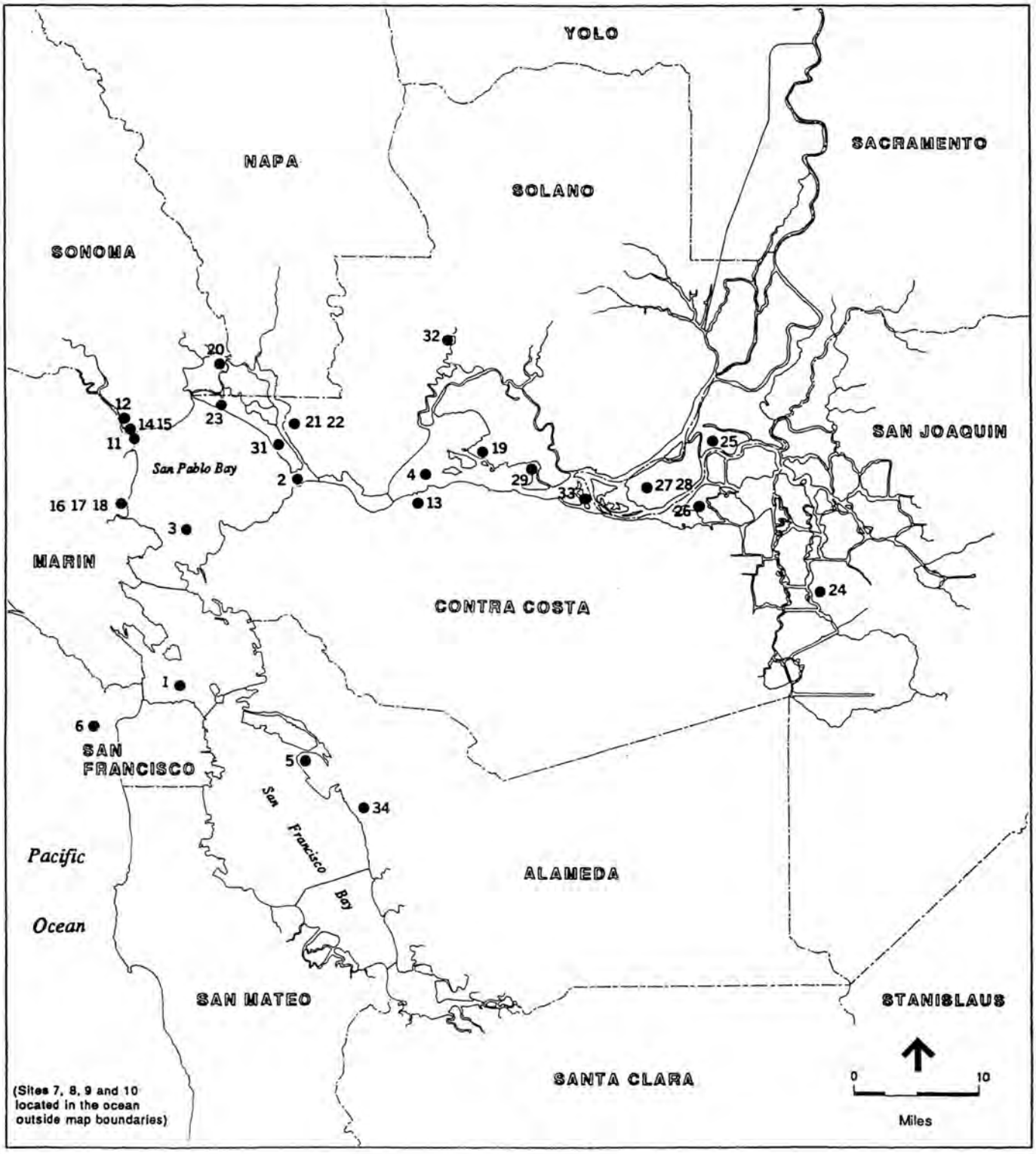
14 Includes costs for site preparation, transport and placement of dredged material, site management and maintenance; for rehandling at Sherman Island, includes rehandling and off-site transport costs.
15 Not including permitting or dredging costs.

SOURCE: LTMS, 1993

Map 2

Existing and Potential Disposal Sites

NOTE: Site names identified on Table 2.



SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
Thirty Van Ness Avenue • Suite 2011 • San Francisco, California 94102 • (415)557-3686

August 7, 1992

To: All Commissioners, Alternates, and Interested Parties
From: Alan R. Pendleton, Executive Director

Subject: **Bay Plan Amendment No. 3-91: San Francisco Bay Plan Dredging Findings and Policies**
(For Information Only)

On May 21, 1992, the Commission amended the *San Francisco Bay Plan* dredging findings and policies and on July 13, 1992 the federal Office of Ocean and Coastal Resource Management (OCRM) concurred that the amendment is routine program implementation of the Commission's coastal management program for the San Francisco Bay segment of the California coastal zone. The amended *Bay Plan* dredging findings and policies are now in effect and are set forth below.

San Francisco Bay Plan
Dredging

Findings

a. Much of the Bay bottom is shallow. It averages 20 feet in depth, and the bottom is covered with accumulated sediment—silt, sand, and clay sediment is carried into the Bay annually in tributary waterway flows, most of it settling to the Bay bottom. In addition, over 100 million cubic yards of sediment—inflowing and resuspended—lodges in harbors and navigable channels from which it must be dredged at considerable cost.

b. Dredging consists of excavating or extracting materials from the Bay. Dredging is often necessary to provide and maintain safe navigation channels and harbors for port facilities, water-related industries, and recreational boating, and for flood control channels.

c. Past and present waste disposal practices have resulted in the introduction of pollutants in to the Bay, some of which have degraded Bay sediments. These pollutant are not distributed evenly in the Bay and localized areas are highly contaminated. Dredging and subsequent aquatic disposal of contaminated sediments in the Bay can resuspend and redistribute pollutants in the water column, making them accessible to Bay organisms and result in possible adverse impacts on natural resources of the Bay.

d. Material dredged from the Bay has historically been disposed of aquatically in the Bay. In more recent times, most aquatic disposal has occurred at one of four Bay U.S. Army Corps of Engineers designated disposal sites where the material is expected to disperse and the maximum amount would be carried out the Golden Gate on the Ebb tides and cause the least environmental impact as possible. These sites are: (1) off Alcatraz Island; (2) in San Pablo Bay; (3) in Carquinez Strait; and (4) in the Suisun Bay Channel. But even at the site nearest the ocean, off Alcatraz Island, less than half of the disposed material is carried out to sea by the tides.

e. Capacity at the Alcatraz Island disposal site is limited because over years of use a large mound of material has formed which, unless future disposal is properly managed, may adversely affect water circulation and Bay aquatic life, and pose a hazard to maritime navigation.

f. Alternate locations to Bay aquatic disposal include non-tidal upland and ocean sites. Only small amounts of material have been disposed of in non-tidal sites historically. Additional non-tidal sites with increased capacity should be available for dredged material disposal projects in early 1993, and ocean disposal sites are expected to be available for use in early 1994. Some non-tidal upland sites may be categorized as waters of the United States pursuant to federal law.

g. Certain dredged material can be used beneficially rather than treated as a waste. The material can be used to bolster levees and dikes, create and restore tidal marshes and managed wetlands, cover and seal sanitary landfills, and as fill in construction projects.

h. Dredged material disposed of at sea could return to the Bay with tidal currents or could cause damage to marine organisms or beaches sites. These conditions are capable of being analyzed prior to disposal at sea.

i. The Regional Water Quality Control Board and the Environmental Protection Agency are responsible for determining appropriate dredged material pollutant testing and discharge standards and for assuring that dredging and the disposal of dredged materials are consistent with the maintenance of Bay water quality. The U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers have joint federal responsibility for regulating ocean, Bay, and wetland disposal.

j. The Long Term Management Strategy (LTMS), initiated by the U.S. Army Corps of Engineers in 1991, is a multiple federal and state agency initiative to study comprehensively Bay dredging issues and prepare by 1995, a long-range Bay dredging and dredged material disposal management plan and implementation program. When completed, the LTMS is expected to provide the basis for uniform federal and state dredged material disposal policies and regulations.

k. Underground fresh water supplies are an important supplement to surface water now brought into the Bay Area by aqueduct from mountain reservoirs. Deep dredging of Bay mud, or excavation for tunnels or bridge piers, could strip the "strip" from the top of a fresh water reservoir under the Bay, allowing the salt water to contaminate the fresh water, or allowing the fresh water (if artesian) to escape in large quantities and thus cause land to sink. The precise location of ground water reservoirs under the Bay is not yet well known, however.

Policies

1. Dredging should be authorized when the Commission can find (a) the applicant has demonstrated that the dredging is needed to serve a water-oriented use or other important public purpose, (b) the materials to be dredged meet the water quality requirements of the San Francisco Bay Regional Water Quality Control Board, (c) important fisheries and Bay natural resources would be protected, and (d) the materials would be disposed of in accordance with Policy 2.

2. Disposal of dredged materials should be encouraged in non-tidal areas were the materials can be used beneficially, or in the ocean. Disposal in tidal areas of the Bay should be authorized when the Commission can find that: (a) the applicant has demonstrated that non-tidal and ocean disposal is infeasible; because there are no alternate sites available or likely to be available for use in a reasonable period, or the cost of disposal at alternate sites is prohibitively expensive; (b) disposal would be at a site designated by the Commission; (c) the quality and volume of the material to be disposed is consistent with the advice of the San Francisco Bay Regional Water Quality Control Board; and (d) the period of disposal is consistent with the advice of the Department of Fish and Game and the National Marine Fisheries Service.

3. When the annual amount of dredged material proposed to be disposed in tidal areas of the Bay exceeds the disposal volume targets established by the Commission, in determining which projects to authorize, the Commission shall be guided by all relevant factors concerning the pro-

posed projects, including, but not limited to, need for the dredging and the dredging project, regional economic impact, environmental impact, and other regional effects of the project, and the economic feasibility of using alternate disposal sites.

4. To ensure adequate capacity for necessary Bay dredging projects and to protect Bay natural resources, acceptable non-tidal disposal sites should be secured and ocean disposal sites designated. Further, disposal projects should maximize use of dredged material as a resource, such as creating, enhancing, or restoring tidal and managed wetlands, creating and maintaining levees and dikes, providing cover and sealing material for sanitary landfills, and filling at approved construction projects.

5. Once non-tidal or ocean disposal sites have been secured or designated, and prior to completion of the LTMS, the maximum feasible amount of dredged material should be disposed of at non-tidal sites or in the ocean. Until non-tidal upland disposal sites are secured and ocean disposal sites designated, aquatic disposal in the Bay should be authorized at sites designated by the U.S. Army Corps of Engineers and the Commission. Dredged materials disposed of aquatically in the Bay, particularly at the Alcatraz Island disposal site, should be carefully managed to ensure that the amount and timing of disposal does not create navigational hazards, adversely affect Bay currents or natural resources of the Bay, or foreclose the use of the site by projects critical to the economy of the Bay Area.

6. All proposed channels should be carefully designed so as not to undermine the stability of any adjacent dikes, fills or fish and wildlife habitats.

7. The Commission should encourage increased efforts by soil conservation districts and public works agencies in the 50,000-square-mile Bay tributary area to continuously reduce soil erosion as much as possible.

8. To protect underground fresh water reservoirs (aquifers), (a) all proposals for dredging or construction of work that could penetrate the mud "cover" should be reviewed by the Regional Water Quality Control Board and the State Department of Water Resources, and (b) dredging or construction work should not be permitted that might reasonably be expected to damage an underground water reservoir. Applicants for permission to dredge should be required to provide additional data on ground water conditions in the area of construction to the extent necessary and reasonable in relation to the proposed project.

9. Interested agencies and parties are encouraged to explore and find funding solutions to the additional costs incurred by transporting dredged materials to non-tidal upland and ocean disposal sites, either by general funds contributed by ports and other relevant parties, dredging applicants or other wise.

10. Dredged materials should only be used to create artificial islands in the Bay if competent studies demonstrate that these fill islands would have no harmful effect on Bay natural resources.

11. The Commission should encourage, sponsor and participate in the LTMS and other initiatives conducting research on Bay sediment movement, the effects of dredging and disposal on Bay natural resources, alternatives to Bay aquatic disposal, and funding additional costs of transporting dredged materials to non-tidal upland and ocean disposal sites.