

DREDGING AND DISPOSAL ROAD MAP



May 1, 1998

San Francisco Bay Conservation
and Development Commission

United States Army Corps of Engineers
San Francisco District



Dredging and Disposal Road Map

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 has typically been disposed of at the in-Bay disposal site near Alcatraz Island. The accumulation of a dredged material "mound" at the Alcatraz site and allegations that dredging and disposal of dredged material adversely impact the Bay's natural resources have drawn attention to these activities.

Originally the Alcatraz disposal site was approximately 100 feet deep. By the late 1980s, the top of the mound was less than 30 feet below the Bay's surface. Lately, the top has eroded, while the base of the mound appears to be widening. Federal and state regulatory agencies initially addressed the mounding problem by imposing volume and timing restrictions on disposal activities. However, because strict management of in-Bay disposal activities provides only a short-term solution, a long-term regional management plan for the disposal of dredged material is needed to resolve the dredging and disposal problem in San Francisco Bay.

2. **LTMS.** On July 19, 1990, the Commission voted to participate in the LTMS with the U. S. Army Corps of Engineers (Corps), the U.S. Environmental Protection Agency (U.S. EPA), the San Francisco Bay Regional Water Quality Control Board (Regional Board), and the State Water Resources Control Board (State Board). Over 40 other concerned agencies and groups are also contributing to the development of a plan for managing dredging and disposal activities in an economically and environmentally sound manner over the next 50 years. The LTMS plan is based on a series of technical studies. Studies of the impacts and feasibility of disposal and beneficial reuse of dredged material at upland sites were managed by the Commission. Disposal options in the ocean and in-Bay locations were studied, respectively, by the U.S. EPA and the Regional Board. Currently, the LTMS agencies are completing a Policy Environmental Impact Statement and Programmatic Environmental Impact Report (EIS/R) that considers the impacts of alternative policies for managing dredging and disposal activities in the region. The EIS/R preferred alternative recommends that in-Bay disposal be reduced over time to a low level (one million cubic yards per year), with the remainder of Bay dredging volumes either beneficially reused or disposed of at the Deep Ocean Disposal Site. The final EIS/R will be issued in the spring of 1998. The LTMS agencies have begun preparation of a Management Plan to implement the preferred alternative.

3. **San Francisco Bay Plan Amendment.** On May 21, 1992, the Commission amended the dredging findings and policies in the *San Francisco Bay Plan* (Bay Plan) based partly on the following conclusions drawn from the first Dredging and Disposal Road Map, dated April 4, 1992:

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

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.

Summary of 1997 Dredging and Disposal Activities and Projections for 1998

Table 1 summarizes dredging and disposal activities for San Francisco Bay. The data for 1997 and 1998 projections of dredging and disposal are from Dredged Materials Management Office (DMMO) permit applications, from BCDC files, and in a few cases, from personal communication with dredging project managers. The data for actual dredging activities are from the Dredging Summaries, produced quarterly by the Corps. The locations of major dredging projects in the Bay Area are shown in Map 1.

1. **Dredging.** Projected volumes for dredging activity in 1997, based on permit applications submitted to the DMMO, were approximately 9 million cubic yards (mcy). The actual amount of dredging in San Francisco Bay for the 1997 calendar year was 39% lower than predicted, with close to 5.5 mcy of material actually dredged. Almost two-thirds of the volume dredged in 1997 was from new-work projects, mainly from the Port of Oakland's 42-foot deepening project (Chart 1). The second largest portion of dredged material was from Corps maintenance dredging projects. Projections for 1998 suggest little change from 1997 total dredge volumes. As in 1997, in 1998 the largest portion of dredged material (42%) is expected to come from new-work projects, with the deepening projects of the Ports of Richmond and Oakland being the main contributors to this component (Chart 2). Smaller projects not affiliated with the Corps or the local major ports are expected to contribute 26% of the projected total dredge volume for 1998.

2. **Disposal.** Less than 35% of the material dredged in 1997 was disposed of in the Bay (Chart 3). The majority (62%) was disposed of at the Deep Ocean Disposal Site, driven mainly by the Port of Oakland's 42-foot deepening project. This shows tremendous progress in the move towards reducing in-Bay disposal of dredged material. Unfortunately, upland disposal alternatives were little-used in 1997, probably due to a lack of sites available to accept material. For 1998, this may change: about 18% of the material dredged in 1998 is expected to go to upland disposal (Chart 4), much of it to beneficial uses such as to bolster levees at Winter Island in Contra Costa County. About 40% of the material for 1998 is expected to go to the Deep Ocean Disposal Site. About 42% of material dredged in 1998 is expected to be disposed of in the Bay with the vast majority of this going to the Alcatraz Disposal Site. Beneficial upland use of dredged materials should increase in the coming years, as several upland sites are expected to go on-line soon (see below).

The Future of Alternatives to In-Bay Disposal - Upland Disposal

The Long Term Management Strategy (LTMS) Reuse/Upland Work Group studied opportunities for reusing and disposing of dredged material at a variety of non-tidal sites. As a part of this effort, over 100 sites for beneficial reuse projects, rehandling facilities, or confined disposal were initially examined and ranked based on engineering, environmental, and land use factors. While many sites were considered to have a high feasibility for upland disposal and/or reuse of dredged materials, few of them have become available in recent years despite strong support from the LTMS agencies. While difficulties in obtaining permits or production of required environmental documentation have been obstacles to bringing upland disposal options on-line, perhaps most

important is the need to supply funding for the differential in cost between in-Bay disposal and upland disposal. Table 2 summarizes current and potential dredged material disposal options, and locations of these sites are shown in Map 2. Below, several of the most promising upland reuse/disposal sites are discussed in more detail.

Alameda Naval Air Station

The City of Alameda, through the Alameda Reuse and Redevelopment Authority (ARRA) is exploring the possibility of constructing an 18-hole golf course on part of the former Alameda Naval Air Station, which closed in 1997. The area in question, known as the Northwest Territories, is adjacent to Oakland Inner Harbor, and would be adjacent to a proposed 525-acre U.S. Fish and Wildlife Service refuge. The City has written a letter to the Port of Oakland expressing its interest in receiving clean fill to be used to raise site elevations. The ARRA has commissioned a study by a golf course consultant to explore the feasibility of a golf course at the site. Any further action on the use of dredged material at the site would take place only if it is determined that a golf course is a feasible use of the site. If the project proceeds, the Port may provide 750,000 cy of material from the 50-foot deepening project that would be pumped to the site for de-watering and used in construction of the golf course.

Hamilton Wetland Restoration Project

The proposed site is located in Marin County, and was part of Hamilton Army Airfield, which is in base closure. The area is a diked historic baylands and has subsided to an average elevation of -5 feet. The State Coastal Conservancy and the Hamilton Restoration Group (HRG), which is chaired by staffs of the Conservancy and the Commission, are exploring the feasibility of restoring the area to wetlands. A conceptual plan and feasibility study was released in April 1998. The conceptual restoration plan involves using dredged material to raise the site to elevations appropriate for the establishment of 914 acres of tidal and non-tidal wetland habitats, using about 10 mcy of dredged material.

A full EIS/EIR is presently under preparation. The Corps is studying the feasibility of federal cost-sharing for the beneficial reuse facility, based upon the conceptual plan, which would then need to be authorized by the United States Congress. Applicable state and federal approvals would be applied for in 1999, with a proposed construction date in the year 2000.

Mare Island Confined Disposal Facility

The proposed site for this project is at the former Mare Island Naval Shipyard, which is in base closure, with most of the land to be transferred to the City of Vallejo. The City is interested in generating revenue by charging dredgers for disposal of dredged material at the site. The proposal involves seven of ten existing ponds which were used by the Navy for disposal of dredged materials from berthing areas. Adjacent to the site are salt marshes and the San Pablo Bay Wildlife Refuge, which is managed by the U. S. Fish and Wildlife Service (USFWS). The USFWS has expressed an interest in obtaining and restoring the three remaining ponds as part of a proposed interpretive center for the refuge .

In March, 1998, the City of Vallejo released a feasibility study which concluded that operation of the ponds as a disposal site for materials unsuitable for aquatic disposal would be highly economically feasible, even if the three ponds were transferred to the USFWS refuge and not used for further disposal. The site capacity is estimated to be 12 mcy, with disposal costs of \$7 per cy of dredged material. The City would charge dredgers a tipping fee beyond this "break even" cost. The implementation costs of this project are relatively low because extensive site preparation will not be needed.

Although much of the necessary pipeline for transferring dredged materials from scows to the ponds exists and is operable, at least some repair will be necessary in starting up the facility. First, as part of the base closure, the Navy will be required to remove unexploded ordnance from the ponds; this process will last at least through 1999. Review under state and federal environmental law will then be required, and the City of Vallejo will need to gain state and

federal permits in order to operate the facility. The City has not initiated the environmental review and permitting process.

Montezuma Wetlands Restoration Project

The proposed project is sponsored by Levine Fricke Restoration Corporation, the site owner. The project sponsor proposes to restore wetlands to over 1,800 acres of the 2,600-acre site, located in Solano County at the mouth of Montezuma Slough, by raising site elevations to support wetlands using dredged material. Construction of wetland habitat would allow for the disposal of both non-cover and cover material, as defined by the Regional Water Quality Control Board. The sponsors also propose to construct a dredged material rehandling facility, which would occupy 165 acres of the site. The site is currently used for livestock grazing, and is surrounded by agricultural uses, residential developments, and managed and tidal wetlands.

The estimated capacity of the site is approximately 17 mcy for the wetlands restoration project, and 400,000 cy per year for the rehandling facility. The disposal fees are estimated to range from \$6 to \$10 per cubic yard of dredged material, depending on the quality and quantity of material. A final EIS/EIR for the project is expected in May or June of 1998. The project sponsor has been working to acquire the necessary permits for this project, which it anticipates will be acquired by early 1999, paving the way for site preparation so that dredged material can be accepted later that same year.

Port of Oakland Berth 10

The Port of Oakland's Berth 10 Rehandling Facility is located along the waterfront of Oakland Outer Harbor. The Facility is currently used by the Port to de-water dredged materials that are unsuitable for aquatic disposal. Materials typically are on-site for one to two weeks, which is sufficient to meet landfill requirements for water content. Dredged materials are confined by berms, and any water runoff passes through weirs to screen out suspended solids before the water is discharged back into the Bay. Site capacity is roughly 15,000 cubic yards of wet dredged material.

The Port has a permit from the Regional Board to operate the facility for their own materials, and have recently decided to accept materials from outside projects. The site would be leased to outside parties for the duration of their use of the facility, and the other party would be required to obtain a discharge permit for each use from the Regional Board and remove the material after dewatering.

Winter Island

The Winter Island site is proposed as a rehandling facility that would accept materials from maintenance dredging of Suisun Channel, to be used in levee restoration projects on the island to provide flood control. The project would require the construction of internal levees to hold the dredged material while it dries. After drying, the material would be moved to island levee rehabilitation projects. The local sponsor for the Suisun Bay maintenance dredging is Contra Costa County, and the County is supportive of an upland disposal project. The owner and local sponsor of the facility would be the Winter Island Reclamation District, which operates a duck club on the island. Currently the Reclamation District has a permit from the Corps to operate the facility, and they are awaiting approval from the Regional Board. In addition to permits, the project participants are awaiting funding for startup costs: the Corps has requested supplemental funding from Congress, a portion of which would be used for their \$1.5 million contribution to startup costs, and the Reclamation District is seeking funding for their \$200,000 share. When operational, the site capacity is expected to be 100,000 cy per drying cycle, with disposal costs of \$15 per cy of in-place material. The Reclamation District is hoping to be able to receive dredged material from the Corps' 1998 maintenance dredging of Suisun Channel.

TABLE 1
Projected and Actual Dredging Volumes
(Provided for planning purposes. Figures contained herein are preliminary estimates.)

| Project | Disposal Site | Dredge Volume (cubic yards) | | |
|--|---------------------------------------|-----------------------------|-------------|----------------|
| | | 1997, Projected | 1997 Actual | 1998 Projected |
| <i>Federal COE projects</i> | | | | |
| Petaluma River - Across the Flats | Upland reuse at Hamilton base cleanup | 0 | 0 | 300,000 |
| Pinole Shoal | San Pablo (SF-10) | 229,000 | 256,846 | 40,000 |
| Port of Oakland Shipping Channels | Alcatraz (SF-11) | 165,000 | 213,982 | 150,000 |
| Port of Richmond Shipping Channels | Alcatraz (SF-11) | 426,000 | 346,024 | 80,000 |
| Redwood City Harbor | Alcatraz (SF-11) | 41,630 | 0 | 0 |
| San Leandro Channel (COE) | Alcatraz (SF-11) | 110,600 | 172,896 | 0 |
| San Rafael Canal - Across the Flats | Upland Disposal | 17,000 | 0 | 0 |
| | Alcatraz (SF-11) | 156,200 | 191,829 | 0 |
| Suisun Bay Channel | Suisun Bay (SF-16) | 150,000 | 0 | 150,000 |
| | Winter Island | 0 | 0 | 110,000 |
| <i>Federal non-COE projects</i> | | | | |
| Moffet Field Fuel Supply Channel | Alcatraz (SF-11) | 148,710 | 0 | 0 |
| <i>Port Maintenance Projects</i> | | | | |
| Port of Oakland Berth Maintenance: | Deep Ocean (SF-DODS) | 0 | 9,561 | 0 |
| | Sidecast | 1,200 | 1,200 | 0 |
| | Alcatraz (SF-11) | 175,000 | 72,319 | 0 |
| Port of Redwood City Berth Maintenance: | Alcatraz (SF-11) | 30,000 | 0 | 16,600 |
| | Upland Disposal | 0 | 0 | 6,000 |
| Port of Richmond Berth Maintenance (other maintenance included with "Port of Richmond Deepening" under New Work) | Alcatraz (SF-11) | 0 | 0 | 20,000 |
| Port of San Francisco Central Basin | Alcatraz (SF-11) | 275,000 | 0 | 275,000 |
| Port of San Francisco Berth Maintenance: | Alcatraz (SF-11) | 307,930 | 0 | 281,850 |
| | Upland Disposal | 2,400 | 0 | 1,200 |
| <i>CalTrans Projects</i> | | | | |
| Bay Bridge Retrofit: | Alcatraz (SF-11) | 248,200 | 0 | 248,200 |
| | Upland Disposal | 11,800 | 0 | 11,800 |
| Benicia-Martinez Bridge Retrofit | Carquinez (SF-9) | 62,000 | 0 | 62,000 |
| Carquinez Bridge Retrofit | Carquinez (SF-9) | 5,700 | 0 | 5,700 |
| Richmond-San Rafael Bridge Retrofit: | San Pablo (SF-10) | 215,680 | 0 | 215,680 |
| | Upland Disposal | 3,320 | 0 | 3,320 |
| San Mateo-Hayward Bridge Retrofit: | Alcatraz (SF-11) | 80,900 | 0 | 80,900 |
| | Upland Disposal | 18,000 | 0 | 18,000 |

TABLE 1 (cont'd)

| Project | Disposal Site | Dredge Volume (cubic yards) | | |
|--|-------------------|-----------------------------|-------------|----------------|
| | | 1997, Projected | 1997 Actual | 1998 Projected |
| <i>Other Maintenance Projects</i> | | | | |
| Acolian Yacht Club | Alcatraz (SF-11) | 0 | 0 | 12,000 |
| Bel Marin Keys | Upland Disposal | 10,000 | 0 | 10,000 |
| Belvedere Cove | Alcatraz (SF-11) | 0 | 0 | 300 |
| Benicia Port Terminal Company | Carquinez (SF-9) | 29,800 | 2,149 | 15,000 |
| Black Point Launch Ramp | San Pablo (SF-10) | 0 | 235 | 200 |
| Brisbane Marina | Alcatraz (SF-11) | 76,000 | 0 | 94,000 |
| City of Benicia - Benicia Marina | Carquinez (SF-9) | 40,000 | 16,090 | 0 |
| City of San Francisco - Marinas: | Alcatraz (SF-11) | 50,000 | 0 | 50,000 |
| (advanced maintenance) | Upland Disposal | 0 | 0 | 300,000 |
| City of San Rafael - San Rafael Canal: | San Pablo (SF-10) | 20,000 | 28,750 | 0 |
| | Alcatraz (SF-11) | 5,000 | 750 | 0 |
| Clipper Yacht Harbor | Alcatraz (SF-11) | 600 | 0 | 600 |
| Corinthian Yacht Club | Alcatraz (SF-11) | 37,400 | 7,825 | 20,000 |
| Exxon Dock - Benecia | Carquinez (SF-9) | 38,000 | 19,000 | 20,000 |
| Foster City Lagoon | Alcatraz (SF-11) | 92,900 | 0 | 92,900 |
| Glen Cove Marina | Carquinez (SF-9) | 0 | 13,990 | 0 |
| Kappas Marina | Alcatraz (SF-11) | 17,000 | 0 | 17,000 |
| Larkspur Ferry Terminal/Channel | Alcatraz (SF-11) | 25,000 | 20,905 | 25,000 |
| Loch Lomand Marina | San Pablo (SF-10) | 50,000 | 32,570 | 20,000 |
| Marin Yacht Club | San Pablo (SF-10) | 4,000 | 3,475 | 4,000 |
| Oyster Point Marina | Alcatraz (SF-11) | 0 | 0 | 110,178 |
| Paradise Cay | Alcatraz (SF-11) | 10,000 | 11,700 | 9,000 |
| PG&E - Antioch Power Plant | Upland Disposal | 2,182 | 0 | 2,182 |
| PG&E - Pittsburg Power Plant | Upland Disposal | 43,054 | 0 | 43,054 |
| Port Sonoma Marina | Upland Disposal | 220,000 | 0 | 240,000 |
| Richmond Long Wharf - Chevron | Alcatraz (SF-11) | 265,000 | 283,030 | 280,000 |
| San Francisco Drydock: | Alcatraz (SF-11) | 333,000 | 0 | 233,500 |
| | Upland Disposal | 35,000 | 0 | 0 |
| San Francisco Yacht Club | Alcatraz (SF-11) | 0 | 20,715 | 0 |
| San Leandro Marina | Alcatraz (SF-11) | 75,000 | 60,150 | 0 |
| Schnitzer Steel | Alcatraz (SF-11) | 13,000 | 7,284 | 10,000 |
| Tosco (previously Unocal) Dock - Rodeo | Carquinez (SF-9) | 55,240 | 0 | 65,000 |
| Unocal-Richmond Inner Harbor | San Pablo (SF-10) | 20,778 | 26,300 | 0 |
| Vallejo Ferry Terminal: | Carquinez (SF-9) | 6,700 | 8,305 | 0 |
| | Upland Disposal | 1,300 | 0 | 0 |
| Vallejo Yacht Club | Carquinez (SF-9) | 0 | 1,500 | 0 |

TABLE 1 (cont'd)

| Project | Disposal Site | Dredge Volume (cubic yards) | | |
|---|------------------------------|-----------------------------|------------------|------------------|
| | | 1997, Projected | 1997 Actual | 1998 Projected |
| <i>New Work</i> | | | | |
| Port of Oakland 42' Project | Galbraith | 10,000 | 1,500 | 10,000 |
| Port of Oakland 42' Project | Deep Ocean (SF-DODS) | 3,000,000 | 2,399,969 | 1,000,000 |
| Port of Oakland Berth Deepening: | Deep Ocean (SF-DODS) | 50,000 | 23,206 | 0 |
| | Alcatraz (SF-11) | 20,000 | 42,708 | 0 |
| Port of Richmond 38' Deepening (also includes maintenance dredging of Port) | Deep Ocean (SF-DODS) | 1,250,000 | 938,004 | 1,554,156 |
| | Port of Richmond Parking Lot | 234,000 | 242,219 | 0 |
| Port of San Francisco North Ferry Terminal Deepening | Alcatraz (SF-11) | 7,900 | 0 | 7,900 |
| Port of San Francisco South Ferry Terminal Deepening: | Alcatraz (SF-11) | 8,650 | 0 | 8,650 |
| | Upland Disposal | 1,000 | 0 | 1,000 |
| Wickland Oil, Proposed Point Orient Terminal | Upland Disposal | 0 | 0 | 80,000 |
| Total Dredging Volumes: | | 9,038,774 | 5,476,986 | 6,411,870 |
| <i>Summary by Disposal Site:</i> | | | | |
| Alcatraz (SF-11) | | 3,201,620 | 1,452,117 | 2,123,578 |
| Carquinez (SF-9) | | 237,440 | 61,034 | 167,700 |
| Deep Ocean (SF-DODS) | | 4,300,000 | 3,370,740 | 2,554,156 |
| San Pablo (SF-10) | | 539,458 | 348,176 | 279,880 |
| Sidecast | | 1,200 | 1,200 | 0 |
| Suisun Bay (SF-16) | | 150,000 | 0 | 150,000 |
| Upland Disposal (all types) | | 609,056 | 243,719 | 1,136,556 |
| <i>Summary by Project Type:</i> | | | | |
| Federal projects | | 1,444,140 | 1,181,577 | 830,000 |
| Port Maintenance Projects | | 791,530 | 83,080 | 600,650 |
| CalTrans projects | | 645,600 | 0 | 645,600 |
| Other Maintenance Projects | | 1,575,954 | 564,723 | 1,673,914 |
| New Work | | 4,581,550 | 3,647,606 | 2,661,706 |

Chart 1
1997 Disposal Volumes (Actual) by Project Type

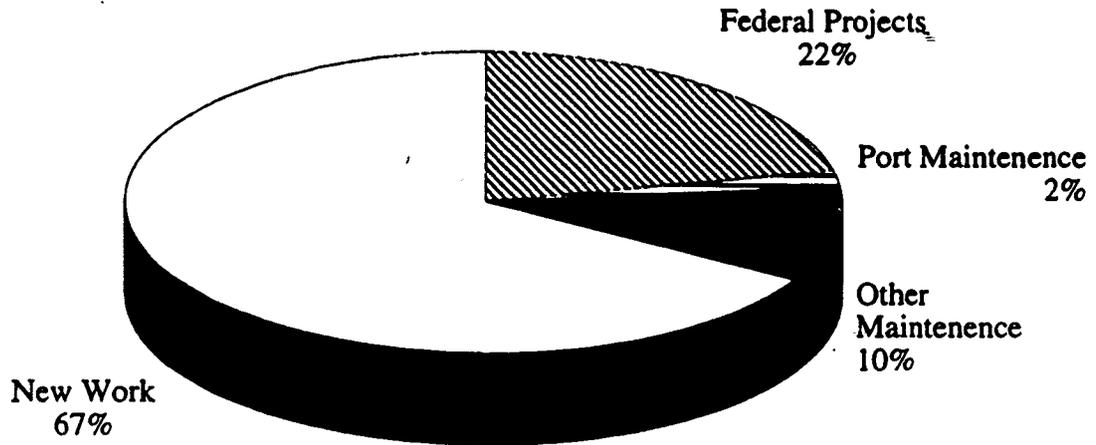


Chart 2
1998 Disposal Volumes (Projected) by Project Type

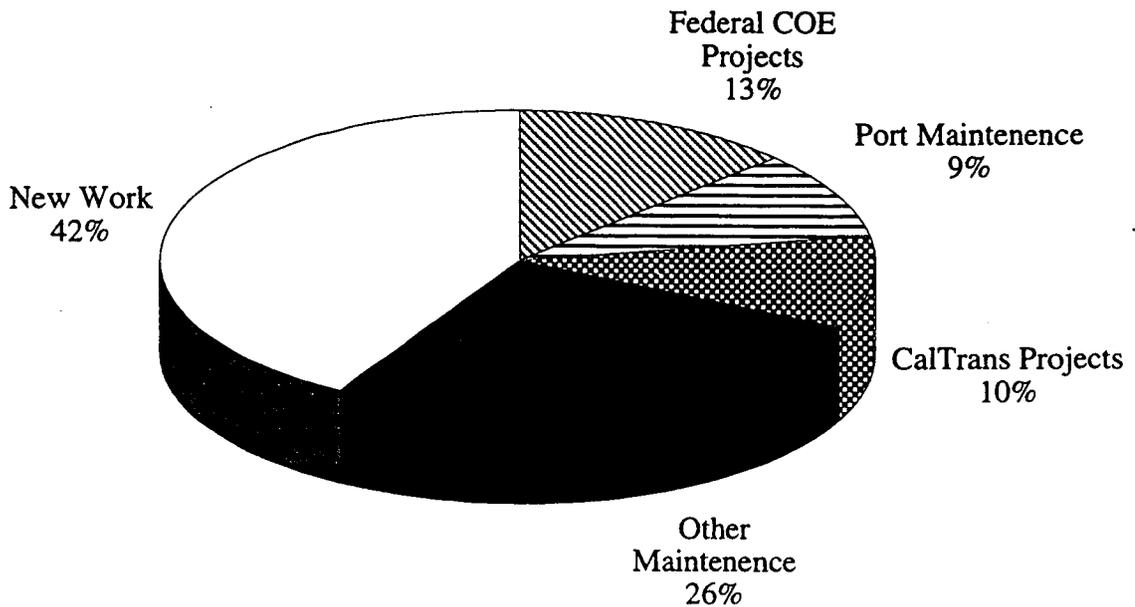


Chart 3
1997 Disposal Volumes (Actual) by Site

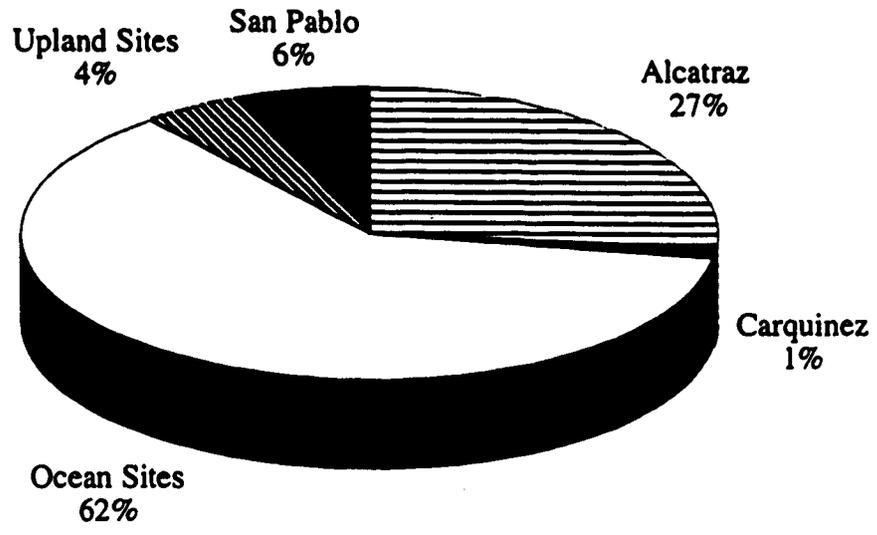
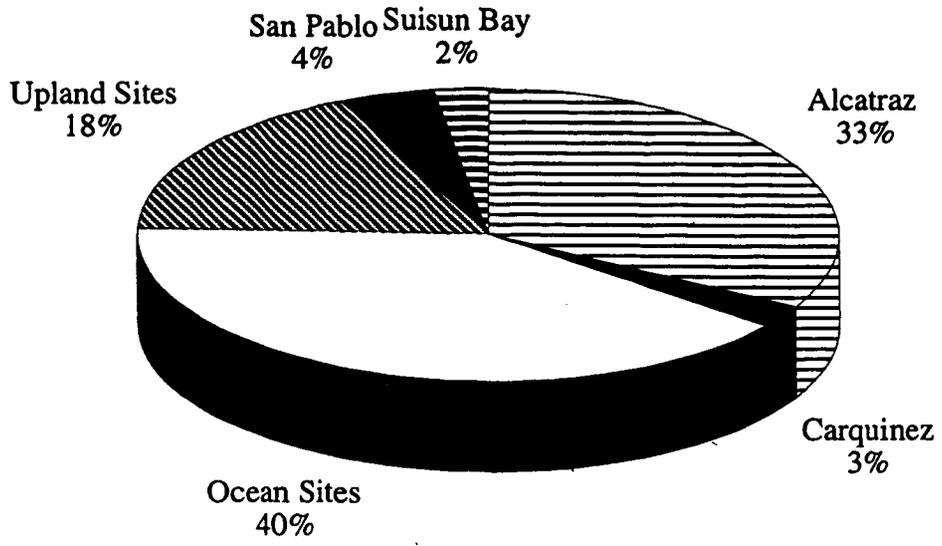


Chart 4
1998 Disposal Volumes (Projected) by Site



**TABLE 2
Dredged Material Disposal Options**

(Provided for planning purposes. Figures contained herein are preliminary estimates.)

| Disposal Site | Site Status Feasibility | Implementation Costs (million dollars) | Disposal Cost (dollars per cubic yard) | Site Capacity | Comments |
|---|------------------------------|--|--|---|--|
| Authorized In-Bay Sites | | | | | |
| 1) Alcatraz (SF-11) | Existing | 0 | 4 | 4 million cubic yards (mcy)/yr | Long-term use constraints: capacity & volume limits; seasonal restrictions. |
| 2) Carquinez Strait (SF-9) | Existing | 0 | 5-6 | 2-3 mcy/yr | Long-term use constraints: capacity & volume limits; seasonal restrictions. |
| 3) San Pablo Bay (SF-10) | Existing | 0 | 4-5 | 0.5 mcy/yr | Long-term use constraints: capacity & volume limits; seasonal restrictions. |
| 4) Suisun Bay (SF-16) | Existing | 0 | 5.5 | 0.2 mcy/yr | Exclusive use for Suisun Bay Channel material. |
| Proposed In-Bay Sites | | | | | |
| 5) Bay Farm Island Borrow Pit | Not currently available/Low | 80.2 (excluding costs for further studies, etc.) | 2-3 | 10-15 mcy | Was considered for Oakland Harbor -42' deepening project. No use currently proposed. |
| 6) Middle Harbor Enhancement Project | Not currently available | Not available | 2.5 | 7 mcy | Under consideration for Oakland Harbor 50' deepening project. Site depth would be decreased on average from -38 feet to -4 feet. Issues include: levels of contamination of material, and desirability of fill in bay. |
| Ocean | | | | | |
| 7) S.F. Bar Channel (SF-8) | Existing | 0 | Not available | Not available | Exclusive use for material from Bay Bar Channel. |
| 8) S.F. Deep Ocean Disposal Site (SFDODS) | Existing | 5.0 | 6-8 | 4.8 mcy/yr | Permanent site designation and disposal volume limit scheduled for end of 1998. |
| Reuse/Non-tidal | | | | | |
| 9) Airport Borrow Pits (Solano) | Not currently available/High | 1.2 ⁴ | 6.4 ⁵ | 2.0 mcy/re-handling cycle ⁶ 15.2 mcy for confined disposal ⁷ | LTMS identified as highly feasible for rehandling and confined disposal, and prepared conceptual plans (12/94). Project requires sponsor and funding. |
| 10) Alameda Naval Air Station (Alameda) | Not currently available | Not currently available | Not currently available | 0.75 mcy | City of Alameda possibly interested in using clean dredged material from Oakland Harbor 50' deepening project for construction of golf course. Feasibility study for golf course currently underway. |

¹ Disposal site shown on Map 2.

² Feasibility, if listed, is from LTMS technical studies

³ Disposal cost estimates based on Central Bay dredging projects (unless otherwise noted), and do not include implementation costs.

⁴ Includes costs for construction, engineering, administrative, and other improvements; cost of site acquisition, mitigation, and operation and maintenance are not included.

⁵ Includes costs for mobilization, dredging (\$16/cy based on small dredging projects, about 50K cy), transport, and placement at reuse site.

⁶ In the Bay and Delta regions, rehandling or drying cycle typically lasts from 18 to 24 months.

⁷ Confined disposal assumes multiple disposal events and an average 40-60% compaction of dry material.

TABLE 2 (cont'd)

| Disposal Site | Site Status / Feasibility | Table 1 Cost (million dollars) | Table 2 Cost (million dollars/cy) | Site Capacity | Comments |
|---|---|---|---|---|---|
| 11) Bel Marin Keys Unit 5 (Marin) | Not currently available/High | Not available | Not available | 20 mcy | LTMS identified as highly feasible for habitat restoration. Privately-owned but under consideration for acquisition by Coastal Conservancy. If acquired, may be incorporated into Hamilton restoration project. |
| 12) Cargill Salt evaporator ponds (discontinued - now owned by Ca. Dept of Fish & Game) (Solano & Napa) | Not currently available/High but site owner opposed to use | 38 ⁸ | 5 ⁹ | 7 to 11 mcy | LTMS identified as highly feasible for habitat restoration. California Department of Fish & Game does not believe dredged materials are needed for restoration. |
| 13) Cargill Salt crystallizer ponds (east of Napa River) (Napa) | Not currently available/High | 3.4 (re-handling) ⁸ 14-65 (confined disposal) ¹⁰ | 7-16 (re-handling) ⁵ 5 (confined disposal) ⁹ | Up to 1.9 mcy/drying cycle ⁶ 5.5 mcy for confined disposal ⁷ | LTMS identified as highly feasible for rehandling and confined disposal projects, and prepared conceptual plans (1993). However, site privately-owned, mitigation likely required, and funding needed. |
| 14) Cullinan Ranch (Napa & Solano) | Not currently available/High but site owner opposed to use | To be determined | 9 | 16 mcy | LTMS identified as highly feasible for habitat creation. However, USFWS, site manager, not interested in restoring site using dredged material. |
| 15) Galbraith Golf Course (Alameda) | Existing | 21 | 9 | 1.2 mcy | LTMS identified as highly feasible for confined disposal. Capacity to be reached with material from Port of Oakland -42' deepening project. |
| 16) Hamilton Army Airfield & State Lands Commission Antenna Field (Marin) | Not currently available/High Potentially available to use dredged material for base clean-up in 1998-2000; Potentially available to use material for habitat restoration in 1999-2000. | 18.4 | 7.4-11.3 | 10.2 mcy | LTMS identified as highly feasible for habitat restoration. CEQA/NEPA process initiated in March, 1998. Draft conceptual restoration plan issued April, 1998. |
| 17) Leonard Ranch (Sonoma) | Not currently available/High but site owner opposed to use | 2.3 ⁸ | 7-16 ⁵ | Up to 0.8 mcy/drying cycle ⁶ | LTMS identified as highly feasible for rehandling, and prepared conceptual plans (11/93). |

⁸ Includes costs for site acquisition, engineering, utility relocation, construction, and administration; mitigation and monitoring are not included.

⁹ Includes costs for transport, pump-out, and placement at reuse site; dredging costs not included. Add \$2.20/cy for small projects.

¹⁰ \$65 million cost to establish operations comparable to hazardous waste facility.

TABLE 2 (cont'd)

| Disposal Site | Site Status / Feasibility | Implementation Cost (million dollars) | Disposal Cost (dollar per cubic yard) | Site Capacity | Comments |
|---|------------------------------|---------------------------------------|---------------------------------------|---|---|
| 18) Mare Island (Solano) | Not currently available/High | 0.4 | 7 | 12 mcy for confined disposal ⁷ | LTMS identified as highly feasible for rehandling and/or confined disposal, and prepared conceptual plans (12/95). Ponds no longer used by Navy. Three of 10 ponds likely to be used as part of USFWS refuge. City of Vallejo finalized feasibility study re: multi-user facility in March, '98, and found use of ponds for unsuitable material "viable." |
| 19) Montezuma (Solano) | Not currently available/High | To be borne by project applicant. | 6 to 10 ¹¹ | 17 mcy for habitat creation, with 3 mcy for confined disposal, ⁷ 0.4 mcy/drying cycle ⁶ for rehandling facility | LTMS identified as highly feasible for habitat creation, confined disposal, and/or rehandling. FEIS/R to be issued May 1998. Permits expected early 1999, with possibility of accepting material later in 1999. |
| 20) Napa River Site (Napa) | Existing | Not applicable | Not applicable | 0.2 mcy ¹² | Two sites currently used for material from Napa River federal channel. Dry material used on-site for perimeter levees |
| 21) North Point Property (Sonoma) | Not currently available/High | 1.0 ⁴ | 4.7 ⁵ | 3 mcy | LTMS identified as highly feasible for habitat restoration, and prepared conceptual plan (12/94). However, privately-owned, and acquisition and restoration funds needed. |
| 22) Petaluma Drying Ponds (Sonoma) | Existing | Not available | Not available | 0.5 mcy/drying cycle ⁶ | LTMS identified as highly feasible for rehandling. However, currently used for material from Petaluma River federal maintenance channel only. |
| 23) Pierce Island (Solano) | Existing | Not applicable | Not applicable | 0.6 mcy | Currently used for material from Suisun Slough federal channel only. Dry material likely used at landfill or duck club levees. |
| 24) Port of Oakland Berth 10 Rehandling Facility | Existing | Not available | 60 ¹³ | 15,000 cy/2-week drying cycle | Currently used by the Port for material from dredging projects that is unsuitable for aquatic disposal. Site will be made available to other users, who will need to obtain their own Regional Board discharge permits. |
| 25) Port of Richmond Former Shipyard No. 3 (Contra Costa) | Existing | Not available | Not available | Not available | LTMS identified as highly feasible for rehandling. Capacity was reached with material unsuitable for aquatic disposal from Port of Richmond -38' deepening project. Port interested in expanding facility for regional use if economically feasible. |
| 26) Port of San Francisco Pier 94 (San Francisco) | Not Available/High | Not available | Not available | Not available | LTMS identified as highly feasible for rehandling. Port of S.F. considering economic feasibility and community acceptability. |

¹¹ Includes all disposal-related costs except for dredging and transport.

¹² 1996 data

¹³ Cost to Port for all disposal-related costs, including dredging and transport to end-user.

TABLE 2 (cont'd)

| Disposal Site | Site Status / Feasibility | Implementation Cost (million dollars) | Disposal Cost (dollar per cubic yard) | Site Capacity | Comments |
|---|------------------------------|---------------------------------------|---------------------------------------|---|---|
| 18) Mare Island (Solano) | Not currently available/High | 0.4 | 7 | 12 mcy for confined disposal ⁷ | LTMS identified as highly feasible for rehandling and/or confined disposal, and prepared conceptual plans (12/95). Ponds no longer used by Navy. Three of 10 ponds likely to be used as part of USFWS refuge. City of Vallejo finalized feasibility study re: multi-user facility in March, '98, and found use of ponds for unsuitable material "viable." |
| 19) Montezuma (Solano) | Not currently available/High | To be borne by project applicant. | 6 to 10 ¹¹ | 17 mcy for habitat creation, with 3 mcy for confined disposal, ⁷ 0.4 mcy/drying cycle ⁶ for rehandling facility | LTMS identified as highly feasible for habitat creation, confined disposal, and/or rehandling. FEIS/R to be issued May 1998. Permits expected early 1999, with possibility of accepting material later in 1999. |
| 20) Napa River Site (Napa) | Existing | Not applicable | Not applicable | 0.2 mcy ¹² | Two sites currently used for material from Napa River federal channel. Dry material used on-site for perimeter levees |
| 21) North Point Property (Sonoma) | Not currently available/High | 1.0 ⁴ | 4.7 ⁵ | 3 mcy | LTMS identified as highly feasible for habitat restoration, and prepared conceptual plan (12/94). However, privately-owned, and acquisition and restoration funds needed. |
| 22) Petaluma Drying Ponds (Sonoma) | Existing | Not available | Not available | 0.5 mcy/drying cycle ⁶ | LTMS identified as highly feasible for rehandling. However, currently used for material from Petaluma River federal maintenance channel only. |
| 23) Pierce Island (Solano) | Existing | Not applicable | Not applicable | 0.6 mcy | Currently used for material from Suisun Slough federal channel only. Dry material likely used at landfill or duck club levees. |
| 24) Port of Oakland Berth 10 Rehandling Facility | Existing | Not available | 60 ¹³ | 15,000 cy/2-week drying cycle | Currently used by the Port for material from dredging projects that is unsuitable for aquatic disposal. Site will be made available to other users, who will need to obtain their own Regional Board discharge permits. |
| 25) Port of Richmond Former Shipyard No. 3 (Contra Costa) | Existing | Not available | Not available | Not available | LTMS identified as highly feasible for rehandling. Capacity was reached with material unsuitable for aquatic disposal from Port of Richmond -38' deepening project. Port interested in expanding facility for regional use if economically feasible. |
| 26) Port of San Francisco Pier 94 (San Francisco) | Not Available/High | Not available | Not available | Not available | LTMS identified as highly feasible for rehandling. Port of S.F. considering economic feasibility and community acceptability. |

¹¹ Includes all disposal-related costs except for dredging and transport.

¹² 1996 data

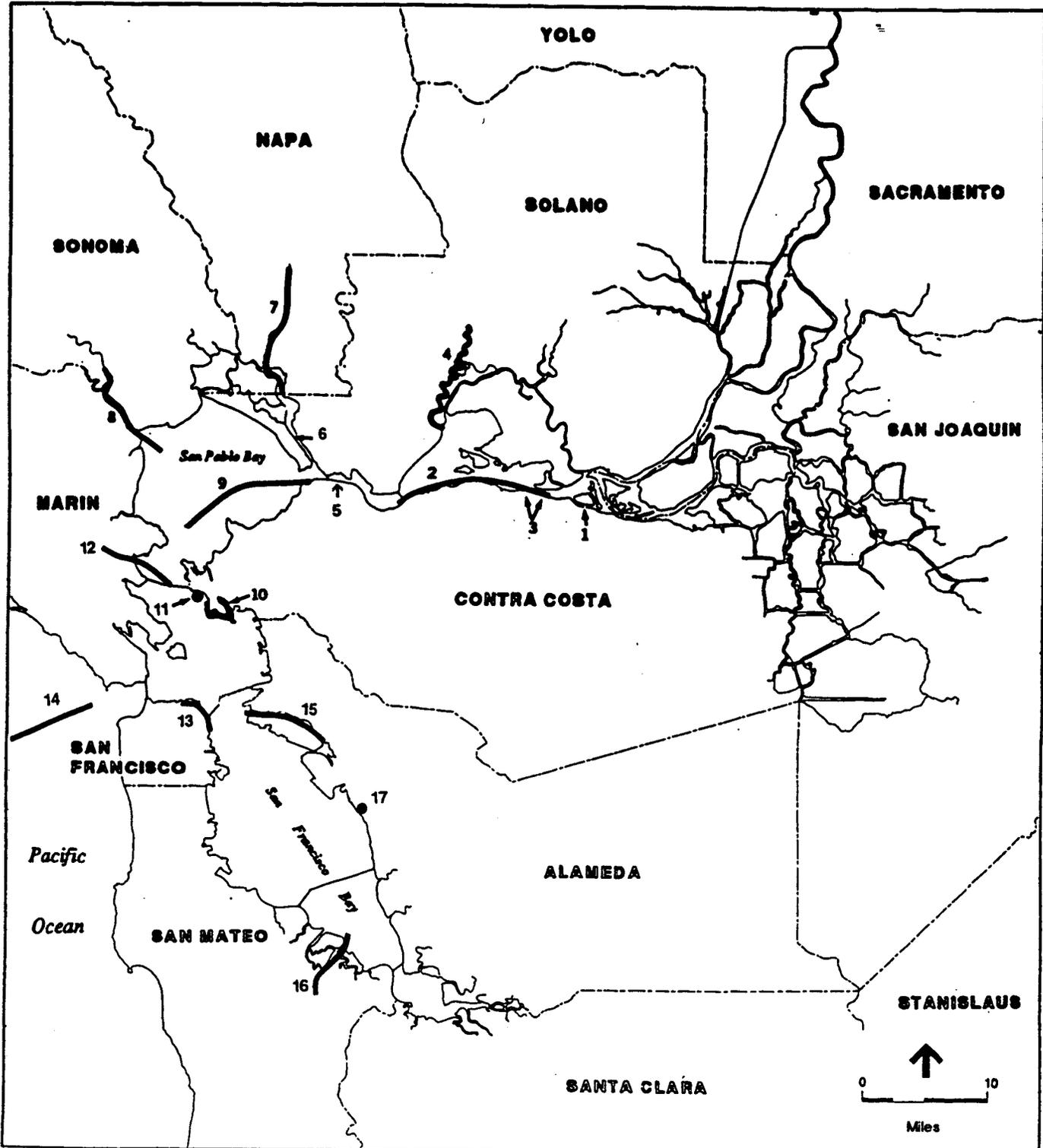
¹³ Cost to Port for all disposal-related costs, including dredging and transport to end-user.

TABLE 2 (cont'd)

| Disposal Site | Site Status / Feasibility | Implementation Costs (million dollars) | Disposal Cost (dollar per cubic yard) | Site Capacity | Comments |
|--|--|---|---------------------------------------|---|---|
| 27) Port Sonoma Marina Drying Ponds (Sonoma) | Existing | 0 | 12 | 0.06 mcy per drying cycle ⁶ 0.3 mcy (total pond capacity) | Exclusive use by marina only. Ponds presently full. Regional use of ponds currently unlikely due to limited capacity and limited interest of owner. |
| 28) Port Sonoma Marina - Highway 37 Agricultural Site (Sonoma) | Under Construction/Feasible | 0.8 ⁸ | Not available | 0.24 mcy | Site to be used for Port Sonoma Marina material in 1998 on a one-time basis only. |
| 29) Praxis-Pacheco (Contra Costa) | Not currently available/High | Not available | Not available | 2.5 mcy for confined disposal ⁷ | LTMS identified as highly feasible for confined disposal. Site proposed for commercial development |
| 30) San Leandro (Alameda) | Existing | 2.4 | 15 | 1.6 mcy/drying cycle ⁶ | LTMS identified feasibility as rehandling facility as high. Currently used exclusively for San Leandro Harbor federal channel. |
| 31) Sherman Island Scour Pond Site (Sacramento) | Not currently available/High | To be determined | Not available | Not available | Two other sites at Sherman Island currently accept material from freshwater environments. This project would accept material from maintenance dredging in Suisun Bay Channel. LTMS identified as highly feasible for levee restoration. DWR also interested in using material for restoration. Concerns re: project funding & salinity impacts. |
| 32) Skaggs Island (Sonoma) | Not currently available/High but site owner opposed to use | 39.9 for habitat creation ⁷ | 5.2 ⁹ | 16 mcy for habitat creation, or 72 mcy for confined disposal ⁷ | LTMS identified as highly feasible for habitat creation, and prepared conceptual plan (5/93). |
| 33) Sonoma Baylands (Sonoma) | Existing | 7.6 (includes 39-acre project costs) ⁸ | 5 | Completed | LTMS identified as highly feasible for habitat restoration. Site capacity reached with Port of Oakland -42' deepening and Petaluma River maintenance project. |
| 34) West Contra Costa Sanitary Landfill (Contra Costa) | Not currently available/High | Not available | Not available | Not available | LTMS identified as highly feasible for confined disposal. Need capping material as part of site closure. Requires an off-loading area. |
| 35) Winter Island (Contra Costa) | Not currently available/High | 1.7 | 15 | 0.1 mcy/year | Currently permitted to take 100K of Suisun Bay federal channel material in 1998. |

Major Dredging Areas

- | | | |
|---------------------------|-----------------------|--------------------------|
| 1 New York Slough | 7 Napa River | 13 Port of San Francisco |
| 2 Suisun Bay Channel | 8 Petaluma River | 14 San Francisco Bar |
| 3 Concord NWS | 9 Pinole Shoal | 15 Oakland Harbor |
| 4 Suisun (Slough) Channel | 10 Richmond Harbor | 16 Redwood City |
| 5 Exxon - Benicia | 11 Chevron - Richmond | 17 San Leandro Marina |
| 6 Mare Island Strait | 12 San Rafael Creek | |



Existing and Potential Disposal Sites

NOTE: Site names identified on Table 2.

