United States General Accounting Office

GAO

Report to Congressional Requesters

November 1989

WATER RESOURCES

Problems in Managing Disposal of Material Dredged From San Francisco Bay

GAO/RCED-90-18

GAO

United States
General Accounting Office
Washington, D.C. 20548

San Francisco Regional Office

Suite 900, State Fund Building
1275 Market Street
San Francisco, CA 94103

B-234429

November 8, 1989

The Honorable Barbara Boxer
The Honorable George Miller
The Honorable Nancy Pelosi
The Honorable Fortney H. Stark
House of Representatives

As requested in your May 23, 1988, letter, this report addresses the designation of new dredged material disposal sites and the management of dredging and disposal at existing sites in the San Francisco Bay Area by the U.S. Army Corps of Engineers and the Environmental Protection Agency.

Unless you publicly release its contents earlier, we will make this report available to other interested parties 30 days after the date of this letter. At that time, we will send copies to the Secretary of the Army; the Administrator, Environmental Protection Agency; the Commandant, U.S. Coast Guard; the Director, Office of Management and Budget; and other interested parties.

Should you have any questions about this report, please contact me at (415) 556-6200. Major contributors to this report are listed in appendix IV.

Thomas P. McCormick

Thomas P. McCormick
Regional Manager

Executive Summary

Purpose

Foreign imports and exports valued at about $15.2 billion moved through San Francisco Bay in 1985. They were carried by ships that, over the last 2 decades, have become larger, requiring deeper channels and ports.

The U.S. Army Corps of Engineers' San Francisco District estimates that during fiscal years 1989-95, about 74.6 million cubic yards of material will need to be dredged from the bay and that most of it will be dumped at ocean or bay disposal sites. The district also estimates that new sites will be needed for 19.4 million cubic yards of the total dredged.

At the request of four Members of Congress from the Bay Area, GAO reviewed Corps and Environmental Protection Agency (EPA) efforts to (1) designate new disposal sites and (2) ensure that environmental damage at existing ocean and bay disposal sites is within acceptable limits.

Background

The Corps and EPA are the principal federal agencies responsible for designating and managing aquatic disposal sites so that the nation's bays and oceans are not significantly harmed. In the Bay Area, sites are designated as follows:

- The Corps' San Francisco District designates bay disposal sites. The EPA Administrator, however, may prohibit or withdraw the use of bay sites whenever disposal will significantly degrade municipal water supplies, or result in significant loss of or damage to fisheries, shell fisheries, wildlife habitat, or recreation areas.
- EPA Region 9 designates ocean disposal sites. If use of an EPA site is not feasible or no site has been designated, the Corps' district may designate a site for a specific project using EPA's criteria. If region 9 concludes that EPA's criteria have not been met, ocean disposal is not allowed unless the district obtains a waiver of the criteria from the EPA Administrator.

The Corps' district manages the disposal of material that it dredges and issues permits for the aquatic disposal of material dredged by others (permitted projects). Region 9 reviews disposal plans for Corps projects and permit applications for other projects.

Results in Brief

Needed disposal sites have not been designated because the Corps' district has not completed required environmental studies. Completion of environmental studies for ocean disposal sites has been delayed because EPA found that the district made questionable assumptions about safety

in deciding not to study potential disposal sites beyond the Continental Shelf. The district is reconsidering which sites should be studied, and the ocean site designation process is now scheduled to be completed by December 1991. Because needed disposal sites have not been designated, the Corps has had to defer two projects scheduled to start in fiscal year 1988, which, according to the Corps, has resulted in delaying an estimated $31.1 million in economic benefits that they were expected to provide.

GAO found problems in testing guidance, the Corps' quality assurance program, inspections, and monitoring efforts, which indicate that the district and region 9 do not have adequate assurance that environmental damage at existing ocean and bay disposal sites is within acceptable levels. The Corps and EPA plan to issue revised testing guidance for ocean disposal by the end of calendar year 1989. In addition, the district is taking steps to improve its quality assurance, inspection, and monitoring programs. A written plan for managing Bay Area dredging and disposal activities is not scheduled to be completed until 1992.

Principal Findings

Evaluation of Ocean Disposal Sites Has Been Delayed

The Marine Protection, Research, and Sanctuaries Act requires, among other things, that ocean disposal sites be located beyond the Continental Shelf, if feasible. Under 1984 joint EPA and Corps guidance, the ocean disposal site designation process starts with defining a geographic area of consideration within an operationally and economically feasible range of dredging sites. If the defined area excludes sites beyond the Continental Shelf, then such sites need not be studied in depth.

In February 1988, the district completed a feasibility study that limited the geographic area for consideration to about 24 nautical miles from the entrance to the bay. This limit excluded sites past the Continental Shelf from further evaluation. The study stated that the 24-nautical-mile limit was imposed primarily to keep operations within Coast Guard radar range to enhance safety by reducing the potential for collisions and other accidents.

Region 9 disagreed with the limit, stating that the district needed to consider whether there are alternatives to Coast Guard radar or ways to extend its range. The district has agreed to reevaluate the geographic

area for consideration, and the district and region 9 estimate that it will be defined by January 1990.

Corps dredging to expand bay channels and harbors will remain at a standstill until the district finds disposal sites with sufficient capacity. The process for designating ocean disposal sites is scheduled for completion by December 1991.

Improvements Needed to Ensure Environmental Safety at Existing Sites

Under EPA regulations, an array of chemical and biological tests may be used to determine whether dredged material can be safely dumped at ocean and bay disposal sites. Biological tests are required, for example, before material can be dumped in the ocean if contamination is suspected. Joint EPA/Corps guidance for conducting the biological tests for ocean disposal was issued in 1977. In September 1988, a joint Corps/EPA study concluded that required tests might not predict toxicity because the guidance did not recommend adequate procedures and appropriate test organisms. In May 1989, the Corps and EPA said revised guidance should be issued by September 1989. EPA now estimates that revised guidance will not be issued until the end of calendar year 1989.

A Corps quality assurance regulation requires Corps inspections every 2 years of laboratories that test sediment for the Corps to ensure that they have the capability to perform required chemical analyses (adequate personnel, equipment, and procedures). However, required inspections were not performed for the three laboratories that tested sediment for the district in 1987 and 1988 because the district misunderstood the regulation. Therefore, the district had little assurance that tests performed for it produced reliable results. The district's Environmental Branch Chief said inspections will be performed in the future.

Corps regulations leave inspections for determining permit compliance to the discretion of the district. The district did not systematically inspect permitted projects—records indicate that the district inspected 2 of the 21 permitted projects that were active in 1988—to ensure that dredging was limited to authorized locations. In addition, the district and Coast Guard performed limited surveillance of disposal operations to ensure that material was dumped within designated site boundaries. As a result, permit violations were not detected until after they occurred, and other violations might have gone undetected. The district plans to increase inspections of permitted projects and improve surveillance of the largest bay disposal site.

The district is developing a program to monitor environmental conditions in the bay to determine if material dumped at bay disposal sites is causing significant harm to the environment. Implementation of the program was scheduled to begin in September 1989. In addition, the district is developing a management plan for Bay Area dredging and disposal operations which will detail inspection, surveillance, and monitoring programs. The plan is to be completed in June 1992.

Recommendations

To prevent future delays in the process for designating ocean disposal sites, GAO recommends that the Secretary of the Army direct the Chief, Corps of Engineers, to take specific steps to ensure that the feasibility of locating ocean disposal sites off the Continental Shelf is adequately considered. (See ch. 2.)

To ensure that disposal in the ocean or bay is limited to safe material, GAO recommends that the EPA Administrator and the Secretary of the Army reach agreement on, and issue revised guidance for, the biological testing needed to predict the toxicity of contaminated dredged material. GAO also recommends other steps to ensure that environmental damage at existing ocean and bay disposal sites is kept within acceptable levels. (See ch. 3.)

Agency Comments and Our Evaluation

The Department of Defense, EPA, and the Department of Transportation provided comments on the report, which were incorporated where appropriate. Defense concurred in GAO's recommendations, but EPA did not comment on them. No recommendations were addressed to the Department of Transportation. The agencies' comments and GAO's evaluation are discussed in chapters 2 and 3 and included in appendixes I through III.

Contents

Tables

Figures

Abbreviations

EPA	Environmental Protection Agency
GAO	General Accounting Office
NOAA	National Oceanic and Atmospheric Administration
OTA	Office of Technology Assessment

Introduction

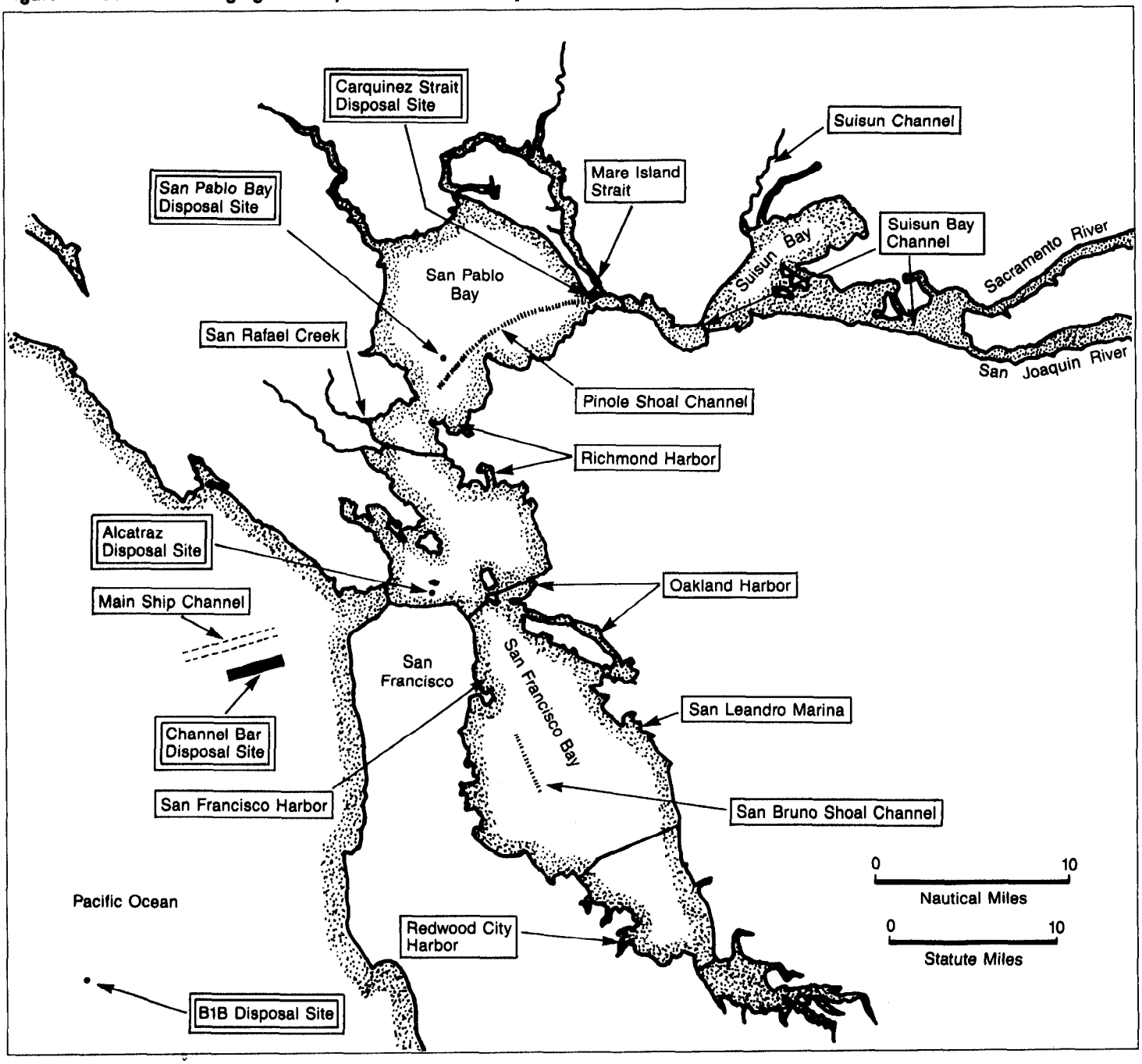
The San Francisco Bay provides extensive economic and recreational benefits to the country and the Bay Area. Among the economic benefits are commercial shipping and fishing. According to a 1985 National Oceanic and Atmospheric Administration (NOAA) assessment, about 5,000 passenger and cargo ships move through San Francisco Bay annually. Foreign imports and exports going through bay ports in 1985 were valued at about $15.2 billion. Most of that, about $11.2 billion, went through the Port of Oakland. The assessment estimated that commercial fish and shellfish landed at 13 Bay Area ports amounted to about $12.5 million in 1985. Most of the fish were landed at the ports of San Francisco, Sausalito, and Oakland.

According to a 1985 National Research Council assessment, the commercial shipping trend over the last 2 decades has been toward larger ships that require deeper channels and ports. At the Port of Oakland, for example, the draft of containerships has increased from 30 feet in the 1960s to 38 feet in the 1980s. The assessment states that the trend toward larger ships is primarily due to their greater efficiency.

Dredging and Disposal in the Bay Area

While some sections of the San Francisco Bay are naturally deep, such as the 360-foot depth at the Golden Gate and the 90-foot depth at the Carquinez Strait, much of the bay is naturally shallow. Thus, dredging is needed to provide access to ports and marinas. In addition, after initial dredging is completed, periodic maintenance dredging is necessary to remove sediment that flows into the bay from rivers or is shifted within the bay by wind, waves, and tidal currents. Selected Bay Area dredging and disposal sites are shown in figure 1.1.

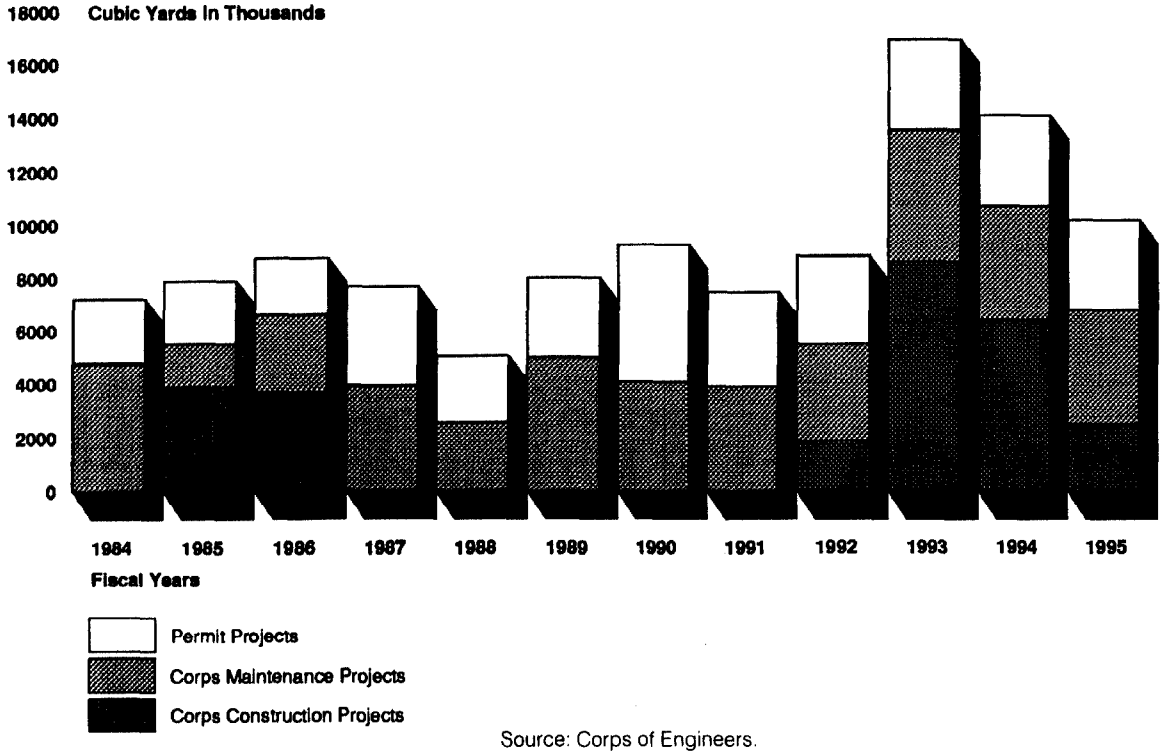
Figure 1.1: Selected Dredging and Disposal Sites in the Bay Area



Source: Corps of Engineers.

The U.S. Army Corps of Engineers' San Francisco District estimates that about 74.6 million cubic yards of sediment will need to be dredged from the bay during fiscal years 1989 through 1995. (See fig. 1.2.) Much of this material will be dredged by the Corps or its contractors as part of Corps construction and maintenance projects. Generally, construction projects increase the width and depth of channels and harbors up to specifications authorized by the Congress. Once construction projects are completed, maintenance projects keep the channels and harbors from filling up. The large increase in dredging requirements starting in fiscal year 1992 is due to the planned start of three Corps construction projects.

Figure 1.2: Actual and Projected Dredging Requirements for Fiscal Years 1984 Through 1995



Source: Corps of Engineers.

According to the Corps' San Francisco District, it spent about $9.6 million to dredge about 3.9 million cubic yards of sediment in fiscal year 1987 and about $6.2 million to dredge about 2.5 million cubic yards of

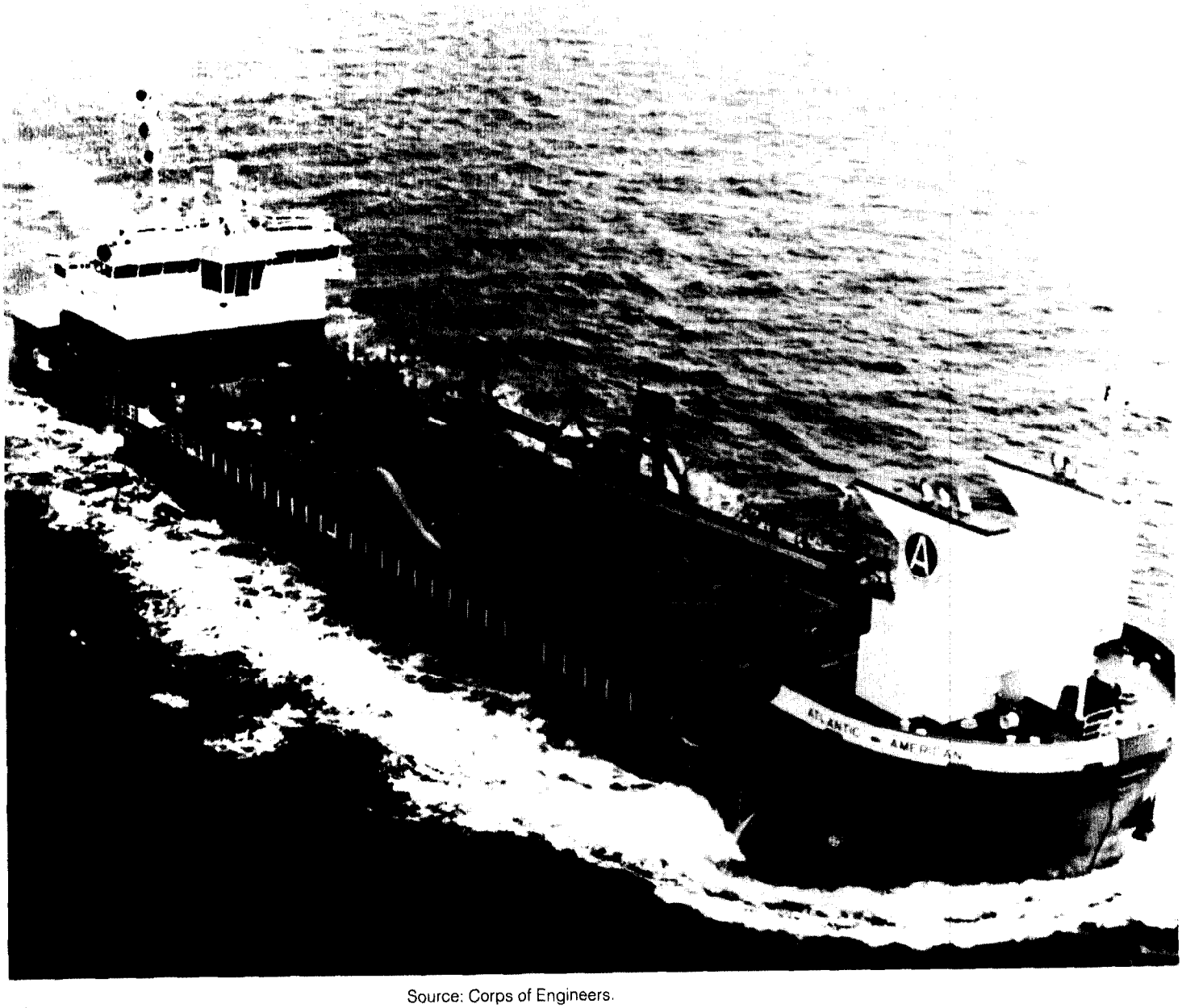
sediment in fiscal year 1988. These costs did not include expenditures for Corps supervision, surveys, and overhead.

Other organizations that dredge in the Bay Area include the U.S. Navy, the U.S. Coast Guard, and marina operators. The Rivers and Harbors Appropriation Act of 1899 (33 U.S.C. 403) requires these organizations to obtain a Corps permit before initiating dredging projects. Such projects are referred to in this report as "permitted projects."

The distribution of dredging activities between Corps and permitted projects may change. According to a Corps headquarters Policy, Review, and Initiatives Division official, the federal budget deficit may require the Corps to suspend maintenance of some projects, and the Corps is developing criteria for selecting those projects. If the Corps suspends maintenance of a project, dredging would have to be done under permit.

Bay Area dredgers primarily use hopper dredges and clamshell dredges. Hopper dredges (see fig. 1.3) use large hydraulic pumps to suck sediment off the channel bottom through drag arms and into a sediment container on the ship. The dredge moves from the dredge site under its own power and dumps the sediment at a disposal site.

Figure 1.3: Hopper Dredge

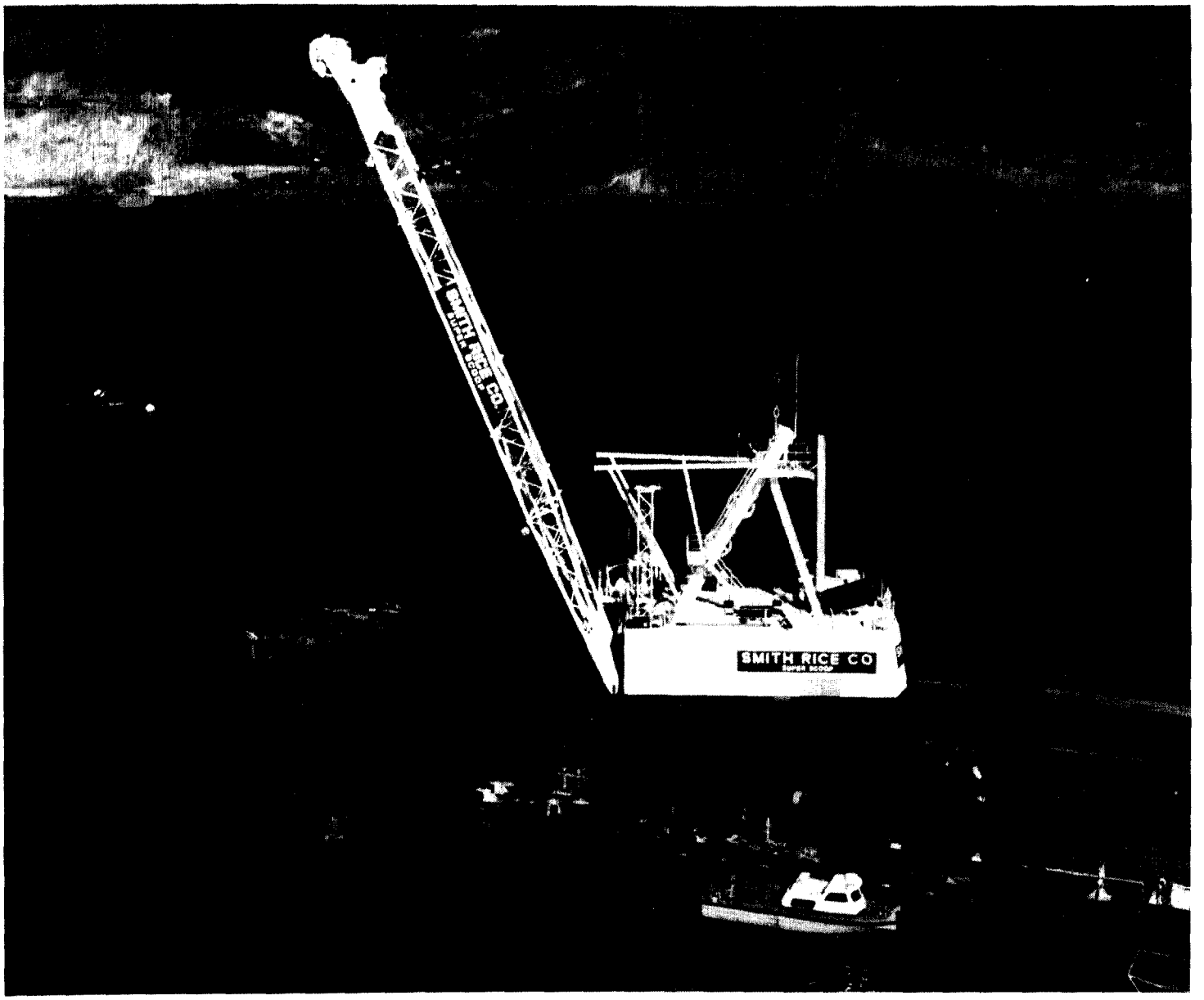


Source: Corps of Engineers.

Clamshell dredges (see fig. 1.4) are mechanical dredges that use a type of bucket attached to a crane to dig sediment off the channel bottom and load it into barges. Tug boats move the barges to disposal sites where

they are unloaded, generally by opening doors in the bottom of the barges.

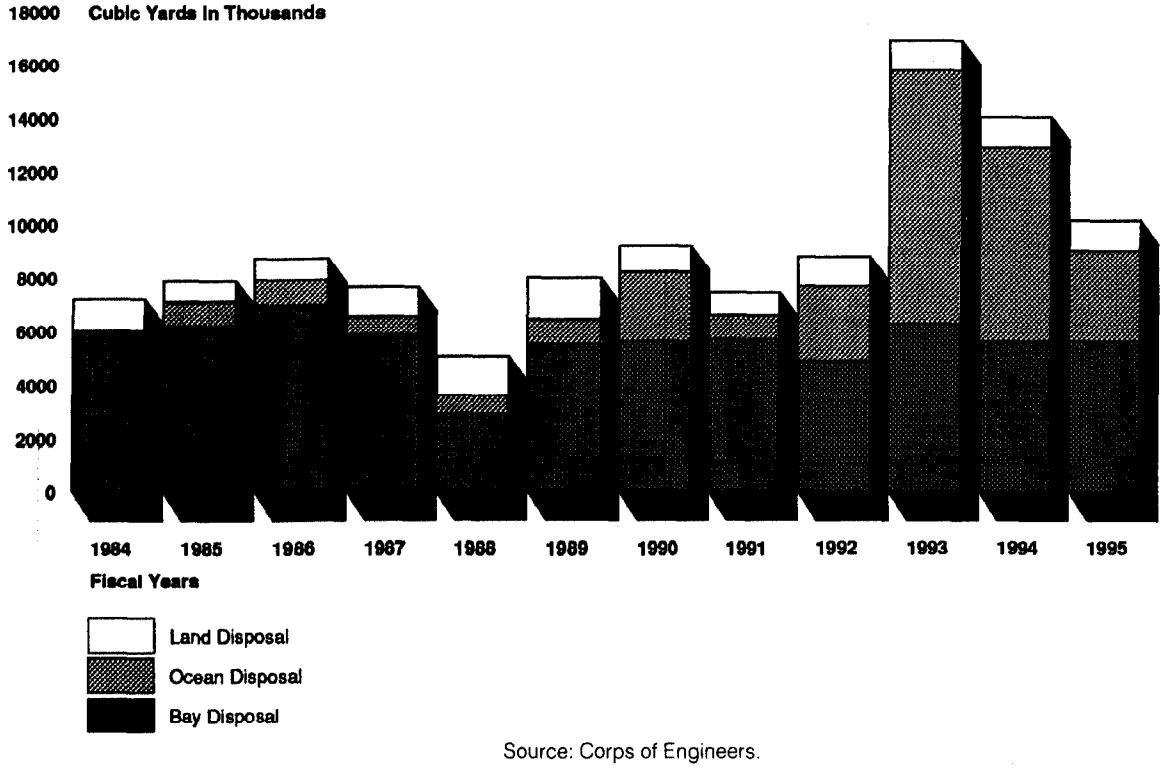
Figure 1.4: Clamshell Dredge



Source: Corps of Engineers.

Figure 1.5 shows that, since 1984, most material dredged from the bay was deposited at bay and ocean disposal sites, with relatively small amounts at land disposal sites. It also shows that the Corps plans to dispose of most of the sediment during fiscal years 1989 through 1995 at bay and ocean disposal sites.

Figure 1.5: Actual and Projected Dredged Material Disposal for Fiscal Years 1984 Through 1995



Source: Corps of Engineers.

Federal and State Responsibilities for Designating and Managing Ocean and Bay Disposal Sites

The Corps, the Environmental Protection Agency (EPA), other federal agencies, and the states are responsible for designating and managing aquatic dredged material disposal sites, including wetland sites. Generally, the Corps and EPA ensure that the environmental effects of aquatic disposal are within acceptable levels.

Effects of Aquatic Disposal

Since 1970, a number of studies have addressed the effects of dredged material disposal on the aquatic environment. Assessments of these studies by the National Research Council in 1985 and the Office of Technology Assessment (OTA) in 1987 indicate that aquatic disposal can have a variety of physical, chemical, and biological effects.

The OTA report stated that levels of suspended solids in the water during disposal are usually low enough to cause few detectable physical effects on organisms that live in the water. The primary physical effect of disposal is to suffocate bottom-dwelling organisms that are covered by more than a foot or so of dredged material. The degree of physical impact is greatly influenced by such factors as the depth of water, frequency of dumping, and volume of material dumped at the disposal site.

While organisms usually begin recolonizing disposal sites within weeks after disposal ceases, sensitive sites such as oyster beds may never fully recover. On the other hand, some sites may be colonized by new organisms and become commercially important fisheries or shell fisheries. The rates and type of recolonization are affected by the nature of the dredged material in comparison with the original sediment.

In addition to the physical impact, dredged material may cause adverse chemical or biological effects if it contains contaminants, such as heavy metals, mercury, or certain chlorinated and polynuclear aromatic hydrocarbons. The OTA report stated, for example, that bottom-dwelling organisms that recolonize contaminated disposal sites may take up and accumulate contaminants. The amount of accumulation may vary, according to the National Research Council report, because the chemical form of some contaminants may prevent their absorption by organisms at the site. In addition, an OTA representative stated that it is difficult to determine (1) how accumulation of contaminants affects bottom-dwelling organisms in terms of end points such as lesions and cancers and (2)

the extent to which accumulated contaminants come from dredged material or from other sources.

The OTA report also stated that no quantitative criteria exists for defining the degree to which dredged material is contaminated, and so it is difficult to estimate exactly how much dredged material is clean, somewhat contaminated, or highly contaminated. The Corps, however, considers a large portion of dredged material to be relatively clean. In addition, the National Research Council report stated that management strategies, such as burial beneath a cap of clean sediment, may permit aquatic disposal of some contaminated material.

Designation and Management of Bay Disposal Sites

The Clean Water Act (33 U.S.C. 1251) was enacted to restore and maintain the physical, chemical, and biological integrity of the nation's waters, such as San Francisco Bay. Organizations responsible for implementing the act in the Bay Area include the Corps' San Francisco District, EPA Region 9, the California State Water Resources Control Board, and the San Francisco Bay Regional Water Quality Control Board.

EPA implementing guidelines and regulations (40 C.F.R. 230.1, 230.2, and 231.2(e)) state that the Corps and EPA should prevent the discharge of dredged material in the waters of the United States unless it can be demonstrated that the discharge will not result in significant degradation of municipal water supplies, or the significant loss of or damage to fisheries, shell fisheries, wildlife habitat, or recreation areas. Factors to be considered in evaluating a particular discharge include (1) practicable alternatives to the proposed discharge with potentially less damaging consequences and (2) the possibility of chemical contamination of the material to be discharged (40 C.F.R. 230.5). These guidelines apply to Corps projects and permitted projects.

The Corps specifies authorized dredging locations and disposal sites in contracts for its construction and maintenance projects and in permits for other projects. However, EPA may prohibit or withdraw the use of disposal sites if it determines, after notice and opportunity for public hearings, that disposal will cause unacceptable harm. In addition, the Corps and EPA are authorized to impose penalties for permit violations.

Under sections 303 and 401 of the Clean Water Act, the states may set water quality standards, subject to EPA review and approval, and ensure that disposal actions meet them. Water quality standards for the bay are

spelled out in the San Francisco Basin Water Quality Control Plan. Standards were set by the State Water Resources Control Board and approved by EPA Region 9 in December 1987. The San Francisco Bay Regional Water Quality Control Board reviews sediment evaluations and dredged material disposal requests to determine whether disposal will violate the standards.

Designation and Management of Ocean Disposal Sites

A purpose of the Marine Protection, Research, and Sanctuaries Act (33 U.S.C. 1401) is to regulate ocean dumping to prevent or strictly limit the ocean dumping of any material that would adversely affect the marine environment. EPA Region 9, the Corps district, and the U.S. Coast Guard each have responsibilities for implementing the act in the Pacific Ocean off the coast of northern California.

Section 102(c) of the act (33 U.S.C. 1412(c)) authorizes EPA to designate ocean disposal sites, and section 102(a) of the act specifies the factors that must be considered in designating such sites, including (1) the effects of dumping on fish, shellfish, wildlife, shorelines, and beaches and the persistence and permanence of these effects and (2) appropriate locations and methods of disposal or recycling, including land-based alternatives and the probable impact of requiring use of such alternate locations or methods upon considerations affecting the public interest. In addition, section 102(a)(I) states that, in designating recommended sites, EPA shall utilize locations beyond the Continental Shelf whenever feasible.

Under section 103(b) of the act (33 U.S.C. 1413(b)), the Corps may designate sites for specific permits or Corps dredging projects if EPA has not designated a site or EPA sites cannot be used. In designating such sites, the district must use EPA's criteria. In addition, EPA ocean dumping regulations (40 C.F.R. 225.2) require EPA regions to review the proposed dumping and inform the district in writing whether or not the sites meet the criteria. No permit may be issued if a region determines that the criteria have not been met. However, the regulations also provide a mechanism for obtaining a waiver from EPA's Administrator, if the district determines that there is no economically feasible alternative to ocean dumping. Under the act, the Administrator must grant the waiver unless it is determined that the proposed dumping will have unacceptable effects on municipal water supplies, shellfish beds, wildlife, fisheries (including spawning and breeding areas), or recreation areas.

May 1984 joint EPA/Corps guidance states that the ocean site designation process should take place in three phases:

- Phase 1 delineates the geographic area for consideration and collects basic information on that area.
- Phase 2 studies the targeted area to identify candidate sites on the basis of environmental and other factors.
- Phase 3 evaluates candidate sites using EPA's criteria, selects a site for designation, processes necessary environmental impact documents, and develops a site management plan.

Generally, the Corps funds the studies necessary for the three phases, except that EPA funds the processing of environmental impact documents. According to the Corps' Civil Works Director, the Corps is reevaluating its funding responsibilities.

To help prevent unacceptable environmental effects, the Corps and EPA evaluate the suitability of sediment for disposal at designated sites. Corps contracts and permits specify dredging locations and may contain provisions necessary to safeguard the environment. According to EPA, site designations may also contain conditions on use of the site, further protecting the marine environment. EPA is authorized to impose penalties for violations of the act, regulations, and permits. The U.S. Coast Guard is responsible for surveillance and other appropriate enforcement activity to prevent unlawful dumping.

Additional Laws Regulating Bay and Ocean Disposal

Other federal laws govern disposal operations in the Bay Area:

- Under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 and 4332), an environmental impact statement is required for major federal actions that significantly affect the quality of the environment. According to EPA, while generally not bound by the act, it has a voluntary policy of preparing environmental impact statements for ocean disposal site designations. EPA includes other federal, state, and local agencies in the development of site designation environmental impact statements.
- Under the Coastal Zone Management Act of 1972 (16 U.S.C. 1451, 1456(c)(1)), the federal government is required to comply with state coastal zone management plans to the maximum extent practicable, if disposal directly affects coastal waters. In the Bay Area, the state entities responsible for coastal zone management are the San Francisco Bay

Conservation and Development Commission and the California Coastal Commission.

- Under the Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. 662), site designations must be coordinated with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the state agency administering fish and wildlife resources. In the Bay Area, the state agency is the California Department of Fish and Game.

EPA stated that other federal statutes that are routinely addressed are the Endangered Species Act, the Historic Preservation Act, and the Migratory Bird Treaty Act.

Objectives, Scope, and Methodology

By letter dated May 23, 1988, Representatives Barbara Boxer, George Miller, Nancy Pelosi, and Fortney H. Stark expressed concerns about whether Bay Area dredging and disposal activities comply with the Clean Water Act and the Marine Protection, Research, and Sanctuaries Act. In discussions with their offices, we agreed to focus on the Corps' and EPA's efforts to (1) designate new disposal sites and (2) ensure that environmental damage to existing ocean and bay sites is within acceptable levels.

To assess the designation of disposal sites (see ch. 2), we

- examined the process by which potential disposal sites are identified, studied, and designated;
- reviewed Corps and EPA efforts to coordinate site designation with federal and state resource agencies and the private sector;
- reviewed the progress of efforts to designate ocean, bay, and land disposal sites; and
- obtained the Corps' estimates of the cost of disposal at alternative sites.

To assess the management of existing ocean and bay disposal sites (see ch. 3), we reviewed the Corps' and EPA's efforts to

- ensure that dredged material is suitable for disposal at the selected site,
- ensure that dredging and disposal are restricted to authorized locations and monitor the effects at these locations,
- identify any unacceptable environmental effects of disposal, and
- establish standards and procedures for measuring these effects.

As the requesters of this report suggested, we contacted the Aquatic Habitat Institute, which was also studying dredging in San Francisco

Bay. Institute representatives told us that their study would discuss scientific and technical uncertainties about the environmental effects of disposal in the bay and the Sacramento-San Joaquin Delta and describe the studies underway to resolve these uncertainties. As requested, we did not include these areas in our review.

From July 1988 to May 1989, we reviewed the designation and management of dredged material disposal sites in the Bay Area. In conducting the review, we held discussions with and examined records of

- the Corps' headquarters in Washington, D.C.; the Waterways Experiment Station in Mississippi; the South Pacific Division and the San Francisco District in San Francisco; the New England Division in Massachusetts; and the Walla Walla District in the state of Washington;
- EPA's headquarters in Washington, D.C., and region 9 in San Francisco;
- the Navy, Coast Guard, National Marine Fisheries Service, Fish and Wildlife Service, and U.S. Geological Survey;
- state agencies, including the San Francisco Bay Regional Water Quality Control Board, the San Francisco Bay Conservation and Development Commission, and the California Department of Fish and Game; and
- environmentalist groups, dredge and tug boat companies, and sediment-testing laboratories.

We did not verify the Corps' information on the amount of material dredged from the bay because it would have been too time-consuming. In addition, we did not validate Corps estimates of the disposal costs for new ocean or land disposal sites. However, we discussed the district's ocean disposal cost-estimating model with estimators at Corps headquarters and the Walla Walla District and with representatives of dredge and tug boat companies in the Bay Area.

To verify the frequency and extent of district inspections, we reviewed files for all projects identified by the district as dredged in 1988 under Corps permits. We also reviewed the files to determine the number and status of permit violations.

We reviewed the San Francisco District's fiscal year 1988 annual assurance statement on internal controls. According to the statement, no material weaknesses were identified.

Our work was performed in accordance with generally accepted government auditing standards. The Department of Defense, EPA, and Department of Transportation provided written comments on this report.

These comments are incorporated where appropriate, are presented and evaluated in chapters 2 and 3, and are included in appendixes I through III.

Slow Progress Made Toward Designating Additional Disposal Sites

While sediment dredged during maintenance continues to be dumped at existing Bay Area disposal sites, the district estimates that new disposal sites will be needed for 19.4 million cubic yards of material to be dredged for three Corps construction dredging projects. The lack of sites for 8.4 million cubic yards of material has delayed two of the projects. The Corps estimates that these two projects could annually provide $31.1 million in benefits to the national economy.

The Corps' San Francisco District's efforts to evaluate and designate additional disposal sites began in fiscal year 1985. Four years later, progress has been minimal:

- An ocean disposal site has been designated, but only for 500,000 cubic yards of sediment. The designation process for ocean sites with greater capacity has been delayed because EPA found that the district made questionable assumptions about safety in deciding not to evaluate sites beyond the Continental Shelf. In addition, we found problems with the district's cost estimates for alternative ocean disposal sites. The district is reconsidering which sites should be evaluated and estimates that the process for designating ocean sites will be completed by December 1991.
- The evaluation of bay and land disposal sites is continuing. The district Disposal Management Program Chief estimates that the designation process will be completed by February 1991.

Lack of Disposal Capacity Has Delayed Construction Projects

Over the last 2 years, disposal in the bay has generally been limited to material dredged during maintenance. District studies indicate, however, that bay sites cannot accommodate planned construction and two Corps construction projects scheduled to start in fiscal year 1988 have been delayed until acceptable disposal sites for the 8.4 million cubic yards of material to be dredged are located. The district had planned to dispose of the dredged sediment from these construction projects in the bay near Alcatraz Island. District studies indicated, however, that the Alcatraz disposal site did not have sufficient capacity for the material, and additional disposal sites were needed.

Table 2.1 lists the two delayed projects, as well as a third project now scheduled to start in fiscal year 1992, and the Corps' January 1989 estimate of average annual benefits to be derived from the projects. Generally, the estimated benefits represent reduced transportation costs associated with using larger vessels.

Table 2.1: Dredging Requirement and Scheduled Start of Corps Construction Projects Currently Authorized for the Bay Area

In millions

Project	Estimated annual benefit	Dredging requirement in cubic yards	Fiscal year of scheduled start	
			Original	Current
Oakland Harbor	$26.8	7.0	1988	1992
Richmond Harbor	4.3	1.4	1988	1992
J.F. Baldwin Channel	34.7	11.0	1992	1992
Total	**$65.8**	**19.4**		

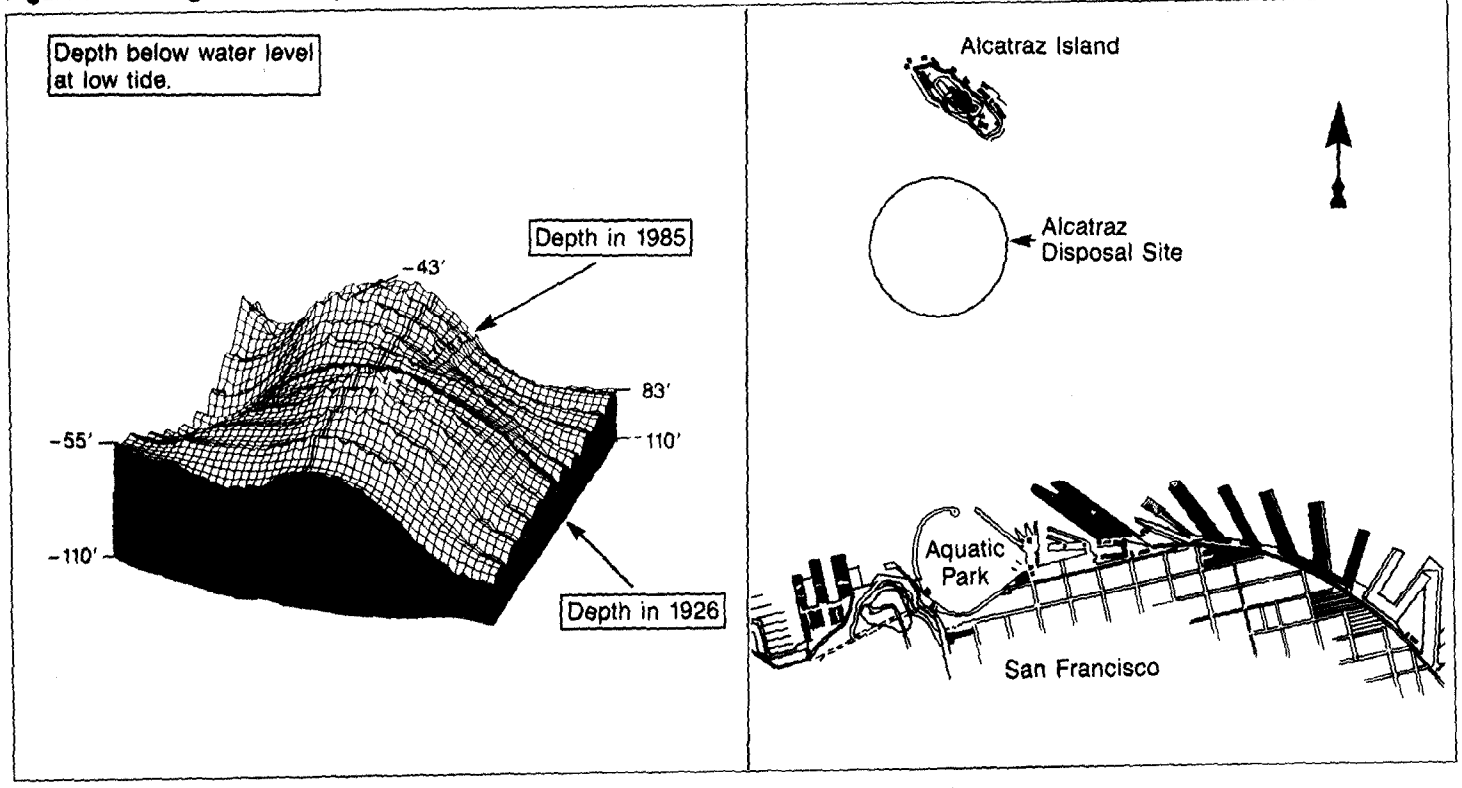
Source: Corps of Engineers.

Since the late 1970s, most material dredged from the bay has been redeposited in the bay near Alcatraz Island. The district believed Alcatraz to be an ideal disposal site because dredged material deposited there would disperse into the ocean or to other locations in the bay, and not accumulate at the site.

The district originally planned to dispose of the 19.4 million cubic yards at Alcatraz. In November 1982, however, the Coast Guard and ship pilots informed the district that there appeared to be a mound within the Alcatraz disposal area. The district's investigations showed that (1) dredged material had accumulated at the site and (2) the site's future capacity would depend on several variables, including the rate of disposal, the type of material dumped, and the velocity of the current during and following disposal. Figure 2.1 shows the depth of the mound in 1926 and in 1985.[1]

[1]The top of the mound was about 25 feet below the surface of the bay in 1982, but it has been leveled off several times by the district.

Figure 2.1: Changes in the Depth of the Alcatraz Disposal Site Between 1926 and 1985



Source: Corps of Engineers and U.S. Geological Survey.

Concluding that Alcatraz no longer represents a bottomless disposal site, the district looked at other existing disposal sites and determined that none of these sites could accommodate the material from planned construction projects. For example, the district could not use the only ocean disposal site that existed at that time because EPA generally restricts disposal at the site to sediment dredged from the main ship channel outside of the Golden Gate. As a result, in fiscal year 1985, the district initiated a Disposal Management Program to, among other things, designate additional ocean, bay, and/or land disposal sites.

Completion of Designation Process for Ocean Disposal Sites Has Been Delayed

In May 1988, Corps district efforts to designate a new ocean disposal site resulted in the designation of a site for 500,000 cubic yards of material to be dredged during the Oakland Harbor construction dredging project. The district and EPA Region 9 estimate that the designation process for ocean disposal sites with greater capacity will not be completed until December 1991. This includes the time necessary for the district to redefine the zone of siting feasibility.

According to 1984 joint EPA/Corps guidance, the first step in the designation process is to consider a number of factors, such as safety and transportation costs, and delineate the geographic area for consideration—termed the zone of siting feasibility. The objective in establishing the zone is to ensure that sites are within an operationally and economically feasible range of dredging locations. If the zone excludes sites beyond the Continental Shelf, then disposal beyond the Continental Shelf is considered infeasible.

The district completed a feasibility study in February 1988 and established a zone that excluded sites beyond the Continental Shelf. Because of objections raised by region 9, the district has agreed to reevaluate the zone. Our review of the February 1988 study shows that in reevaluating the zone, the district needs to reconsider (1) the need for Coast Guard radar coverage of disposal sites and alternative safety measures and (2) the factors that form the basis for cost estimates.

Designation of an Ocean Site for 500,000 Cubic Yards of Material

In March 1988, the district published a final supplement to the environmental impact statement for the Oakland Harbor Project, in which it concluded that the 7 million cubic yards of material to be dredged from the harbor should be dumped in the ocean at a new site termed "B1." The project was to be implemented in two phases. Contaminated material would be dumped at the site during phase one, and uncontaminated material would be dumped at the site during phase two to cover the contaminated material.

Region 9 informed the district that its review of the final supplement identified two areas that needed additional analysis: (1) the technical feasibility of containing contaminated material by covering it with uncontaminated material and (2) the assessment of a disposal site off the Continental Shelf.

In May 1988, the Corps' South Pacific Division designated a disposal site near B1, termed "B1B," for material to be dredged from the Oakland

Harbor. The division responded to region 9's concerns about the final supplement by limiting disposal at the site to 500,000 cubic yards of material that has been tested and found to be environmentally acceptable. Contaminated material would be disposed of on land rather than in the ocean. Region 9 approved the B1B site because it would be used for a relatively small amount of uncontaminated material.

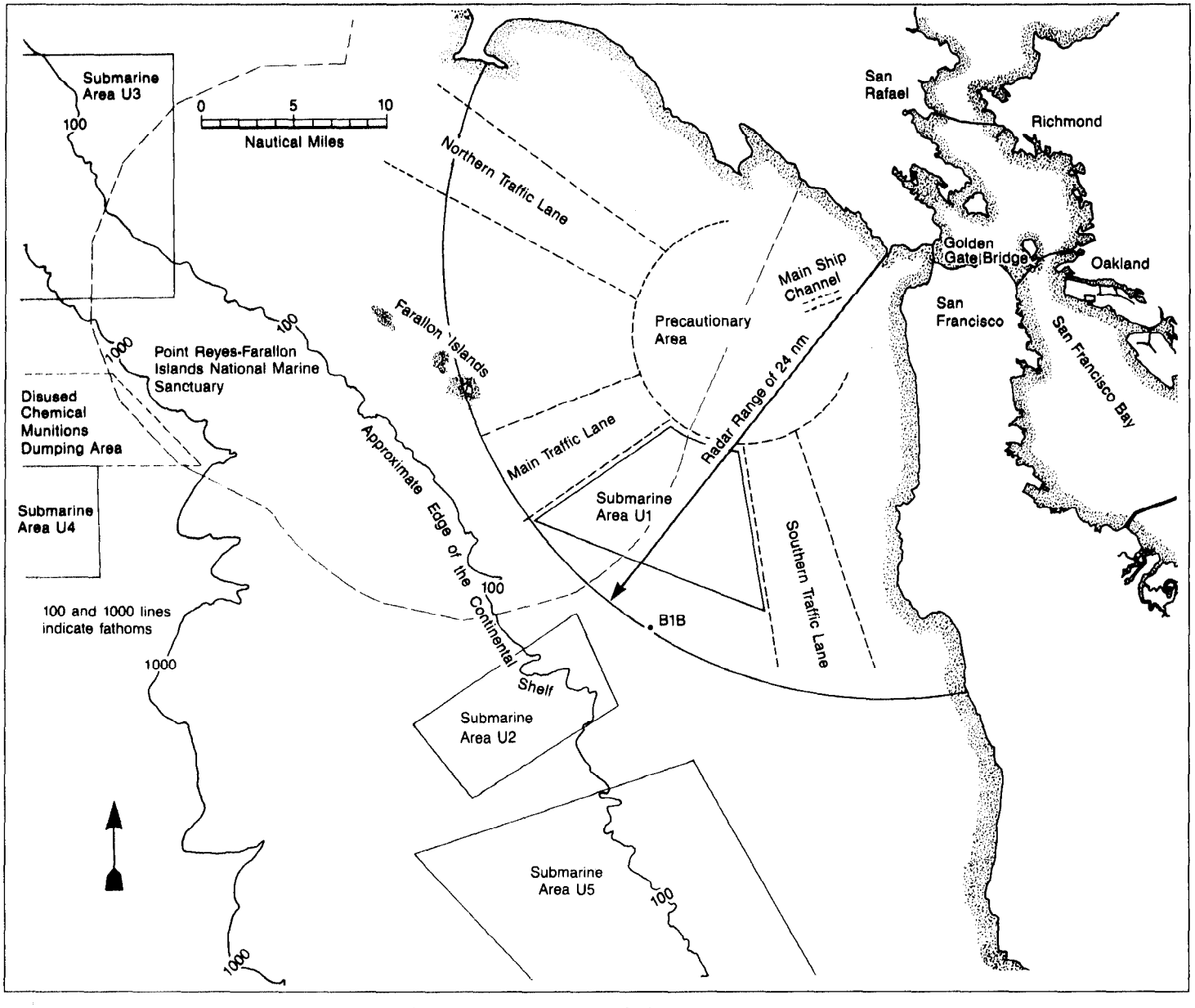
The Port of Oakland received a permit from the district and subsequently dumped about 20,000 cubic yards of dredged material at the B1B disposal site, before a state court halted disposal at the site. The issue in state court is whether the California Coastal Commission must review the port's project to ensure that it is consistent with California's coastal management program.

Safety Issues

The district appended its feasibility study to the final supplement to the Oakland Harbor project's environmental impact statement. The feasibility study states that the zone of siting feasibility was limited to the maximum range of the Coast Guard radar—about 24 nautical miles—primarily to enhance navigational safety and reduce the potential for collisions. Figure 2.2 shows that this range excludes potential sites beyond the Continental Shelf.

EPA's ocean-dumping regulations do not define the Continental Shelf. NOAA officials informed us that west of the Golden Gate the Continental Shelf ends where the Pacific Ocean is roughly 100 fathoms (600 feet) deep. The director of EPA's Marine Operations Division suggested that we use NOAA's definition.

Figure 2.2: Approximate Range of Coast Guard Radar



Source: Corps district and NOAA.

In its December 7, 1987, comments on the district's draft environmental impact statement supplement, region 9 stated that:

"EPA acknowledges that safety of marine transportation . . . is an essential consideration . . . . The [final supplement] should discuss whether other methods of navigational surveillance . . . are available and acceptable to the U.S. Coast Guard . . . . The [supplement] should also discuss ways the radar net can be improved to allow tracking of vessels farther out to sea."

The district's final supplement did not provide the requested information.

Tug boat company representatives and Coast Guard officials did not agree that Coast Guard radar range should be the primary factor in determining where to place a disposal site. Tug boat operators told us, for example, that they rely primarily on their own radar systems for safety. The Commander of the Coast Guard's Vessel Traffic Service said that coverage by Coast Guard radar may have a more significant impact on safety at disposal sites closer to the Golden Gate, where vessel traffic is heavier, than on sites farther from the Golden Gate, where vessel traffic is not as heavy.

Coast Guard officials also said that weather conditions frequently limit the range of the radar system, which is primarily intended to monitor vessels within the precautionary zone near the Golden Gate. Officials estimated that radar coverage extends to the 24-nautical-mile limit, where the district designated the B1B disposal site, only about 50 percent of the time.

Considering region 9's request for additional information, and our discussions with tug boat company representatives and Coast Guard officials, we believe a more thorough analysis of safety issues is warranted before deciding the feasibility of disposal beyond the Continental Shelf. In September 1989, EPA stated that the issue of the need to avoid submarine-operating areas should also be included in the revised analysis.

Disposal Cost Issues

The February 1988 feasibility study included cost estimates for transporting dredged material to the ocean. The district used a computer model it had developed to generate the estimates. We found that the model had not been reviewed and approved for use by the South Pacific Division or Corps headquarters and had a mathematical error in the formula used to compute the average amount of material that can be dredged per hour. In addition, our discussions with Corps cost estimators and representatives of dredging and tug boat companies led us to question several factors that tend to increase the estimates.

- The district assumed that dredgers would own the tug boats that move barges to and from ocean disposal sites. We examined a January 1989 version of the model that the district modified to update labor rates and correct the dredging rate formula, and found that estimates included about $600 per hour for 4,300-horsepower tugs and about $800 per hour for 5,700-horsepower tugs. However, Bay Area dredgers told us they would lease tug boats. A Corps cost estimator and representatives of dredging and tug boat companies estimated that tugs of these sizes could be leased for $250 to $350 per hour.
- To calculate average monthly ownership costs, the district estimated that dredge and other equipment would be used 6 months per year. Yet the Corps' 1987 construction equipment schedule requires that 8 months be used to estimate dredging costs in the Bay Area.
- The district estimated that tug boats would average 5 nautical miles per hour in the bay and 4 nautical miles per hour in the ocean when moving barges to and from disposal sites. Representatives of dredging and tug boat companies estimated that they would average 6 nautical miles per hour in the bay and ocean.

In September 1989, EPA noted that it had requested, but was not permitted, to review the model. District officials said that the estimates published in 1988 were discussed with dredging company representatives in 1987, who raised no objections. However, the district plans to review the estimates before completing the next zone of siting feasibility study.

Schedule for Completing Site Designation Process

The Corps' district has agreed to reconsider the zone of siting feasibility, and as shown in table 2.2, estimates that the zone will be defined by January 1990, about 7 months from the start of ocean studies. The district is coordinating the selection of a new zone with EPA Region 9, state agencies, and other organizations. Coordination included a public scoping meeting on April 11, 1989. The site designation process is scheduled for completion by December 1991.

Table 2.2: Tentative Schedule for Completing the Ocean Disposal Site Evaluation and Designation Process

Phase	Date
Complete scoping meetings	Apr. 1989
Initiate ocean studies	June 1989
Define the zone of siting feasibility	Jan. 1990
Submit draft environmental impact study to Corps headquarters	Mar. 1991
Submit final environmental impact study to Corps headquarters	Nov. 1991
EPA designation of an ocean disposal site	Dec. 1991

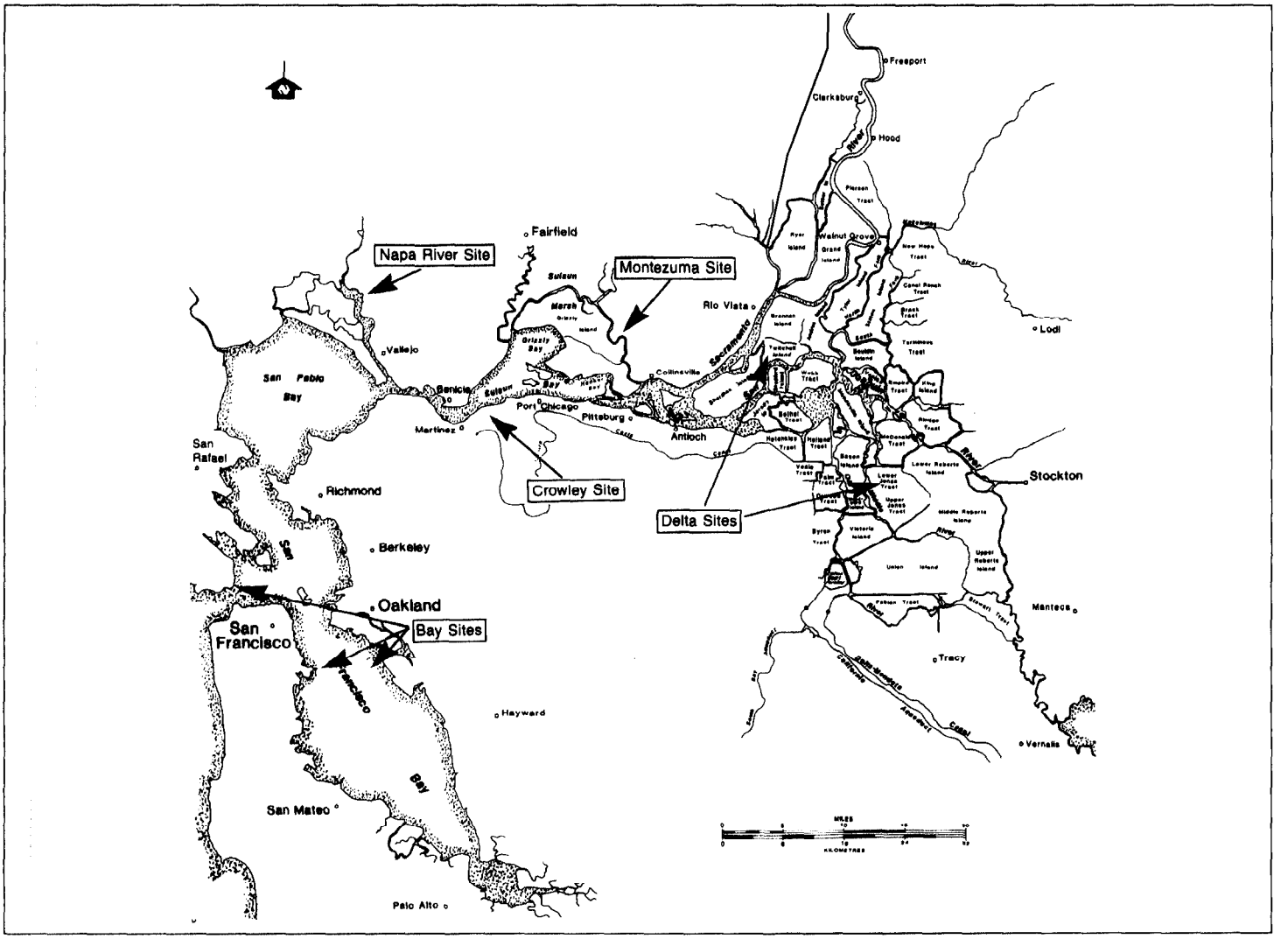
Source: Corps district and EPA Region 9.

In its September 1989 comments on our draft report, the Department of Defense noted that this schedule is proposed. In addition, the district is being directed to initiate discussions with the state of California or its regional designee in light of a recent determination that the major project beneficiary must become a major proponent of the project and appropriately cost-share in the study.

Process for Designating Bay and Land Disposal Sites Scheduled for Completion in February 1991

Recent district studies have concluded that bay and land disposal of some dredged material might be feasible at several sites. (See fig. 2.3.) A major unresolved issue for bay disposal sites is the potential environmental impact on fisheries of dumping dredged material in the bay. Major unresolved issues for land disposal sites are cost and potential environmental impact.

Figure 2.3: Approximate Location of Selected Potential Bay and Land Disposal Sites



Source: Corps district, Port of Oakland, and California Department of Water Resources.

A January 1989 draft study by a district contractor identified several candidate bay disposal sites. The draft does not recommend any one site and states that a major unresolved issue is the potential impact on fisheries of dumping in the bay. The draft study estimated that the cost of using candidate disposal sites would range from $0.60 to $2.06 per cubic yard for material dredged from Oakland Harbor and from $1.73 to $2.77 per cubic yard for material dredged from Richmond Harbor. The draft does not state whether the estimates include the cost of moving the dredge and equipment to dredging sites.

In 1987 a district contractor identified several potential land disposal sites in the Bay Area and recommended a more detailed study of them. Another district contractor completed the detailed study in November 1988. The study report states that the three most feasible sites are Crowley, Napa, and Montezuma. The district is evaluating whether use of these sites is feasible, and if so, what type and quantity of material can be disposed of there. Table 2.3 provides the contractor's cost estimate for disposal at the three sites. Estimates include the cost of moving equipment to dredging sites, buying and preparing land for disposal sites, and mitigating wetland impacts.

Table 2.3: Estimated Cost of Using Potential Bay Area Land Disposal Sites

(Cost per cubic yard)

	Dredge site	
Disposal site	**Oakland Inner Harbor maintenance project**	**Richmond Harbor maintenance project**
Crowley	$10.74 - $11.44	$9.64 - $10.34
Napa	7.66 - 8.64	6.66 - 7.64
Montezuma	7.48 - 9.62	7.38 - 9.52

Source: Corps of Engineers.

In August 1988, the Port of Oakland reported that it planned to use Oakland Harbor sediment to strengthen the levees that surround Twitchell Island and Lower Jones Tract in the Sacramento-San Joaquin Delta. The port issued a draft supplemental environmental impact report in February 1989, and the Central Valley Regional Water Quality Control Board held a public hearing on the project in June 1989.

In addition, the district is initiating a study of the feasibility of placing sediment dredged from the bay in the delta. Major unresolved issues include (1) the cost of transporting dredged material to delta islands and (2) the environmental impact of placing saline dredged material at a land site located near fresh water.

A district official said the district plans to publish environmental impact statements for bay and land disposal sites by February 1991.

Conclusions

Material dredged from the bay for maintenance projects is still being dumped at existing disposal sites. The Corps' district has concluded, however, that these sites do not have sufficient capacity for the 19.4 million cubic yards of material to be dredged during three Corps construction projects. The Disposal Management Program, which was started in fiscal year 1985, has not yet solved the problem of needed additional disposal capacity. As a result, two construction projects that annually could provide millions of dollars in economic benefits have been delayed.

Studies to evaluate and compare the cost and environmental impact of using alternative dredged material disposal sites are underway. As of July 1989, the district was over 1-1/2 years away from completing the process for bay and land disposal sites and 2-1/2 years away from completing the process for ocean disposal sites.

Completion of the ocean disposal site designation process has been delayed by the need to restudy the zone of siting feasibility. The original feasibility study did not address (1) alternatives to Coast Guard radar for ensuring the safety of ocean disposal operations, (2) ways that the Coast Guard's radar range could be increased to cover sites off the Continental Shelf, and (3) mechanisms to compensate for the limitations of Coast Guard radar. In addition, the study contained cost estimates that were generated by a model that contained a mathematical error and several questionable factors.

Recommendations

To prevent future delays in the process for designating ocean disposal sites, we recommend that the Secretary of the Army direct the Chief, Corps of Engineers, to (1) evaluate alternative mechanisms for ensuring the safety of disposal operations on and off the Continental Shelf and (2) review and validate the model used as the basis for cost estimates.

Agency Comments and Our Evaluation

The Department of Defense generally concurred in our findings and recommendations. Defense stated that it has taken actions to ensure the safety of disposal operations, including (1) considering conflicting or incompatible uses during site designation as well as general regional availability, cost, and reliability of positioning systems in defining the

zone of siting feasibility, (2) publishing Notices To Mariners and notices to NOAA for navigation chart revisions on the coordinates and depth of each established disposal site, and (3) requiring Coast Guard certification of seaworthiness and navigation safety equipment and capabilities of dredging and disposal equipment. While these actions may help ensure the safety of disposal operations, they do not completely respond to the recommendation that the Corps evaluate alternative safety mechanisms in establishing the feasibility of disposal off the Continental Shelf. To implement our recommendation, the Corps needs to include such an evaluation in its planned zone of siting feasibility study.

Defense also stated that the Corps' San Francisco District has begun to review the model used for cost estimates. It said that the validation of the model will occur when the number of alternative disposal sites is reduced to a manageable number and the final analysis is undertaken, which is tentatively scheduled for completion in the third quarter of fiscal year 1990.

Since our recommendations were not directed to them, EPA and the Department of Transportation did not comment on them. EPA and the Department of Transportation did, however, provide comments on our findings, and we incorporated their comments where appropriate. The detailed comments of the three agencies and our responses are included in appendixes I through III.

Improvements Needed to Ensure That Environmental Damage at Existing Ocean and Bay Sites Is Within Acceptable Levels

According to the Corps' district, in fiscal years 1987 and 1988, about 10.1 million cubic yards of dredged material was dumped in the ocean and bay. The Corps' district and EPA Region 9 do not have adequate assurance that all of this material was dumped within designated ocean and bay disposal site boundaries and that environmental damage at these sites was within acceptable limits. Specifically, we found the following problems:

- Required sediment tests might not have predicted the toxicity of contaminated dredged material because guidance did not provide adequate procedures and appropriate test organisms.
- The reliability of sediment test results in 1987 and 1988 was questionable because the district did not ensure that sediment-testing laboratories have the required chemical and biological testing capabilities.
- Some permit violations involving the dredging of potentially contaminated material and disposal outside of disposal site boundaries were detected after they occurred, and other violations might have gone undetected, because district inspections and surveillance were limited.
- Information needed to assess the environmental impact of dredged material that has been dumped at disposal sites is not available because monitoring programs have not been developed and implemented.

The Corps and EPA plan to issue revised sediment-testing guidance during 1989. Additionally, district officials said that efforts are underway to improve quality assurance, inspection, surveillance, and monitoring programs. The district's Disposal Management Program Chief told us that the district is developing a comprehensive management plan that will address each of the above programs. The official said, however, that specifics of the plan were not available and the plan will not be completed until June 1992.

Revised Sediment Test Guidance Is Needed

Under EPA regulations, sediment tests generally are required before dredged material is dumped at ocean or bay disposal sites. The district and region 9 lack assurance that biological tests accurately predicted the toxicity of dredged material, however, because guidance did not provide adequate procedures and appropriate test organisms.

An array of chemical and biological tests are used to determine whether dredged material can be safely dumped at ocean and bay disposal sites. Chemical tests measure contaminant levels in the sediment. Biological tests measure the number of organisms that die during exposure to the sediment (bioassay tests) and the extent to which contaminants are

taken up by organisms that survive exposure to the sediment (bioaccumulation tests). The Corps and EPA assess the lethal and sublethal toxicity of the material and the potential for significant adverse effects by comparing test results for sediment from the dredge site with results for sediment from a reference site.

Sediment Testing for Ocean Disposal

EPA ocean-dumping regulations (40 C.F.R. 227.6 and 227.13) require that sediment suspected of contamination be subject to biological tests to determine the potential for significant undesirable effects. Joint EPA/Corps guidance identifying the procedures and organisms to be used during the tests was issued in 1977.[1] This guidance was used as the basis for evaluating Oakland Harbor sediment for disposal at the B1B ocean disposal site.

According to an analysis of the 1977 guidance by an EPA official and a contractor, presented in 1984, operational experience with the guidance led to identification of several issues and limitations. For example:

- Toxicity methods are limited to measuring mortality over short exposure periods, and the species selected for these tests are often insensitive. If mortality is to be a useful end point for regulating sediment disposal, only the most sensitive species should be used.
- There is no strategy or rationale for interpreting bioaccumulation information. The link between bioaccumulation information and biological effects remains undefined.

Because of limitations in the 1977 guidance, the Corps and EPA began a study of it in 1982. Although the study was performed on sediment in Black Rock Harbor, Connecticut, and disposal in Long Island Sound, it was intended to apply to dredging and disposal operations in general. According to the September 1988 final report:[2]

"... the implementation manual [1977 guidance] currently used for evaluating dredged material impacts is in need of revision. When the methods recommended in this manual were applied to BRH [Black Rock Harbor] dredged material, no toxicity

[1]Ecological Evaluation of Proposed Discharge of Dredged Material into Ocean Waters: Implementation Manual for Section 103 of Public Law 92-532 (Marine Protection, Research, and Sanctuaries Act of 1972), EPA/Corps Technical Committee on Criteria for Dredged and Fill Material (Waterways Experiment Station, 1977).

[2]J.H. Gentile, et al., Synthesis of Research Results: Applicability and Field Verification of Predictive Methodologies for Aquatic Dredged Material Disposal, Technical Report D-88-5 (Waterways Experiment Station, 1988).

was detected. This contradicts the results reported in this program. Consequently, additional species and biological test methods need to be incorporated into revisions of the manual. These toxicity tests may be of longer duration and more sophisticated than those currently recommended."

In its September 1989 comments on our draft report, EPA stated that it did not believe that the 1977 guidance was ineffective. EPA agreed, however, that the guidance (1) may not be the most sensitive predictor of toxicity, (2) no longer reflects state-of-the-art procedures and tests, and (3) needs to be revised.

EPA, in consultation with the Corps, is revising the guidance covering sediment tests for ocean disposal. In May 1989, Corps and EPA officials said they have not reached final agreement on which biological tests should be performed, when they should be performed, or how the results should be evaluated. Officials estimated, however, that revised ocean disposal guidance would be issued by September 1989.

In September 1989, EPA stated that progress has been made on testing and evaluation procedures, and the Department of Defense stated that the Corps and EPA are in close agreement on sediment-testing procedures. EPA and Defense stated that revised guidance is scheduled to be issued by the end of calendar year 1989. Defense also stated that test species and data interpretations will need to be developed on a region-by-region basis.

Sediment Testing for Bay Disposal

Under EPA regulations (40 C.F.R. 230.60 and 230.61), chemical and biological tests also may be used to evaluate sediment for bay disposal. According to guidelines included by reference in Corps regulations (33 C.F.R. 336.1(b)(8)(ii)), bioassay/bioaccumulation tests should be performed if contaminant concentrations in dredging site sediment are greater than concentrations in disposal site sediment. A Corps Waterways Experiment Station interpretation of these regulations states, however, that biological testing may be warranted if (1) substantially greater concentrations of contaminants are observed at the dredge site than are found at the disposal site and (2) these contaminants are likely to be absorbed by organisms at the site. EPA officials said that the Corps' interpretation could lead to a gradual increase in contamination at bay disposal sites, since less than "substantial" increments in contamination are permitted.

District and region 9 officials said EPA and Corps headquarters have not issued joint guidance on how to perform biological tests for disposal in the waters of the United States, such as the bay. Corps and EPA headquarters officials said they plan to adopt guidance, similar to the revised ocean disposal guidance, for aquatic systems such as the bay that are covered by the Clean Water Act. In its comments on this report, EPA stated that the Corps and EPA are developing guidance for managing dredged material, which will provide a decision-making framework for determining an environmentally acceptable disposal option. EPA expects that such guidance will prevent dredged material disposal concerns such as those currently experienced in the Bay Area.

Improved Quality Assurance Program Is Needed

A 1986 Corps engineering regulation requires the district to implement a quality assurance program for sediment tests performed by Corps contract laboratories. The program entails Corps inspections of the laboratories to determine whether they have the capability to perform required chemical analyses (adequate equipment, personnel, and quality control procedures). Laboratories are to be inspected before contract award and every 2 years thereafter. The Corps' program does not cover biological testing.

The district had not implemented the quality assurance program and, as a result, the district could not rely on chemical test results. The district's Environmental Branch Chief informed us that he had not been aware that the regulation applied to the district's sediment-testing program but said that inspections would be performed in the future. In addition, the district has not instituted a program to ensure that permittees use qualified laboratories.

Corps Quality Assurance Program Is Not Comprehensive

EPA regulations require biological tests in some cases and recommend them in others. However, Corps laboratory inspections assess the personnel, equipment, and procedures involved in chemical tests, but not those involved in biological tests. A Corps Dredging Division official said that inspections focus on chemical tests instead of biological tests because regulators tend to rely more heavily on chemical tests results, and chemical tests require more sensitive and precise equipment. However, EPA and Waterways Experiment Station officials said that biological test results are critical to evaluating sediment and that revised testing procedures may require more complex biological tests as the Corps and EPA attempt to measure the sublethal effects of contaminated material on organisms at the site.

Required Inspections Have Not Been Done

During 1987 and 1988, the district used three commercial laboratories to perform sediment tests. According to district Environmental Branch officials and laboratory representatives, two of the three contractors received no Corps inspections. The third laboratory was inspected by the Corps' Waterways Experiment Station in March 1986. However, a Waterways Experiment Station official said that the inspection addressed other testing activities by the laboratory and did not address sediment-testing activities for the district. In addition, the inspection report stated that the laboratory could not be adequately evaluated because it lacked a quality management plan.

Without such inspections, the district lacks assurance that the contractor has effective quality controls, and as a result, cannot always rely on test results. For example, in November 1987, one of the uninspected contractors tested sediment from the Alcatraz disposal site for polynuclear aromatic hydrocarbons, some of which are persistent and cancer causing, and mercury. The contractor reported high levels of polynuclear aromatic hydrocarbons. According to a district Environmental Branch official, the district suspected that samples may have been contaminated during handling, potentially invalidating the test. The district had the material retested by the same contractor, using stricter quality control procedures, who found somewhat lower levels of polynuclear aromatic hydrocarbons, but higher levels of mercury.

An inspection of the contractor's quality controls should have uncovered any weaknesses in sample-handling techniques. According to a 1981 joint EPA/Corps technical report, a complete quality control program should emphasize sample-handling techniques. The report states that this is necessary because the greatest potential for sample contamination occurs during sample collection, handling, preservation, and storage.

The district's Environmental Branch Chief said he originally believed that the 1986 regulation did not apply to sediment testing for dredging projects. He said, however, that a February 1988 Corps headquarters technical note clarified the requirement, and he plans to require inspections of future contractors.

Need to Ensure That Permittees Use Qualified Laboratories

The Corps' regulation also does not address quality assurance for laboratories that perform sediment tests for permitted projects. In November 1988, however, the Corps issued a regulatory guidance letter that requires the district to ensure that the information submitted by permittees is acceptable by reviewing and approving permittee contractors. In January 1989, a district Regulatory Branch official said the district does not require permittees to use laboratories approved by the Corps or others, such as the state. As a result, the district has little assurance that test results provided by permittees are reliable.

Improved Inspection and Surveillance of Dredging and Disposal Operations Are Needed

District engineers routinely inspect Corps projects to ensure compliance with contract provisions. Corps regulations (33 C.F.R. 326.4) require the district, at its discretion, to take reasonable measures to inspect permitted activities to ensure that they comply with permit terms and conditions. We found that the district had not given inspections of permitted projects a high priority and did not systematically inspect permitted dredging operations—records indicate the district inspected 2 of the 21 permitted projects that were active in 1988. In addition, the district and Coast Guard performed no routine surveillance of two bay disposal sites, and surveillance of the third bay disposal site and the B1B ocean disposal site provided only limited assurance that material was dumped within designated site boundaries.

Seven permit violations occurred in fiscal year 1988, and others might have gone undetected, that could have caused unacceptable environmental damage at Bay Area disposal sites. Five involved dredging material in amounts greater than the permit authorized; these were identified by underwater surveys required by the Corps' permits and performed by permittees. The remaining two involved dredging and/or disposal in unauthorized areas and were reported by concerned citizens. Each of the seven violations was discovered after it had occurred, and we believe some of them might have been prevented by a systematic inspection program.

District officials advised us that they have taken steps to improve controls over dredging and disposal operations. However, these improved controls have not yet been formalized and incorporated into a comprehensive plan for managing Bay Area dredging and disposal operations.

Permit Violations May Impair the Environment

According to our analysis of district information, violations were discovered or reported for 7 of 21 dredging permits during 1988. Corps district information showed that 21 permits for about 2.6 million cubic yards of dredged material were active during 1988. The seven permits with violations authorized the dredging of about 1.7 million cubic yards of material.

One violation involved dredging in the Oakland Harbor and disposal in the ocean. The Corps' permit prohibited dredging from two locations where sediment was deemed by region 9 to be unsuitable for ocean disposal. In addition, the permit limited disposal in the ocean to the specified boundaries of the B1B site. Four days after dredging had started, a concerned citizen notified region 9 that dredging had occurred in the prohibited areas. A joint district/region 9 investigative team found that about 8,800 cubic yards of material had been dredged from prohibited locations and dumped at B1B. Sediment samples indicated that half the material was contaminated and unsuitable for ocean disposal. In addition, the team discovered that some material might have been dumped outside B1B's boundaries. EPA is pursuing administrative remedies, such as civil penalties, against the permittee and its contractor.

Five violations involved dredging at Navy and commercial facilities at depths greater than those authorized in the permits. All of the material was dumped at bay disposal sites, and according to district officials, two of the five violations involved material that might be contaminated. The district identified the violations by examining underwater surveys that it had required the permittee to perform after dredging was completed. District officials informed us that the violators will be required to perform daily dredge surveys in the future. In addition, the district plans to request that permittees place provisions in future dredging contracts that would result in reduced payments to contractors that over-dredge.

The seventh violation, reported by a boat operator, involved dumping sediment outside of the Alcatraz disposal site boundaries. The district's Construction-Operations Division Chief said the district took no enforcement action as a result of the report, because it came to the district's attention after dredging had ceased and the only remedy available is suspension of the permit. According to a Corps headquarters official, the Corps is drafting implementing regulations for a 1987 amendment to section 309 of the Clean Water Act (33 U.S.C. 1319), which authorized the Corps to assess penalties for permit violations.

The District Placed Low Priority on Inspection and Surveillance Activities

Permit project inspections and disposal site surveillance have not been a high priority with the district. Records indicate that the district performed two inspections of permitted dredging projects and limited or no surveillance of the three bay disposal sites. Adequate training is needed to ensure effective surveillance of the B1B ocean disposal site.

During 1988, the district had assigned one individual in its Regulatory Branch to process permit applications, review sediment test results, and inspect projects. That official said he did not have time to systematically inspect projects even though he believed such inspections were necessary. District files recorded two inspections during 1988.

District officials said that in January 1989, they assigned one additional staff position to regulating dredging activities. When the position is filled, they plan to increase inspections of permitted projects. However, they have not developed a written program detailing the number and frequency of the planned inspections.

The Regulatory Branch official initially said that the district relied on the Coast Guard's radar to ensure that disposal takes place within the boundaries of the three bay disposal sites. However, Coast Guard officials said the radar does not cover the San Pablo Bay and Carquinez Strait disposal sites. In addition, they noted the radar system shows only whether tug boats and hopper dredges go to the Alcatraz disposal site, not whether they actually dump there.

After we informed the district of these gaps in coverage, district officials said they plan to develop a written agreement with the Coast Guard regarding surveillance of the three bay disposal sites. To help ensure that disposal takes place within site boundaries, the district plans to include a requirement that permittees report by radio to the Coast Guard after they enter site boundaries, but before they start dumping. While the new requirement strengthens the Coast Guard's ability to observe disposal operations at the Alcatraz disposal site, we believe additional controls may be needed for the two sites without radar coverage. The district's Construction-Operations Division Chief said, however, that the district does not plan to perform on-site inspections at the two disposal sites without radar coverage.

For the B1B ocean disposal site, the district permit requires tug boat operators to notify the Coast Guard upon arrival at the site, but before dumping, so that the Coast Guard can verify the tug boat's location with radar. To supplement radar coverage, the district requires the permittee

to (1) hire inspectors to accompany tug boats to the disposal site and (2) use an electronic-positioning system to ensure that disposal takes place within disposal site boundaries. In addition, the district requires the permittee to submit electronic-positioning system printouts and inspection logs to the district for review so that the district can verify where dumping took place.

Coast Guard and district officials said that surveillance procedures for B1B are generally adequate. District officials said that disposal problems occurred during the Port of Oakland's use of B1B because inspectors hired by the port were inadequately trained and fishermen interfered with disposal operations.

Site Monitoring Programs Are Needed

Although EPA regulations do not require monitoring programs for bay disposal sites, the Corps' district has started to develop them to ensure that adverse environmental effects are within acceptable limits. The programs are also needed to assure state regulatory agencies that dumping at bay disposal sites can safely continue.

EPA regulations (40 C.F.R. 228.9) authorize the regional administrator or the district engineer, as appropriate, to require monitoring programs for ocean disposal sites if deemed necessary. The administrator for region 9 required a monitoring program for the B1B ocean disposal site; however, efforts to develop a comprehensive program for the site ceased when disposal at the site was stopped.

Corps Waterways Experiment Station interim guidance, dated March 1988, states that the purpose of monitoring is to document whether unacceptable impacts are occurring or conditions are developing that could lead to unacceptable impacts. According to the interim guidance, the steps essential to an effective site-monitoring program include

- defining and setting thresholds for unacceptable conditions to be prevented at the site,
- describing procedures to be used to measure environmental conditions, and
- identifying optional courses of action if thresholds are exceeded.

In 1988 and 1989, the San Francisco Bay Regional Water Quality Control Board held hearings to reexamine its policy, adopted in 1980, to defer to the Corps district for management and regulation of disposal in the bay. During the hearings, several organizations expressed concern over the

potential impact of continued disposal on the bay. The California Department of Fish and Game informed the board, for example, that it believed the preponderance of available information and observations support the contention that dredged material disposal produces substantial and unacceptable adverse impacts to the bay's resources including toxicity and habitat destruction.

In March 1989, the district informed the board that it had spent over $3 million studying the impacts of dredged material in the bay in the 1970s and has conducted several studies of the mounding problem and water quality impacts at the Alcatraz disposal site in the 1980s. The district stated that information gathered to date suggests that impacts have been isolated to the disposal site and that no impacts outside the site can be attributed to disposal. The district also stated, however, that it was developing a comprehensive monitoring program for the bay.

In addition to assuring state regulatory agencies that environmental impacts are within acceptable limits, effective monitoring programs could disclose adverse effects before they become significant. For example, a monitoring program at the Alcatraz disposal site might have disclosed the unexpected accumulation of dredged material before the mound became a navigation hazard.

District officials informed us that comprehensive monitoring programs for bay sites are being developed as part of the district's Disposal Management Program and estimated that programs would be completed and implementation started by September 1989. They said that efforts to monitor the sites in the past lacked the essential elements described by the Waterways Experiment Station guidance because the guidance is relatively new.

Region 9 and the district have not reached final agreement on a monitoring program for the B1B ocean disposal site. The district provided a proposed monitoring program to region 9 in April 1988. Region 9 informed the district the following month that it would provide comments on the proposal at a later date.

Region 9's Marine, Ocean, and Wetlands Branch Chief said the district's monitoring program was deficient because it addressed physical but not biological effects. However, the official said that a state court stopped disposal at the site before this concern could be communicated to the district.

Conclusions

Under EPA regulations, chemical and biological tests were used to determine whether dredged material can be safely dumped at ocean and bay disposal sites. However, biological tests for ocean disposal might not have predicted toxicity because joint Corps/EPA guidance did not provide adequate procedures and appropriate test organisms. In May 1989, the Corps and EPA said revised guidance should be issued by September 1989. They also said, however, that final agreement had not been reached on which biological tests should be conducted, when they should be conducted, and how test results should be evaluated. In September 1989, the Department of Defense and EPA stated that they were close to reaching agreement on these issues and estimated that revised guidance would be issued by the end of calendar year 1989.

The results of chemical tests performed for the district were questionable because the Corps did not inspect the laboratories that the district used to perform sediment tests. The Corps' inspection requirements do not cover biological tests, which are critical to evaluating sediment. In addition, the reliability of tests results for permitted projects was questionable because the district had no program to ensure that permittees used qualified laboratories.

Some permit violations involving the dredging of potentially contaminated material and disposal outside of disposal site boundaries were detected after they occurred, and other violations might have gone undetected, because (1) the Corps' district inspected only 2 of 21 permitted projects active in 1988 and (2) district and Coast Guard surveillance of disposal sites was limited. The district is taking steps to increase inspections of permitted projects and improve surveillance of the largest bay disposal site.

The district cannot assure state regulatory agencies that the environmental impact at bay disposal sites is within acceptable limits and identify adverse effects before they become significant because comprehensive programs to monitor the environmental impact of dredged material at disposal sites have not been developed and implemented. The district is developing such programs for bay disposal sites, and implementation is expected to begin by September 1989. A comprehensive monitoring program would be needed for the B1B ocean disposal site, should it be used again.

The district is developing a comprehensive plan for managing Bay Area disposal sites that will address each of the above areas. The official said,

however, that specifics of the plan were not available and the plan will not be completed until June 1992.

Recommendations

To ensure that disposal in the ocean or bay is limited to safe material, we recommend that the EPA Administrator and the Secretary of the Army reach agreement on, and issue revised guidance for, the biological testing needed to predict the toxicity of contaminated dredged material.

To ensure that environmental damage is within acceptable levels, we recommend that the Secretary of the Army direct the Chief, Corps of Engineers, to (1) regularly inspect laboratories that test sediment for the Corps, expand inspections to include biological testing, and implement procedures to ensure that permittees use qualified laboratories, (2) systematically inspect permitted dredging activities and perform surveillance of disposal sites when they are being used, and (3) develop and implement monitoring programs for bay disposal sites. These improvements should be included in the Corps' plan for managing dredging and disposal operations that is now being developed.

Agency Comments and Our Evaluation

The Department of Defense stated in September 1989 that it concurred in our recommendation on biological testing guidance. Defense stated that the joint EPA/Corps technical implementation manual that provided guidance on bioassays and monitoring has been sent to all Corps and EPA field offices for final review. Defense and EPA stated that the revised sediment-testing guidance should be published by the end of calendar year 1989.

Defense agreed with our recommendation on the Corps' quality assurance program. Defense said the Corps' Waterways Experiment station has drafted general guidance to the field, which is now under review, and estimates a February 1990 completion date for implementation.

With respect to inspection of permitted projects, Defense concurred in the recommendation to systematically inspect permitted dredging activities and perform surveillance of disposal sites being used. Defense stated that staffing constraints are currently preventing the timely implementation of the inspection program. Defense also stated that it (1) planned to rely on the Coast Guard for surveillance of disposal sites, (2) did not plan to implement a Corps surveillance program for disposal sites, and (3) did not plan to improve available surveillance systems.

Coast Guard efforts may supplement but, in our opinion, do not eliminate the need for a district surveillance program. Coast Guard radar coverage of the Alcatraz site provides only limited assurance that dumping takes place within disposal site boundaries since radar operators cannot confirm where material was actually dumped. In addition, the Department of Transportation noted that the Coast Guard has no radar coverage of, nor active surveillance program for, vessels using the San Pablo Bay and Carquinez Strait disposal sites.

The Department of Transportation commented in September 1989 that the Coast Guard's surveillance augmentation plans cannot be finalized until the Corps completes developing a plan for managing Bay Area disposal sites. Transportation also noted that Coast Guard augmentation of district surveillance efforts is pending a study of its capabilities and suggested that future planning for disposal operations include consultations with Coast Guard organizations whose resources would be required.

Defense concurred in our recommendation to develop and implement monitoring programs for bay disposal sites. Defense stated that implementation of monitoring programs for disposal sites depended on (1) identification of information needs during an ongoing study and (2) development of a mechanism for cost-sharing or user fees.

In its response, EPA did not comment on the recommendations, but provided comments on our findings, which we have incorporated where appropriate. The detailed comments of the three agencies and our responses are included in appendixes I through III.

Comments From the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310-0103

11 SEP 1989

Mr. James Duffus III
Director
Natural Resources Management Issues
Resources, Community, and
Economic Development Division
General Accounting Office
Washington, D. C. 20548

Dear Mr. Duffus:

This is the Department of Defense (DOD) response to the General Accounting Office (GAO) draft report, "WATER RESOURCES: Problems in Managing Disposal of Material Dredged from San Francisco Bay, dated July 31, 1989, (GAO Code 140836/OSD Case 8074).

See comment 1.

The DOD generally concurs with the overall thrust of the report. The Department notes, however, that the results of the National Research Council and the Office of Technology Assessment reports may have been inaccurately summarized. The GAO summary infers that ocean disposal is not desirable, which is not the position taken in these source reports.

Detailed DOD comments on the report findings and recommendations are provided in the enclosure. The Department appreciates the opportunity to comment on the draft report.

Sincerely,

Robert W. Page
Assistant Secretary of the Army
(Civil Works)

Enclosure

GAO DRAFT REPORT - DATED JULY 31, 1989
(GAO CODE 140836) OSD CASE 8074

"WATER RESOURCES: PROBLEMS IN MANAGING DISPOSAL OF MATERIAL DREDGED FROM SAN FRANCISCO BAY"

DEPARTMENT OF DEFENSE COMMENTS

* * * * * * *

FINDINGS

FINDING A: Background: Dredging and Disposal in the Bay Area. The GAO observed that much of the San Francisco Bay is naturally shallow; therefore, dredging is needed to provide access to ports and marinas. The GAO also noted that, after initial dredging is completed, periodic maintenance dredging is needed to remove the sediment that flows into the bay from rivers or is shifted within the bay by wind, waves, and tidal currents.

According to the GAO, the Corps of Engineers estimates that about 74.6 million cubic yards of sediment will need to be dredged from the bay during the period FY 89 through FY 95. The GAO pointed out that much of this material will be dredged by the Corps or its contractors, as part of the Corps construcion and maintenance projects. The GAO described the normal construction project as increasing the width and depth of channels and harbors up to those specifications authorized by the Congress. The GAO contrasted the maintenance projects as the work to keep the channels and harbors from filling up.

The GAO estimated that the San Francisco District of the Corps of Engineers spent about $9.6 million to dredge about 3.9 million cubic yards of sediment in FY 87 and about $6.2 million to dredge about 2.5 million cubic yards of sediment in FY 88. (According to the GAO, these costs do not include expenditures for Corps supervision, surveys, and overhead.)

The GAO also pointed out that other organizations dredge in the Bay Area. The GAO observed, however, that the Corps of Engineers must issue a permit before such dredging may be initiated. The GAO explained that Bay Area dredgers primarily use hopper dredges and clamshell dredges. The GAO described hopper dredges as using large hydraulic pumps to suck sediment off the channel bottom through drag arms and into a sediment container on the ship; the ship then moves to the disposal site and dumps the sediment at the site. The GAO described clamshell dredges as mechanical dredges that use a type of bucket attached to a crane to dig sediment off the channel bottom and load it into barges; tug boats then move the barges to the disposal site where the barges are unloaded. (pp. 2-3, pp. 10-16/GAO Draft Report)

DOD RESPONSE: Concur.

FINDING B: Background: Federal and State Responsibilities for Designating and Managing Ocean and Bay Disposal Sites. The GAO noted that the Army Corps of Engineers, the Environmental Protection Agency, other Federal agencies, and the States are responsible for designating and managing aquatic dredged material disposal sites, including wetland sites. The GAO explained that, generally, the Corps and the Environmental Protection Agency ensure that the environmental effects of aquatic disposal are within acceptable levels. The GAO observed that, since 1970, a number of studies have addressed the effects of dredged material disposal on the aquatic environment. The GAO pointed out that assessments of these studies by the National Research Council (in 1985) and the Office of Technology Assessment (in 1987) have shown that aquatic disposal can have a variety of physical, chemical, and biological effects.

The GAO observed that the Clean Water Act (33 U.S.C. 1251) was enacted to restore and maintain the physical, chemical, and biological integrity of the nation's waters, such as San Francisco Bay. According to the GAO, organizations responsible for implementing the Act in the Bay Area include the Corps San Francisco District, the Environmental Protection Agency Region 9, the California State Water Resources Control Board, and the San Francisco Bay Regional Water Quality Control Board.

The GAO pointed out that a purpose of the Marine Protection, Research, and Sanctuaries Act (33 U.S.C. 1401) is to prevent or strictly limit the ocean dumping of any material that would impair the marine environment. The GAO explained that the Corps San Francisco District and the Environmental Protection Agency Region 9 are responsible for designating and managing ocean disposal sites off the coast of northern California. According to the GAO, the Coast Guard is responsible for surveillance and other enforcement activities to prevent unlawful dumping. (pp. 2-3, pp. 16-21/GAO Draft Report)

See comment 2.

DOD RESPONSE: Partially concur. It should be noted that only the Corps and the Environmental Protection Agency have responsibilities for designating (under Section 103) or specifying (under 404) in-water aquatic dredged material disposal sites and for their subsequent management. Further, the specific legislative intent of Section 404 of the Clean Water Act (as jointly interpreted by the Environmental Protection Agency and the Corps) is non-degradation. The purpose of the Ocean Disposal Act is to regulate to prevent unreasonable degradation, not to prevent impairment of the marine environment. The Department is concerned that a lack of understanding of these issues could be interpreted by the public as a position against open-water disposal.

FINDING C: Lack of Disposal Capacity Has Delayed Construction Projects. The GAO observed that, over the last 2 years, disposal in the San Francisco Bay area has generally been limited to material dredged during maintenance. The GAO

stated that district studies indicate that bay sites cannot accommodate the planned construction of two Corps projects scheduled to start in FY 88 and they have been delayed until additional disposal sites for the 8.4 million cubic yards of material to be dredged are located. According to the GAO, the district had planned to dispose of the dredged sediment from these construction projects in the bay near Alcatraz Island; however, studies indicated that the disposal site did not have sufficient capacity for the material; additional disposal sites were, therefore, needed. The GAO explained that, after the district concluded that Alcatraz no longer represented a bottomless disposal site, the district looked at other existing disposal sites and determined that some of these sites could accommodate a portion of the material from the planned construction projects. The GAO stated that, as a result of this conclusion, in FY 1985, the district initiated a Disposal Management Program to (among other things) designate additional ocean, bay, and/or land disposal sites. (pp. 3-4, pp. 26-29/ GAO Draft Report)

See comment 3.

DOD RESPONSE: Concur. The basic issue is not that additional capacity has not been located, but rather that acceptable capacity has not been located. The present wording in the report implies that the Corps has not devoted sufficient resources to resolving this problem, which is not correct. The basic problem is that the diverse interests within the state (and to some extent within the Federal Government) have not yet been sufficiently weighed and balanced by the state to provide a clear state position on proposed construction dredging within the Bay Area.

FINDING D: Completion of Designation Process for Ocean Disposal Sites Has Been Delayed. The GAO found that, in May 1988, the efforts of the Corps San Francisco District to designate a new ocean disposal site resulted in the designation of a site for 500,000 cubic yards of material to be dredged during the Oakland Harbor construction dredging project. The GAO noted that the Corps district and the Environmental Protection Agency Region 9 estimate the designation process for ocean disposal sites with greater capacity will not be complete until December 1991.

The GAO observed that guidance issued jointly by the Environmental Protection Agency and the Army Corps of Engineers define the first step in the designation process as (1) considering a number of factors, such as safety and transportation costs, and (2) delineating the geographic area for consideration--termed the zone of siting feasibility. According to the GAO, the objective in establishing the zone is to ensure that sites are within an operationally and economically feasible range of dredging locations. The GAO noted that, if the zone excludes sites beyond the Continental Shelf, then disposal beyond the Continental Shelf is considered infeasible.

3

The GAO found that, in February 1988, the Corps San Francisco District completed a feasibility study and established a zone that excluded sites beyond the Continental Shelf. The GAO pointed out that, because of objections raised by Environmental Protection Agency Region 9, the district has agreed to reevaluate the zone. The GAO concluded that, in reevaluating the February study zone, the district should reconsider (1) the need for Coast Guard radar coverage of disposal sites and alternative safety measures and (2) the factors that form the basis for cost estimates. (pp. 3-4, pp. 29-35/GAO Draft Report)

See comment 4.

DOD RESPONSE: Partially concur. The report does not distinguish between project-specific site designation, which either the Corps or the Environmental Protection Agency can pursue, and designation of a multiple use ocean disposal site, which is solely the responsibility of the Environmental Protection Agency. The GAO found that the Environmental Protection Agency has refused to pursue any other than a multiple use ocean site designation action. If the real concern is construction dredging, which is the identified disposal capacity shortfall, then the project-specific designation approach can be used instead and be completed in a much shorter timeframe, since much of the required work is already complete.

See comment 5.

Regarding the zone of siting feasibility analysis, it should be pointed out that the initial analysis was approved by the Environmental Protection Agency. The analysis was subsequently challenged on two occasions and was upheld by the court on both occasions. The Corps reanalysis of the zone of siting feasibility was a requirement of the Environmental Protection Agency before they would agree to proceed with the multiple use site designation effort.

See comment 6.

Further, the GAO conclusion that the zone of siting feasibility analysis is flawed in several respects and inconsistent with similar findings for in-bay disposal sites. The report places emphasis and importance on the Coast Guard radar net for effective regulatory surveillance for in-bay sites, yet ignores the value of such for ocean disposal. Instead, the report echoes the Environmental Protection Agency comment that the Corps should independently pursue other methods or improve the existing system to allow tracking of vessels farther out to sea. The Corps initial zone of siting feasibility analysis may have been deficient in not fully addressing surveillance capabilities and concerns in defining feasibility; however, the DOD questions whether the Corps of Engineers is responsible for or has authority to improve existing systems, etc., unless the improvement is directly related to maintaining critical navigation. Given the fact that reliable Coast Guard surveillance is effective only 50 percent of the time at a distance of 24 miles offshore, the initial zone of siting feasibility probably should have been established closer to shore.

4

FINDING E: Process for Designating Bay and Land Disposal Sites Scheduled for Completion in February 1991. The GAO found recent district studies have concluded that bay and land disposal of some dredged material might be feasible at several sites. The GAO pointed out that a major unresolved issue for bay disposal sites is the potential environmental impact on fisheries of dumping dredged material in the bay. The GAO described the major unresolved issues for land disposal sites as cost and potential environmental impact.

According to the GAO, a January 1989 draft study by a San Francisco District contractor identified several candidate bay disposal sites. The GAO observed, however, that the study does not recommend any one site; instead, it stated that a major unresolved issue is the potential impact of dumping in the bay on fisheries. According to the GAO, the draft study estimated that the cost of using candidate disposal sites would range from $.60 to $2.06 per cubic yard for material dredged from Richmond Harbor.

The GAO also found that, in 1987, a district contractor identified several potential land disposal sites in the Bay Area and recommended a more detailed study of these sites. According to the GAO, in November 1988, another district contractor completed the detailed study of these land sites and found that the three most feasible sites are Crowley, Napa, and Montezuma. The GAO noted that the San Francisco District is currently evaluating whether use of these sites is feasible, and if so, what type and quantity of material can be disposed of there. (pp. 3-4, pp. 36-39/GAO Draft Report)

See comment 3.

DOD RESPONSE: Concur. The Department points out that this is a proposed schedule and that the Corps District is being directed to initiate discussions with either the State of California or its regional designee in light of the recent determination that the major project beneficiary must assume a major project proponency role and appropriately cost-share in this study.

FINDING F: Revised Sediment Test Guidance Is Needed. The GAO explained that, Environmental Protection Agency regulations, sediment tests generally are required before dredged material is dumped at ocean or bay disposal sites. The GAO found, however, that the Army Corps of Engineers San Francisco District and the Environmental Protection Agency Region 9 lack assurance that biological tests accurately predicted the toxicity of dredged material because guidance did not contain effective procedures and appropriate test organisms.

The GAO observed that an array of chemical and biological tests are used to determine whether dredged material can be safely

dumped at ocean and bay disposal sites. The GAO pointed out that the Corps and Environmental Protection Agency assess the lethal and sublethal toxicity of the material and the potential for significant adverse effects by comparing test results for sediment from the dredge site with results for sediment from a reference site. The GAO referred to a 1988 study report done by the Corps and the Environmental Protection Agency that suggested additional biological test procedures and more sensitive test organisms may be necessary to evaluate sediment for San Francisco Bay Disposal.

According to the GAO, the Corps interpretation of the regulations on chemical and biological tests of sediment are that biological testing may be warranted if (1) substantially greater concentrations of contaminants are observed at the dredge site than are found at the disposal site and (2) these contaminants are likely to be absorbed by organisms at the site. The GAO cited conclusions of Environmental Protection Agency officials that the Corps interpretation could lead to a gradual increase in contamination at bay disposal sites, since less than "substantial" increments in contamination are permitted.

The GAO found that the Environmental Protection Agency, in conjunction with the Army Corps of Engineers, is revising the guidance covering sediment tests for ocean disposal and expect to issue the guidance by September 1989. The GAO noted, however, that the Environmental Protection Agency and the Corps still have not reached agreement on (1) which biological tests should be performed, (2) when they should be performed, or (3) how the results should be evaluated. (pp. 3-6. pp. 41-44/ GAO Draft Report)

See comment 3.

DOD RESPONSE: Concur. It should be noted that the Corps and the Environmantal Protection Agency Headquarters, as well as most regions and districts, are in close agreement on testing procedures. Appropriate test species and species-specific data interpretations must (and will continue to be under revised national guidance) be developed on a region by region basis. The Corps and the Environmental Protection Agency Headquarters convened a technical panel of agency experts in March 1988, to provide acceptable regional guidance in this area, as agreement could not be reached at the regional level.

The Environmental Protection Agency Region 9 has generally declined to follow this guidance and has adopted alternative procedures which neither the Corps nor the Environmental Protection Agency Headquarters can support. The basic thrust at present at the headquarters level is to seek maximum technical consistency between the 404 and 103 regulatory programs within the coastal zone.

6

See comment 7.

The specific concern raised in the GAO report on referenced areas does not acknowledge the specific Corps/Environmental Protection Agency guidance that the sediment should, to the extent practicable, represent conditions of the disposal site "environs" in the absence of dredged material disposal. There are sound technical, as well as procedural, reasons for this guidance.

FINDING G: Improved Quality Assurance Program Is Needed. The GAO observed that a 1986 Corps engineering regulation requires the Corps of Engineers San Francisco District to implement a quality assurance program for sediment tests performed by Corps contract laboratories. The GAO pointed out that the program entails Corps inspections of the laboratories to determine whether they have the capability to perform required chemical analyses (i.e., adequate equipment, personnel, and quality control procedures). The GAO noted that the laboratories are to be inspected before contract award and every 2 years thereafter.

The GAO found that the Corps of Engineers San Francisco District had not implemented the quality assurance program and, as a result, the district could not rely on test results. According to the GAO, a district official stated that he had not been aware that the regulation applied to the San Francisco Bay District's sediment testing program, but agreed to perform such inspections in the future. The GAO further found that the Corps program does not cover biological testing nor testing performed by laboratories for permitted projects. (pp. 3-6, pp. 44-47/GAO Draft Report)

DOD RESPONSE: Concur.

FINDING H: Improved Inspection and Surveillance of Dredging and Disposal Operations Are Needed. The GAO observed that the Army Corps of Engineers regulation (33 C.F.R. 326.4) requires the San Francisco District, at its discretion, to take reasonable measures to inspect permitted activities to ensure that they comply with specified terms and conditions. The GAO found that the San Francisco District had not given inspections a high priority and had not systematically inspected permitted dredging operations--records indicate the district inspected only 2 of the 21 permitted projects that were active in 1988. The GAO further pointed out that the San Francisco District and the Coast Guard performed no routine surveillance of two bay disposal sites, and surveillance of the third bay disposal site and the B-1B ocean disposal site provided only limited assurance that material was dumped within designated site boundaries.

7

The GAO learned that seven permit violations occurred in FY 88--and others might have gone undetected that could have caused unacceptable environmental damage at Bay Area disposal sites. The GAO explained that five violations involved dredging material in amounts greater than the permit authorized, which were identified by underwater surveys required by Corps permits and performed by permittees. The GAO reported that the remaining two violations involved dredging and/or disposal in unauthorized areas and were reported by concerned citizens. The GAO found that each of the seven violations was discovered after it had occurred. The GAO concluded that some of the violations might have been prevented by a systematic inspection program.

According to the GAO, district officials stated that steps have been taken to improve controls over dredging and disposal operations. The GAO noted, however, that these improved controls have not yet been formalized and incorporated into a comprehensive plan for managing San Francisco Bay Area dredging and disposal operations. (pp. 3-6, pp. 47-51/GAO Draft Report)

DOD RESPONSE: Concur.

* * * * * * *

RECOMMENDATIONS

RECOMMENDATION 1: The GAO recommended that the Secretary of the Army direct the Chief, Army Corps of Engineers, to evaluate alternative mechanisms for ensuring the safety of disposal operations on and off the Continental Shelf. (p. 6, p. 39/ GAO Draft Report)

See comment 3.

DOD RESPONSE: Concur. The Department has taken actions for ensuring the safety of disposal operations that include: (a) consideration of conflicting or incompatible uses during site designation as well as a general regional availability, cost and reliability of positioning systems in defining the zone of siting feasibility, (b) Publication of Notices to Mariners and notices to the National Oceanic and Atmospheric Agency for navigation chart revisions on coordinates and depth of each established disposal site, and (c) required Coast Guard certification of seaworthiness and navigation safety equipment and capabilities of dredging and disposal plant.

RECOMMENDATION 2: The GAO recommended that the Secretary of the Army direct the Chief, Army Corps of Engineers, to review and validate the model used as the basis for cost estimates. (p. 6, p. 39/GAO Draft Report)

See comment 3.

DOD RESPONSE: Concur. The Corps San Francisco District has begun this review. The validation of the model will occur when the number of alternative disposal sites is reduced to a manageable number and the final analysis is undertaken.

8

This action is tentatively scheduled for completion in the third quarter of FY 1990 and will be subject to the finalization of cost sharing for the disposal study.

RECOMMENDATION 3: The GAO recommended that the Administrator of the Environmental Protection Agency and the Secretary of the Army reach agreement on, and issue, revised guidance for the biological testing needed to predict the toxicity of contaminated dredged material. (p. 6, p. 55/GAO Draft Report)

See comment 3.

DOD RESPONSE: Concur. The joint Environmental Protection Agency/Army Corps of Engineers technical implementation manual that provided guidance on bioassays and monitoring, etc. (as they relate to the requirements of the Ocean Dumping Act) has been sent to all the Corps and the Environmental Protection Agency field offices for final review. Publication is scheduled for the first quarter of FY 1990. The Environmental Protection Agency and the Army are currently working to collectively establish the appropriate priority for development of the revised testing guidance as well as a reasonable, but firm, implementation schedule. No schedule has been established to date.

RECOMMENDATION 4: The GAO recommended that the Secretary of the Army direct the Chief, Army Corps of Engineers, to inspect regulatory laboratories that test sediment for the Corps, to expand inspections to include biological testing, and to implement procedures to ensure that permitees use qualified laboratories. (p. 6, p. 55/GAO Draft Report)

See comment 3.

DOD RESPONSE: Concur. Under the Corps Dredging Operations Technical Support Program, the Corps Waterways Experiment Station has drafted general guidance to the field which is now under review. Implementation must be across the board to include regulatory as well as Federal projects. Estimated completion date of this effort is February 1990.

RECOMMENDATION 5: The GAO recommended that the Secretary of the Army direct the Chief, Army Corps of Engineers, to systematically inspect permitted dredging activities and perform surveillance of disposal sites when they are being used. (p. 6, p. 55/GAO Draft Report)

See comment 3.

DOD RESPONSE: Concur. The San Francisco District of the Corps of Engineers has a program that conducts pre- and post-dredging surveys and logs that information into a database for permitted dredging activities; however, manpower constraints are presently preventing timely implementation, as the two positions assigned to this function are currently vacant. A Corps program for the surveillance of disposal sites is not

anticipated; however, the San Francisco District has developed a Memorandum of Understanding with the Coast Guard, under which the Coast Guard will provide the District information on disposal activities at the Bay disposal areas -- including (a) permittees using the site, (b) a description of the activities underway, and (c) times taken to go from the dredging site to the disposal site and back.

The DOD disagrees with that portion of the GAO recommendation calling for the Corps routinely to attempt to improve available surveillance systems. The DOD is only responsible for improving available systems when these improvements are justified to maintain critical navigation on a case-by-case basis.

RECOMMENDATION 6: The GAO recommended that the Secretary of the Army direct the Chief, Army Corps of Engineers, to develop and implement monitoring programs for bay disposal sites. (p. 6, p. 55/GAO Draft Report)

See comment 3.

DOD RESPONSE: Concur. The Department currently requires appropriate monitoring at all disposal sites, be they 404 or ocean disposal sites. Proposed sites are to be multiple-use sites, and as they are developed in the ongoing San Francisco Bay Disposal Management Program (scheduled for completion in FY 1991), an appropriate monitoring program will be developed (a) based upon information needs identified during the study, and (b) subject to cost sharing and/or mechanisms to impose user fees.

10

The following are GAO's comments on the Department of Defense's letter dated September 11, 1989.

GAO Comments

1. We asked OTA and National Research Council representatives to review the summarization we made of the information in their reports. The OTA representative said our presentation was accurate but more information should be added for completeness. The National Research Council representative said our presentation of the Council's data was neutral and had good balance. We added more information to the discussion of the Council's and OTA's reports as suggested. We believe that the report accurately reflects the OTA and National Research Council reports and disagree that we take an alternate position with respect to the desirability of ocean disposal.

2. We believe other agencies have responsibilities under the Marine Protection, Research, and Sanctuaries Act for designating and managing disposal sites. Under section 107(c) of the act, for example, the U.S. Coast Guard is responsible for surveillance of ocean disposal sites to prevent unlawful dumping. In addition, section 102(a) of the act states that EPA shall consult with federal, state, and local officials in establishing or revising criteria for evaluating and reviewing permit applications. Other agencies also have responsibilities for disposal sites under other laws such as the Fish and Wildlife Coordination Act.

We believe the report accurately presents the purpose of the Clean Water Act. Section 2 of the Marine Protection, Research, and Sanctuaries Act states the policy of the United States is to regulate ocean dumping to prevent or strictly limit the dumping of "any material which would adversely affect . . . the marine environment . . . ." (33 U.S.C. 1401(b)) (Emphasis added.) We changed "impair the marine environment" to "adversely affect the marine environment."

3. We revised the report where appropriate to reflect these comments.

4. According to the 1984 joint EPA/Corps guidance for designating ocean disposal sites, factors that must be considered in the evaluation process are the same for sites to be designated under sections 102 and 103 of the act.

5. A region 9 official told us that EPA has not approved the zone of siting feasibility study. According to region 9's May 3, 1988, letter, EPA evaluated several items of information, including the final supplement to the

environmental impact statement, in deciding to concur in the ocean disposal site. The U.S. Court of Appeals, Ninth Circuit, held that the Corps minimally complied with section 103 of the Marine Protection, Research, and Sanctuaries Act and section 102(2)(c) of the National Environmental Policy Act with regard to the 500,000 cubic yards of sediment. Half Moon Bay Fishermans' Marketing Association v. Carlucci 847 F.2d 1389, 1391 (9th Cir. 1988).

6. The zone of siting feasibility study states that the primary reason for limiting the zone of siting feasibility to the maximum range of Coast Guard radar coverage was to ensure the safety of marine operations and not for regulatory surveillance of disposal operations. According to the study: (1) Coast Guard radar coverage of the disposal site was not effective at nor essential to ensuring that material was dumped within disposal site boundaries because the radar image would not show when and where a discharge took place and (2) systems which can cover a 100-nautical-mile radius are available to provide such surveillance.

7. We did not change the report to reflect this comment. As stated in the report, EPA and Corps officials said in May 1989 that final agreement had not yet been reached on the revised sediment-testing guidance for ocean disposal. In addition, guidance on reference sediment for bay disposal was published as a proposed rule change in December 1980 but was not finalized.

Comments From the Environmental Protection Agency

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 15 1989

OFFICE OF
POLICY, PLANNING AND EVALUATION

Mr. Richard L. Hembra
Director
Environmental Protection Issues
Resources, Community and Economic Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Hembra:

Thank you for the opportunity to review the General Accounting Office (GAO) draft report entitled "Problems in Managing Disposal of Material Dredged From San Francisco Bay" (GAO/RCED-89-188). Pursuant to Public Law 96-226, the Environmental Protection Agency (EPA) is responding to the draft report.

See comment 1.

The report focuses mainly on ocean disposal of dredged material. We generally conclude that the draft report does not comprehensively review the need for evaluation of all available options in determining the most environmentally appropriate disposal sites for dredged material. There are a number of agencies not mentioned in the report that are intimately involved in San Francisco Bay area dredge disposal and management. The report should include the work of the Aquatic Habitat Institute on environmental effects of disposal in the San Francisco Bay and the Sacramento-San Joaquin Delta.

Enclosed are more extensive comments for your consideration. EPA's Region IX, and the Offices of Water and Federal Activities, among other offices, have participated in reviewing this report.

I appreciate the opportunity to respond to the draft report.

Sincerely,

Terry Davies
Assistant Administrator

Enclosure

**SPECIFIC COUNTS ON GAO's DRAFT REPORT:
"Problems in Managing Disposal of Material Dredged from San Francisco Bay"**

See comment 2.

Page 2 - (Paragraph 4, second dash) The Corps may select a site for a particular project when use of an EPA site is not feasible. Revise the text from the comma in the second sentence and onwards to read as follows: "..., the Corps District may select a disposal site for a specific project. In determining whether to approve ocean disposal, the district must use EPA's criteria, and if Region IX concludes that those criteria are not met, ocean disposal is not allowable unless the Corps obtains a waiver of the criteria from the EPA Administrator in accordance with section 103 of the Act."

See comment 2.

Page 2 - (Paragraph 4, first dash) The Administrator may prohibit, withdraw or restrict any defined area in waters of the United States from being specified as a disposal site whenever he determines that the discharge of dredged or fill material will have an "unacceptable adverse effect" on municipal water supplies shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas.

See comment 2.

Page 3 - (Paragraph 3) EPA's Office of Marine and Estuarine Protection and the Corps of Engineers plan to issue revised testing guidance on ecological evaluation of dredged material for unrestricted disposal in ocean waters by the end of calendar year 1989. EPA's section 404 program office is planning to adopt similar guidance for evaluation of dredged material disposal into section 404 waters, wherein the aquatic environment is similar to that in ocean waters.

See comment 2.

Page 3 - (Last paragraph, second sentence) Revised guidance is now scheduled for completion in late calendar year 1989.

See comment 3.

Page 4 - (Last sentence) The "process" referred to is not clear. For example, does this mean completion of a final site designation or completion of studies leading up to site designation?

See comment 2.

Page 5 - (Paragraph 1, third sentence) The September 1988 report should be fully referenced in a footnote. More information on this report needs to be given in the body of the paper because of its alleged statements on the inadequacies of the 1977 manual. The current testing manual may not be the most sensitive predictor of toxicity since it no longer reflects state-of-the-art procedures and tests. We do not, however, agree that the current manual is ineffective as suggested in the GAO report.

See comment 4.

Page 5 - (Paragraph 1, last sentence) When this report was started, fewer decisions had been made on testing procedures and evaluation. As of this writing, this sentence should be qualified to reflect progress on both items.

See comment 2.

Page 11-17 The report recognizes the differences between federal projects and private (permitted) projects. However, in its substantive discussions the report focuses almost exclusively on permitted projects. It is unclear why the substance of the report focuses on permitted projects to the virtual exclusion of federal projects.

See comment 2.

Page 17 - (Last paragraph, last sentence) The correct expression is "chemical form" rather than "chemical composition". The composition may remain the same. The form in which the contaminants reside in relation to the sediment and to the pore water can cause different impacts to organisms.

See comment 2.

Page 18 - (Paragraph 2) Section 404 of the Clean Water Act regulates discharges of dredged or fill material into "waters of the United States." The cornerstone of the section 404 program in terms of environmental protection is the 404(b)(1) Guidelines. The fundamental precept of the Guidelines is that dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that (1) such a discharge will not have an unacceptable adverse impact either alone or when viewed in terms of its cumulative impact on waters of the U.S., and (2) there are not less environmentally damaging practicable alternatives. The Guidelines further require that no discharge should be permitted unless appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

See comment 2.

Page 18 - (Third paragraph) These Guidelines apply to all 404 permits issued by the Corps specifying disposal sites for dredged or fill material. Although the Corps does not issue permits for its own activities, the Corps authorizes its own discharges by applying the 404(b)(1) Guidelines among other requirements. In addition, see comment regarding page 2, paragraph 5.

See comment 2.

Page 18 - (Last paragraph, first sentence) Change to read: "Under section 303 of the Clean Water Act, the States are to set water quality standards subject to EPA review and approval."

See comment 5.

Page 19 - (Paragraph 1 under Designation and Management..., second sentence) The EPA does not share site designation authority with the Corps, as suggested by the report. Under MPRSA section 102(c) site designation authority lies with EPA, and section 103 directs the Corps to use EPA-designated sites to the extent feasible.

Where use of an EPA site is not feasible, the Corps may specify a site as part of permitting or otherwise authorizing ocean disposal for a particular project.

See comment 6.

Page 19 - (Paragraph 1, last sentence) The U.S. Coast Guard is responsible for surveillance under the MPRSA, but not for taking enforcement actions when violations occur. This is an EPA responsibility.

See comment 2.

Page 19 - (Paragraph 2, first sentence) The specific citation is section 102(c) which authorizes EPA to designate sites and specifies that in doing so EPA is to consider the criteria developed by EPA under Section 102 (a).

See comment 2.

Page 19 - (Paragraph 2, last sentence) Section 102(a)(I) is the specific citation regarding sites off the Continental Shelf.

See comment 2.

Page 19 - (Paragraph 3) Under Section 103(b), the Corps is directed to use EPA-designated sites where feasible when authorizing ocean disposal of dredged material. The Corps decision to permit or otherwise authorize ocean disposal, including the selection of the site, is subject to EPA review for compliance with EPA's criteria.

See comment 2.

Page 19 - (Paragraph 3, fifth sentence) The statute provides the mechanism of a waiver from the criteria. As now written, the report incorrectly implies the waiver opportunity was created by regulation. Last sentence starting at bottom of page: Preface with, "The statute provides that the Administrator shall..."

See comment 2.

Page 20 - (First sentence) "The proposed dumping will have unacceptably adverse impacts on municipal water supplies, shellfish beds, wildlife, fisheries (including spawning and breeding areas), or recreational areas." (Section 103(d).

See comment 2.

Page 20 - (Paragraph 3) Site designation restrictions can also condition use of a site, further protecting the marine environment.

See comment 2.

Page 20 - (Last sentence) "EPA is authorized to impose penalties for violations of the Act, regulations, or permits."

See comment 2.

Page 20 - Additional Laws Regulating Bay and Ocean Disposal While EPA is generally not bound by the procedural requirements of NEPA, it has a voluntary policy of preparing EISs for ocean dumping site designation. The Corps may be required by NEPA to prepare EIS's if the action is a major federal action significantly affecting the quality of the human environment.

See comment 2.

Page 21 - (First sentence) Add the word "maximum" before "extent practicable,".

The EPA includes other federal, state, and local agencies in the site designation EIS development. Other federal statutes that are routinely addressed are the Endangered Species Act, the Historic Preservation Act, and the Migratory Bird Treaty Act.

See comment 7.

Page 22 - (Paragraph 1) Permit terms and conditions play a key role in controlling impacts. It is unclear why this important aspect of site management is not addressed.

See comment 8.

Page 23 GAO seems to give a great deal of deference to information provided by the Corps of Engineers. Information on the amount of material dredged from the bay and estimates of disposal costs were not verified. This information needs to be validated in order to have an effective dredge management program. We rely heavily on many Corps' estimates, predictions, and management of dredging and disposal.

See comment 9.

Page 24 - (Paragraph 1) To assure completeness, non-permitted Corps ocean disposal operations should be tallied also.

See comment 3.

Page 25 - (second dash) The use of the term "designation process" needs clarification (see comment for Page 4, last sentence).

See comment 5.

Page 29 - (First sentence) Should read: "The Corps' efforts to select a new ocean disposal site location resulted in choice of a site..." This is to emphasize that the Oakland Harbor site was specified by the corps under section 103, rather than being a site formally designated by EPA under section 102 (a).

See comment 10.

The first paragraph oversimplifies the MPRSA 103 designation of the ocean disposal site for Port of Oakland. The site designation process and the ultimate site selection was an extremely complicated process involving a number of agencies, as well as environmental groups.

See comment 11.

Page 30 - (Paragraph 1) The final supplemental EIS preferred an ocean site called 1M, not B1B, as stated. Also, the dumping of dredged material is for clean sediments. No contaminated sediments were to be dumped. Capping of contaminated sediment with clean material was not the preferred alternative for the Oakland project.

See comment 12.

Page 30 - (Paragraph 3) The report credits the Corps for limiting the amount of dredged material to be disposed to 500,000 cubic yards. This is not acurate. When EPA concurred on the B1B site, the Agency limited disposal at the site to 400,000 cubic yards. EPA determined that the additional 100,000 cubic yards were unsuitable, and would have to be evaluated in a supplemental EIS.

See comment 2.

Page 33 - (Paragraph 3) The issue of the need to avoid submarine transit areas should also be included in this revised analysis.

See comment 2.

Page 33 - (Last paragraph) The report references the Corps computer model for estimating cost of transporting dredged materials. The model was neither reviewed nor approved by the Corps' South Pacific Division and Headquarters. In fact, EPA requested, but was not permitted to review the model.

See comment 13.

Page 35 - (Paragraph 1, last sentence) "The process leading into site designation is scheduled..."

Table 2.2 would benefit from a third column that makes clear the agency roles for each of these tasks. The table identifies a tentative schedule for completing the ocean disposal site evaluation and designation process. We believe the timeframe for final designation does not take into account certain requirements of the NEPA. Specifically, after the Corps' Headquarters receives the final EIS, the EIS would be filed with EPA's Office of Federal Activities and its availability noticed in the Federal Register. No decision on the proposed action shall be made or recorded until thirty days after publication in the Federal Register (40 CFR 1506.10). Although possible, it is unlikely that, were the final EIS submitted to the Corps' Headquarters in November 1991, that final designation by EPA would occur in December 1991. We believe this schedule should be reviewed.

See comment 4.

Page 38 Update status of schedule products and meetings in the first paragraph under Table 2.3.

See comment 6.

Page 41 This chapter does not mention the role of the terms and conditions of permits and Section 103 federal project authorizations for ocean disposal. Detailed and enforceable requirements in these items are essential to controlling impacts and to enable successful enforcement of MPRSA requirements. We note the report does not address these important items.

See comment 2.

Page 41 - (Paragraph 1) When the 1977 sediment testing manual was published, it was the most up-to-date state-of-the-art test for sediment toxicity. Using the manual for guidance, the EPA Regions have been implementing site-specific ocean dumping programs for 12 years. The toxicity tests are an integral part of this process, giving regulators an estimate of the potential for the sediment to harm the environment (see comment for Page 5, Paragraph 1).

See comment 2.

Page 42 - Revised Sediment Test Guidance is Needed The Black Rock Harbor studies were designed to investigate the accuracy of laboratory tests to predict field impacts for dredged material. As

part of the studies, different methods and alternate organisms were tested. The Black Rock Harbor studies were not designed to develop revisions to the dredged material testing manual.

See comment 14.

Given the available guidance, the Corps still does not assure quality sampling data (e.g., samples are not consistently taken to project depth plus the overdredge depth, the number of samples for the size area to be dredged is often inadequate, chemical tests are not conducted for all relevant toxic pollutants, statistical comparisons are done on the wrong "reference" site, etc.). The list of sampling and analysis inadequacies are numerous even within the current guidance.

See comment 2.

Page 43 The Black Rock Harbor study results should be referenced like the 1977 ocean dumping manual at the bottom of the page (see comment for Page 5, Paragraph 1).

See comment 15.

We would like to clarify that comparability between the characteristics of the dredged material and proposed disposal site is not the sole factor to be used in determining compliance with the section 404(b)(1) Guidelines. The Guidelines currently consider comparability when determining appropriate testing requirements. However, other requirements of the Guidelines, specifically section 230.10, must also be considered in the evaluation of dredged materials. In addition, under section 230.11(g), the Guidelines require that the cumulative impacts associated with individual discharges of dredged material on the aquatic ecosystem be included in the evaluation of individual permits. Therefore, dredged material disposal in near coastal waters, like all other discharges of dredged or fill material into waters of the U.S., cannot be permitted unless it has been demonstrated to comply with all requirements of the section 404(b)(1) Guidelines.

See comment 2.

Page 43-44 The report states that chemical and biological testing used to evaluate sediment for ocean disposal may also be applied to bay disposal. The report indicates that there are plans to adopt similar guidance for ocean and bay systems. It appears that GAO believes that the lack of consistency of testing requirements and regulatory standards (or guidelines) are basic problems underlying the dredged material disposal program in the Bay Area. We believe that the report should expand this discussion to better clarify the problem.

See comment 2.

Page 44 - EPA would like to provide clarification regarding the second sentence. Since EPA staff met with GAO officials last May, the Agency is drafting a new version of the revised 1977 implementation manual. We are not certain what modifications, if any, will be needed for use of the implementation manual in section 404. EPA suggests that this paragraph be rewritten as follows:

Corps and EPA officials also said that they plan to adopt similar guidance for aquatic ecosystems, such as the Bay, that are covered by the Clean Water Act. In addition, EPA and the Corps are developing guidance for management of dredged material which will provide a decisionmaking framework for determining an environmentally acceptable disposal option. EPA expects that such guidance will prevent dredged material disposal concerns such as those being currently experienced in San Francisco Bay in the future.

See comment 16.

Page 47 The report does not indicate what the Corps does or does not do to get violators back into compliance. It is not just the Corps' duty to note violations, but to follow up.

See comment 2.

Page 51 - Site Monitoring Programs are Needed (Paragraph 2) The reference to section 228.9(a) should indicate that the Regional Administrator or the District Engineer have authority to require site specific monitoring surveys.

See comment 17.

We question whether surveillance procedures for site B1B "are generally. adequate." The fishermen's interference and untrained inspectors were not the main reasons for disposal problems at site B1B. There were a number of permit disposal violations by the Port of Oakland and the Great Lakes Dredge and Dock Co.

The following are GAO's comments on EPA's letter dated September 15, 1989.

GAO Comments

1. We changed the report to recognize that all available options must be evaluated in determining disposal sites. As stated in chapter 2, the district has an ongoing program to identify and evaluate ocean, bay, and land disposal sites in the Bay Area. We recognize that additional organizations have participated in dredge disposal and management, but we believe the report identifies the primary agencies. We did not revise the report to incorporate the work of the Aquatic Habitat Institute because an Institute representative informed us in August 1989 that its ongoing study was not yet completed. We did not use information from a 1987 Institute study because, according to the representative, study estimates of contaminants released during dredging and disposal operations were very rough.

2. We revised the report where appropriate to reflect these comments.

3. We have not revised the report to reflect this comment. We are referring to the site designation process, which we describe in chapter 1 and in table 2.2.

4. We did not revise the report to reflect this comment. We believe the report accurately describes the Corps' role with respect to the designation of ocean disposal sites. In addition, the report is consistent with the 1984 joint EPA/Corps site designation guidance which states: "Pursuant to section 102(c), EPA has primary responsibility for site designation. Section 103(b) . . . does provide for site designation by COE [the Corps]." (Emphasis added.)

5. Under section 107(c) of the Marine Protection, Research, and Sanctuaries Act, the Coast Guard is responsible for "other appropriate enforcement activity . . . ." We added "appropriate" to the sentence.

6. We did not revise the report to reflect this comment. We believe that the role that permit terms and conditions play in controlling impacts is acknowledged in chapter 1 in the sections on designation and management of bay and ocean disposal sites, and in chapter 3 in the section on permitted project inspections and disposal site surveillance. Chapter 1 states that permits identify dredging and disposal sites and may contain other provisions required to protect the environment. Chapter 3 states that inspections and surveillance activities are needed to enforce permit

provisions. For example, they would ensure that dredging is limited to approved material and that disposal takes place within designated site boundaries.

7. We did not validate the district's estimates because of time constraints. In addition, as stated in chapter 1, we did not include areas in our review that were to be covered in an Aquatic Habitat Institute study. A draft outline of the Institute's study indicated that it will address historical dredging activity in the Bay Area.

8. We did not revise the report to reflect this comment. We did not examine nonpermitted Corps ocean disposal operations in the Bay Area because (1) they have been limited to disposal operations at the channel bar disposal site, (2) disposal at the channel bar disposal site is limited to material dredged from the main ship channel, and (3) dredging was performed by a Corps hopper dredge. Material dredged from the Oakland Harbor and dumped at the B1B ocean disposal site was performed under a Corps permit and was included in our review.

9. We did not revise the report to reflect this comment. We believe chapter 2 describes the designation of the B1B ocean disposal site in sufficient detail.

10. We did not revise the report to reflect this comment. The final supplement to the environmental impact statement stated that the B1 disposal site had been selected, and not the B1B or 1M disposal sites mentioned by EPA. According to page i of the final supplement, ". . . several ocean disposal sites have been evaluated and ocean disposal B1 site . . . has been selected for dredged material disposal." (Emphasis added.) We believe the report clearly states that disposal would be limited to environmentally acceptable material.

11. We did not revise the report to reflect this comment. An April 4, 1988, region 9 letter indicates that the agreement to limit disposal was reached at a March 15 meeting between EPA and the Corps. In addition, a May 3, 1988, region 9 letter states that EPA concurred in the designation of B1B ". . . in response to your [the district's] April 27 letter requesting EPA's concurrence in the March 18, 1988, Public Notice for the intended use of an ocean disposal site for approximately 500,000 cubic yards of Oakland Inner Harbor dredged material." (Emphasis added.) We believe the report recognizes EPA region 9's role in limiting disposal at the site to material that was tested and found to be environmentally acceptable.

12. We did not modify the table. Site designation responsibilities are discussed in chapter 1 of the report. In addition, as stated in the table, the schedule is tentative.

13. We did not revise the report to reflect this comment. Chapter 3 of the report addresses the need for an effective quality assurance program for sediment-testing activities.

14. We did not revise the report to reflect this comment. The need to consider other factors, besides chemical contamination, is addressed in chapter 1 of the report.

15. We did not revise the report to reflect this comment. Chapter 3 of the report notes that until Corps headquarters issues implementing regulations which enable the Corps to assess penalties for permit violations, the only remedy available to the district is suspension of the permit. This is not an effective tool for ensuring compliance when violations are detected after dredging has been completed.

16. We did not revise the report to reflect this comment. The report recognizes the comments of the Coast Guard and the district officials concerning the surveillance procedures. EPA questioned these procedures but did not provide any specifics.

Comments From the Department of Transportation

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

U.S. Department of Transportation

Assistant Secretary for Administration

400 Seventh St., S.W. Washington, D.C. 20590

SEP - 5 1990

Mr. Kenneth M. Mead
Director, Transportation Issues
Resources, Community, and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Mead:

Enclosed are two copies of the Department of Transportation's comments concerning the U.S. General Accounting Office draft report entitled, "Water Resources: Problems in Managing Disposal of Material Dredged from San Francisco Bay."

Thank you for the opportunity to review this report. If you have any questions concerning our reply, please call Bill Wood on 366-5145.

Sincerely,

Melissa J. Allen for

Jon H. Seymour

Enclosures

Enclosure

I. "WATER RESOURCES: PROBLEMS IN MANAGING DISPOSAL OF MATERIAL DREDGED FROM SAN FRANCISCO BAY" (GAO/RCED-90-188)

II. SUMMARY OF GAO FINDINGS AND RECOMMENDATIONS:

See comment 1.

Needed disposal sites have not been designated because the Army Corps of Engineers (COE) has not completed required environmental studies. Site designation studies have been delayed because the Environmental Protection Agency (EPA) found that the Corps made questionable assumptions in deciding not to study potential disposal sites. Failure to designate sites has resulted in delaying an estimated $31.1 million in economic benefits they were expected to provide. GAO also found other problems in testing guidance, the Corps quality assurance program, inspections, and monitoring efforts.

To prevent future delays in designating disposal sites, GAO recommended that the Secretary of the Army take specific steps to ensure that the feasibility of locating ocean disposal sites off the Continental Shelf is adequately considered. GAO also recommended that the EPA Administrator and the Secretary of the Army issue revised guidance for the biological testing needed to predict the toxicity of contaminated dredged material and other steps to assure that environmental damage at existing ocean and bay sites is kept within acceptable levels.

III. SUMMARY OF DEPARTMENT OF TRANSPORTATION POSITION:

The COE and the EPA are the principal Federal agencies responsible for designating and managing marine disposal sites. The COE and the U.S. Coast Guard share surveillance and enforcement responsibilities over dredged material disposal operations associated with Federal Navigation Projects. The COE, as the agency responsible for these projects, has assumed primary responsibility for conducting surveillance of the dredge spoil disposal at specified locations. In an Interagency Agreement between the U.S. Army Corps of Engineers and the U.S. Coast Guard, signed on September 7, 1976, the U.S. Coast Guard agreed to augment the COE's surveillance efforts with available resources and under the COE's direction. This was done utilizing existing offshore radar capability to track vessels transporting dredge spoils in the San Francisco area. Coast Guard offshore radar coverage is limited to a maximum 24-mile radius from Point Bonita. The inshore coverage area is

bounded by Richmond-San Rafael Bridge to the north, Golden Gate Bridge to the west, and San Mateo Bridge to the south. Vessels using disposal sites outside the area of radar coverage inform the Coast Guard Vessel Traffic Service in San Francisco by marine radio of their intention each time they dispose of dredge spoils. The Coast Guard does not conduct active surveillance of these vessels. There are several alternative surveillance procedures or a combination thereof which could be considered in the COE's final supplement to the environmental impact statement. Until the COE completes development of its comprehensive plan for managing Bay Area disposal sites, Coast Guard surveillance augmentation plans cannot be finalized.

At present the Coast Guard continues to assist the COE under the 1976 Interagency Agreement. The Coast Guard would have to consider its multi-mission requirements and its limited resources and funding in light of any additional surveillance requirements placed on it, particularly before entertaining any plans for a dedicated surveillance effort. The status of a new COE/USCG agreement for Bay Area ocean dumping surveillance is pending COE study of this issue.

The Coast Guard suggests that any future planning for the disposal of dredged materials whether off the Continental Shelf, in the Bay Area, or at an existing site, should include consultation and coordination with the Coast Guard Headquarters and local commands listed below whose resources would be required to perform these surveillance functions:

Commanding Officer
U.S. Coast Guard Vessel Traffic Service
Yerba Buena Island
San Francisco, CA 94130-5013

Commanding Officer
U.S. Coast Guard
Marine Safety Office
Bldg. 14
Coast Guard Island
Alameda, CA 94501-5100

Commander (m), (oan)
Eleventh Coast Guard District
Union Bank Building
400 Oceangate
Long Beach, CA 90822-5399

The following are GAO's comments on the Department of Transportation's letter dated September 5, 1989.

GAO Comments

1. We revised the report where appropriate to reflect these comments.

Major Contributors to This Report

Resources, Community, and Economic Development Division, Washington, D.C.

James Duffus III, Director, Natural Resources Management Issues, (202) 275-7756
Leo E. Ganster, Assistant Director
John P. Scott, Advisor

San Francisco Regional Office

John M. Schaefer, Evaluator-in-Charge
Harry Medina, Evaluator
Karen D. Wright, Evaluator
Susan Chin, Evaluator
Jonathan M. Silverman, Reports Analyst

Requests for copies of GAO reports should be sent to:

U.S. General Accounting Office
Post Office Box 6015
Gaithersburg, Maryland 20877

Telephone 202-275-6241

The first five copies of each report are free. Additional copies are $2.00 each.

There is a 25% discount on orders for 100 or more copies mailed to a single address.

Orders must be prepaid by cash or by check or money order made out to the Superintendent of Documents.

United States
General Accounting Office
Washington, D.C. 20548

Official Business
Penalty for Private Use $300

First-Class Mail
Postage & Fees Paid
GAO
Permit No. G100