CHAPTER 2.0 INTRODUCTION

This chapter describes the objectives, organization, and structure of the Long-Term Management Strategy (LTMS) for San Francisco Bay Area dredged material; presents a brief background on the environmental concerns leading to the initiation of the LTMS; discusses the purpose and need for this Policy Environmental Impact Statement/Programmatic Environmental Impact Report (EIS/EIR) and its role in the overall LTMS process; and describes the structure of the EIS/EIR. This chapter also discusses the limitations of the EIS/EIR, the scoping process used to help identify issues of concern, and the evaluation criteria used to assess the alternatives.

BACKGROUND

The San Francisco Bay/Delta Estuary (the Estuary) is one of the critical maritime thoroughfares in the nation, supporting international trade, commercial and recreational fishing, and recreation. For over a century navigational channels through the Estuary have been created, deepened, and maintained by dredging (the removal of sediments from the bottom) to enable ships to navigate safely into and out of ports, harbors, and marinas without running aground. Today's large commercial ships require deeper channels than ever before, and prospects are for even larger ships in the future. Dredging the region's channels, ports and associated docking, berthing and other facilities will continue to be necessary to maintain adequate depths for vessels to maneuver. Tables 2-1 and 2-2 excerpted from the Seaport Plan (BCDC and MTC 1996) indicate the growing amount of imported cargo and vessel calls in the region.

At the same time, the San Francisco Bay/Delta system is the largest and most significant estuary along the entire west coast of North and South America. Over 40 percent of the land area of the state of California — with 60 percent of the state's runoff — drains into the Estuary where it mixes with the saline waters of the Pacific Ocean. Estuarine conditions support the most productive kinds of ecosystems in the world. However, estuaries have also been among the environmental systems most degraded by human activities, and the Estuary is no exception. The past century of intensive human settlement and development in the Bay Area has severely stressed the Estuary, and brought fundamental changes to the ecosystem. Chief among the causes of significant adverse impacts are extensive habitat loss from diking and filling of baylands and wetlands to create farming and industrial land (over 90 percent of the area's historic salt and brackish marshes have been destroyed); huge diversions of fresh water from the Estuary to Central Valley farms, and to cities as far away as southern California (up to 75 percent of the flow of the Sacramento River is diverted before it reaches the Estuary); and pollution from nonpoint and point-source discharges. Compared to these large-scale perturbations, changes associated with dredging and dredged material disposal are much less significant. However, even minor additional impacts to an already stressed ecosystem can be cause for concern, and dredging and disposal are activities that are often very visible to the public. The public has expressed concerns about the potential for both direct and cumulative effects of these activities on the already-stressed resources of the Estuary, and has sought assurance that dredging and disposal are being properly managed with the health of the overall Estuary in mind.

In recent years, concerted efforts have started to reverse some of the negative impacts of human actions on the Estuary. For example, substantial progress has been made over the last two decades in regulating point-source industrial and municipal discharges so that, for many pollutants, loading from these sources today is less than 10 percent of what it was just 20

Table 2-1. 1988 Baseline Imported Cargo Forecast (1,000s of metric tonnes)

	1990	***1995***	***2000***	***2005***	***2010***	***2015***	***2020***
Container	7,773	11,191	14,334	18,282	22,227	26,956	32,567
Break Bulk	291	395	498	630	770	939	1,146
Neo-Bulk	1,136	1,204	1,290	1,498	1,718	1,959	2,217
Dry Bulk	2,414	3,148	3,677	4,206	4,727	5,330	6,902
Liquid Bulk	522	609	654	725	800	886	983
Total	**12,136**	**16,547**	**20,453**	**25,341**	**30,242**	**36,070**	**43,815**

Findings from the Seaport Plan (BCDC and MTC 1996)

The baseline forecast indicates that total waterborne cargo for the San Francisco Bay Area will more than triple by the year 2020. Cargo in containers, neo-bulk (automobiles and scrap steel), break bulk, dry bulk, and liquid bulk cargoes are all expected to increase, with container cargo volume nearly tripling by the year 2020.

The baseline forecast predicts growth in liquid cargoes, such as vegetables oils. Other liquid bulk commodities are primarily handled at proprietary terminals (such as Chevron's Long Wharf at Richmond), and are not included in the Plan. This Plan focuses on general cargo ports and terminals.

The ports of the Bay Area compete with each other and with other West Coast ports for cargo and the ocean carriers that transport this cargo.

Bulk cargoes have traditionally been a large part of the region's cargo activity; however, there are indications that a technological shift has occurred in the way that break bulk, and possibly other bulk cargoes, are transported, with more kinds of goods being transported in containers, rather than the traditional RO/RO mode. The shift to container shipping of goods will likely increase in the future. Recycling of materials, such as steel scrap and cement, has increased because of state laws requiring local governments to reduce the volume of materials going to landfills, and because of growth in the overseas market for scrap iron and steel. Scrap metal exports are growing at Schnitzer Steel, the Port of Redwood City, and the Port of Richmond.

Significant shifts in the method of transporting forecast cargoes could affect the region's need for bulk terminals to handle forecast cargo volumes. Because of these changes, future needs for bulk terminals and berths may be reduced, thus reducing the need for the number of bulk terminals and berths designated in the Seaport Plan to meet the 2020 cargo forecasts.

Monitoring of the container and bulk cargo volumes is needed to provided a basis for ongoing review of the Seaport Plan findings and policies concerning container and bulk cargo marine terminal designations. Data collected through the monitoring process would be used to evaluate requests to convert bulk terminals to container terminals, or to delete bulk or container terminals from the Seaport Plan. Ongoing cargo monitoring would eliminate the need for updating the cargo forecast every 5 years, and would inform the Committee of emerging trends in bulk and container shipping. Collecting annual data on ship calls, tonnage, berth usage, and numbers of containers moved through the Bay Area's ports will provide the information needed for the Committee to update the Seaport Plan on an as-needed basis, and would indicate if and when a new forecast should be made.

Table 2-2. Vessel Calls per Year

Port Name	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*
Port of Oakland	1,457	1,369	1,346	1,407	1,422	1,466
Port of San Francisco	654	628	609	602	523	443
Port of Richmond	204	217	242	212	161	129
Port of Benicia	215	231	251	255	255	226
Port of Redwood City	10	14	14	13	25	19
Encinal Terminals	57	37	44	11	16	16
Total Bay Area	**2,597**	**2,495**	**2,506**	**2,500**	**2,402**	**2,299**

years ago (SFEP 1992b). Similarly, the rate of filling of remaining Estuary wetland habitats and baylands has slowed dramatically in recent years. In 1994, an historic accord was reached on Delta water quality, diversion limits, and non-flow habitat restoration (Landmark Accord on Bay/Delta Protection 1995), to better balance the irrigation and drinking water demands of farms and cities with the fresh water flow and habitat needs of the Estuary. In addition, the Estuary Project (described later in this chapter) completed a Comprehensive Conservation and Management Plan (CCMP) for the Estuary that was signed by both the state and federal governments in 1993 (SFEP 1994). The CCMP contained a range of action items to address specific environmental problems facing the Estuary, including dredging and waterway modification. Development of a Long-Term Management Strategy (LTMS) for San Francisco Bay Area dredged material was one aspect of maintaining and improving the environmental quality of the Estuary called for in the CCMP. The following sections describe the San Francisco LTMS process, its organization, and its goals.

2.1 THE SAN FRANCISCO LONG-TERM MANAGEMENT STRATEGY

The LTMS for San Francisco Bay Area dredged material was established to create a partnership among agencies, navigation interests, fishing interests, environmental organizations, and the public to find acceptable disposal alternatives and to address the various regional concerns regarding dredging and disposal of dredged material. The LTMS seeks to develop a technically feasible, environmentally suitable, and economically prudent long-range approach to meeting the San Francisco Bay region's dredging and disposal needs over the next 50 years. The effort is led by two federal and three state agencies that have the primary responsibility and authority to regulate dredging and dredged material disposal in the Bay Area. These agencies are:

- *U.S. Army Corps of Engineers (COE).* For over a century the COE has had the responsibility of maintaining the navigability of the region's and nation's waterways. The COE constructs new congressionally authorized navigation projects, conducts maintenance dredging of existing federal channels, and issues permits for private dredging activities.

- *U.S. Environmental Protection Agency (EPA).* EPA has regulatory oversight authority over disposal activities to ensure that disposal does not result in significant adverse effects on marine and estuarine resources. EPA establishes the environmental criteria and guidelines that dredging projects conducted or permitted by the COE must meet, and EPA reviews all proposed projects based on these criteria and guidelines.

- *San Francisco Bay Conservation and Development Commission (BCDC).* BCDC is responsible for protecting the Bay from unnecessary filling (including fill from dredged material disposal) and for encouraging environmentally and economically sound uses of the Bay. BCDC issues permits for most dredging and disposal activities in the Bay.

- *San Francisco Bay Regional Water Quality Control Board (SFBRWQCB).* SFBRWQCB is responsible for protecting the quality and beneficial uses of the Bay's water. Dredging and disposal projects must be certified by SFBRWQCB as not violating water quality objectives. SFBRWQCB also conducts or oversees various environmental monitoring programs that are relevant to dredged material management.

- *State Water Resources Control Board (SWRCB).* SWRCB establishes the state's water quality objectives, and oversees the Regional Water Quality Control Boards throughout the state.

Since 1990, the LTMS agencies have been working to develop a comprehensive approach for management of the Bay Area's dredging activities over the next 50 years. Additional information about the laws and policies administered by each of the LTMS agencies and other agencies involved in dredged material issues is provided in section 4.8 (Regulatory Framework).

2.1.1 LTMS Organizational Structure

The LTMS organizational structure, shown in Figure 2.1-1, is designed to facilitate maximum public input and policy discussion. Broad public input is gained via the Policy Review Committee, composed of interested parties and other agencies, which meets quarterly to review the work and progress of the LTMS. Technical committees or "workgroups" form the foundation of LTMS and are charged with addressing technical issues associated with in-Bay, ocean, and upland or wetland reuse and disposal. While the workgroups are directed by LTMS agency staff, representatives from the environmental, business, ports, and fishermen communities make up the majority of the workgroup participants.

A Management Committee, comprised of management executives from the five lead LTMS agencies, oversees the technical workgroups and considers input from the Policy Review Committee. A Technical Review Panel of independent experts also meets to review selected LTMS studies and reports, and provides comments to the Management Committee. The Management Committee, in turn, takes direction from the Executive Committee which consists of the chairpersons of the SFBRWQCB and BCDC, the EPA Regional Administrator, the State Dredging Coordinator, and the Commander of the South Pacific Division of the COE.

Under the LTMS management structure, EPA was given the lead responsibility to identify and designate a new ocean disposal site. BCDC was the lead agency for evaluating upland disposal alternatives and beneficial reuse of dredged material. As the lead on in-Bay disposal issues, the SFBRWQCB examined existing and new in-Bay disposal sites. The COE was assigned responsibility for coordination and management of the overall LTMS effort.

Public and agency participants in the LTMS workgroups and committees are listed in Appendix A.

2.1.2 Overall Goals and Objectives of the LTMS

The formal goals of the LTMS, adopted by the Executive Committee on June 7, 1991, are as follows:

- Maintain in an economically and environmentally sound manner those channels necessary for navigation in San Francisco Bay and Estuary and eliminate unnecessary dredging activities in the Bay and Estuary;
- Conduct dredged material disposal in the most environmentally sound manner;
- Maximize the use of dredged material as a resource; and
- Establish a cooperative permitting framework for dredging and dredged material disposal applications.

To achieve these goals, the participating agencies have also formally adopted the following objectives for the San Francisco LTMS process:

- Coordinate the efforts of responsible agencies regarding dredging activities in San Francisco Bay and Estuary, including activities to reduce contaminant flow into sediments.
- Identify an array of acceptable sites for disposal of material dredged from the Estuary. Sites shall be selected from a prioritized list developed on the basis of agreed-upon criteria. The site selection process shall be based on adequate scientific studies, strategies that reduce adverse impacts and increase benefits, and environmental analysis.
- Promote the reuse of dredged materials whenever it is shown that there is a need for the material and the placement can be done in an environmentally acceptable manner.
- Describe federal, state, and local authorities, criteria, policies, and protocols for dredging and the disposal of dredged materials.

2.1.3 Phases of the LTMS

Conceptually, an overall LTMS process is divided into five sequential phases, each of which leads to decisionmaking before continuing to the next phase

Figure 2.1-1 LTMS Organizational Structure

(Francingues and Mathis 1989). The San Francisco LTMS is following this phased approach. The individual phases of LTMS development, as described in the following paragraphs, are as follows: Evaluate Existing Management Options; Formulate Alternatives; Detailed Analysis of Alternatives; LTMS; Implementation; and Periodic Review and Update. Each phase is briefly described below.

2.1.3.1 Phase I: Evaluate Existing Management Options

The LTMS agencies completed the Phase I evaluation of existing management options and needs, and published the findings of this evaluation (USACE 1990b). The Phase I report concluded that there was clearly a shortfall in disposal capacity, especially for planned "new work" dredging projects; that no multi-user capacity existed for disposal of contaminated dredged material; that environmental concerns about the practice of in-Bay disposal needed to be addressed; and that beneficial reuse options for dredged material should be considered as a high priority wherever feasible. As a result of the Phase I evaluation, the decision was made to move on to Phase II of the LTMS process, and the goals and objectives listed above for the San Francisco region LTMS were adopted.

2.1.3.2 Phase II: Formulate Alternatives

The objective of Phase II is to formulate and identify a list of viable long-term dredged material management options. It calls for equal consideration of upland, wetland, intertidal, and open water (in-Bay and ocean) sites, and potential structural measures to reduce the need for dredging. In this phase, the need for environmental, engineering, and economic studies was determined, and based on these a study plan was developed. The LTMS Study Plan — which included descriptions of study tasks, a program budget, and agency staffing needs — was adopted in 1991.

2.1.3.3 Phase III: Detailed Analysis of Alternatives

This phase provides for a thorough analysis of existing dredged material management, and detailed screening, evaluation, and selection of the preferred long-term dredged material management strategy. This EIS/EIR presents and documents the Phase III LTMS evaluation. This is a Policy EIS/Program EIR — intended to select the overall management approach the LTMS agencies will follow, as opposed to identifying all of the specific measures that may be needed to fully implement the preferred approach. The Environmental Assessment Checklist that was prepared (see Appendix B) pursuant to the California Environmental Quality Act (CEQA) indicated that such a policy/programmatic document was required. Full implementation will involve many specific decisions addressing administrative, procedural, management, and monitoring issues that cannot be evaluated in detail until the overall management approach has been determined. These kinds of decisions will be considered in detail in Phase IV (Implementation) and Phase V (Periodic Review and Update) of the LTMS process. However, a variety of implementation issues that effectively serve as mitigation measures for any of the overall policy approaches, are discussed in Chapter 5 of this document. In addition, different options that the agencies will consider (during Phase IV) for achieving the distribution goals of the preferred alternative are presented in Chapter 7 for preliminary public comment.

Based on the preferred alternative, specific implementation measures will be initiated in Phase IV.

2.1.3.4 Phase IV: LTMS Implementation

The purpose of Phase IV is to develop and adopt the specific management plan for implementing the overall dredged material management approach selected in Phase III. In Phase IV, a draft Comprehensive Management Plan to replace the existing LTMS Interim Management Plan (LTMS 1994a) will be developed and circulated for public comment. Considerations for Phase IV plan development will include administrative, procedural, management, and monitoring requirements. Following the opportunity for public comment, the Management Plan will be finalized and adopted by the LTMS agencies. The Management Plan will include specific policies and procedures covering each of the available dredged material disposal or reuse sites, as well as a description of the agencies' joint procedures for processing and making decisions about proposed dredging projects in the region.

2.1.3.5 Phase V: Periodic Review and Update

The final phase of LTMS development is the periodic re-evaluation of the Management Plan, based on changing regulatory, environmental, technologic, and economic conditions. Public involvement is a critical aspect of this periodic review. The intent of Phase V is to ensure that agency decisionmakers will maintain a viable implementation strategy that reflects changing conditions and concerns. The LTMS agencies are planning to review the San Francisco region's Comprehensive Management Plan every other year and review the overall program every 6 years.

2.1.4 LTMS Work Groups

The LTMS work groups have the responsibility of developing all of the LTMS concepts, work plans, and studies that fall under the five phases of the LTMS. As explained above, the LTMS work groups are organized into three study areas: the Ocean Studies (EPA and COE), the in-Bay Studies (COE and RWQCB), and the Upland Studies (COE and BCDC).

Below is a brief summary of the work that has been accomplished by each work group, as well as studies that have resulted from work group collaboration. The San Francisco Estuary Project's *Comprehensive Conservation and Management Plan Workbook* (SFEP 1996), as well as the *LTMS Status Report July 1995 — Accomplishments and Tasks Ahead* (LTMS 1995e), include more detailed outlines of tasks that have been completed.

2.1.4.1 Ocean Studies

Over 1,000 square miles off the Bay Area coast were surveyed to identify candidate disposal sites with the appropriate seafloor stability, sediment types, and topographic features to accommodate and contain dredged material following disposal. Thirteen reports were published in 1992 that focused on the resources at potential sites, geological and geophysical surveys, current patterns and circulation studies in the area of potential disposal sites, and modeling of potential deposition and water column turbidity at the sites. An EIS (EPA 1993a) was prepared for the designation of a deepwater dredged material disposal site, now known as the San Francisco Deep Ocean Disposal Site (SF-DODS).

2.1.4.2 In-Bay Studies

In-Bay studies focus on reaching a better understanding of the San Francisco Bay's complex estuarine system, which is influenced by river outflows, ocean tides, and multiple human uses of its waters and shores. Studies examined whether disposed material is influenced by water and sediment circulation around the Bay, the toxicity of contaminated sediments to bottom-dwelling mollusks, whether fish in disposal areas are exposed to more contaminants, and whether contaminants in sediments are distributed around the Bay via dredge disposal operations.

Twelve different studies to obtain a better understanding of the behavior and fate of sediments in the Estuary have been completed since 1992. At least six studies that focused on in-Bay environmental effects examined bioaccumulation and effects on fish habitat. Studies have also been conducted on the effects of suspended solids on estuary organisms. A complete list of studies is available in the LTMS Status Report (LTMS 1995e).

2.1.4.3 Upland/Wetland Reuse Studies

Placing material at upland sites — whether in a wetland, landfill, rehandling facility, or containment facility — raises planning, engineering, and political questions, as well as scientific questions. The upland/wetland reuse work group focused on a variety of subjects. These include the opportunities for and constraints of using dredged material as a resource for wetland restoration, landfill cover, and other uses; the potential for placing contaminated sediments in upland areas; and the development of demonstration projects. In addition, this work group examined the feasibility of the creation and operation of rehandling facilities, the potential for treating contaminated material for reuse, and regulatory and land use issues that could prevent wetland restoration using dredged material and other beneficial reuse projects.

In 1990, a comprehensive inventory of 75 upland/wetland reuse sites was completed to determine their suitability for beneficial reuse projects, rehandling facilities, or confined upland placement. Advances have also been made in efforts to identify dredged material reuse and non-aquatic disposal opportunities and constraints. At least 13 studies of upland disposal and beneficial reuse options have been completed. In 1994, the LTMS report *Tidal Wetland Restoration Potential Using Dredged Sediments* was completed (LTMS 1994g). In addition, an evaluation of regulatory and land use elements of dredged material reuse was completed in 1993.

2.1.4.4 Work Group Collaboration — Planning Studies

Work group collaboration has resulted in vast progress in planning studies, including those that focus on the identification of dredged material disposal needs and options, disposal alternatives, and cost estimates. A 1992 report and various follow-up papers focused on dredging project needs, methods to reduce dredging volume requirements, and techniques to eliminate unnecessary dredging. In addition, the LTMS work groups identified all available disposal and reuse options through reports completed between 1992 and 1994. The EIS/EIR contains discussions of the disposal options and the four alternative disposal plans selected and evaluated. A cost estimating model was

also completed in 1994, and both benefit assessments and financial analyses of the different disposal options are included in this EIS/EIR (see sections 4.6 and 6.2). Collaboration of the work groups has also resulted in the development of sediment quality objectives by clarifying testing protocols for ocean, in-Bay, and upland disposal (see section 3.2.5).

2.2 HISTORICAL PERSPECTIVE LEADING TO THE LTMS

The LTMS objectives described above stem directly from the recent history of dredging and dredged material disposal in the San Francisco Bay region, and the problems that have emerged. The background leading up to this EIS/EIR is presented below.

2.2.1 Historical Dredged Material Management in the San Francisco Bay Region

The history of dredging and dredged material management in the Bay Area has been documented in a variety of recent sources, including *The Tule Breakers — The Story of the California Dredge* (Thompson and Dutra 1983); the *Status and Trends Report on Dredging and Waterway Modification in the San Francisco Estuary* (SFEP 1990); the *Comprehensive Conservation and Management Plan* (SFEP 1994); and the *LTMS Progress Report and Interim Management Plan* (LTMS 1994a). The following brief summary is drawn primarily from these sources.

Large-scale dredging has occurred in the Estuary for over 100 years. Many dredge-like machines were used beginning in the 1860s to convert vast tracts of delta marshland into dry farmland. Dredging for navigation purposes occurred as early as the 1850s to maintain channels for a commuter ferry and other vessels into Oakland, and dredges commonly worked the San Francisco waterfront's berthing areas and wharves in the 1860s and 1870s. Dredging to remove mining debris from navigable river channels was occurring by this time, as well, and the first proposal to use dredges to improve inland navigation between San Francisco Bay and Stockton appeared as early as 1870 (Thompson and Dutra 1983). Using processes that are not fundamentally different from those used today, these early dredges worked with self-dumping scows to dispose of the dredged materials away from the navigation channels. Dredged materials from San Francisco Bay navigation channels have continued to be disposed of primarily within the Estuary since then.

Through the years, maritime commerce and growth and development in the Bay Area have gone hand-in-hand. As the population grew, and commerce to and through Bay Area ports increased, more and deeper navigation channels were dredged to accommodate more vessel traffic and larger ships. Prior to 1972, dredged material was disposed at 11 sites within San Francisco Bay. In 1972, the Corps limited disposal to five high-energy sites where dispersion and eventual transport to the ocean was expected. In 1975, two of these sites (both in the South Bay) were de-designated because they were not dispersive.

The state and federal resource agencies also expressed their concerns and, frequently, voiced strong opposition to the high volumes and questionable chemical quality of the sediments disposed of at in-Bay sites. Agency concerns relating to declining sportfish catch in central San Francisco Bay, possible exposure of winter-run chinook salmon to dispersive sediments containing elevated levels of contaminants, and the need for more routine use of the solid phase bioassay in characterizing the suitability of dredged material for aquatic disposal helped create a climate in which the current multiagency LTMS emerged from its one-dimensional predecessor, the COE's Dredging Management Program.

Today, three designated in-Bay disposal sites remain available for use by various dredgers and projects. These are located in Carquinez Strait (SF-9), San Pablo Bay (SF-10), and near Alcatraz Island (SF-11) (see Figure 2.2-1). An average of approximately 4 million cubic yards (mcy) of sediment per year are dredged from the Central and South Bay and disposed at the Alcatraz site, which is the most heavily used of the existing in-Bay sites. Two additional aquatic disposal sites are restricted to disposal of clean sand from COE maintenance dredging projects only: the Suisun Bay site (SF-8) for dredged material from the Suisun Channel; and the San Francisco Bar Channel site, an ocean disposal site for material from maintenance dredging of the San Francisco Bar

Figure

Channel just outside the Golden Gate. In 1993, EPA formally designated the new San Francisco Deep Ocean Disposal Site (SF-DODS) approximately 50 miles offshore of the Golden Gate. The SF-DODS represents the first major multi-user alternative to the historic practice of in-Bay disposal of dredged material.

2.2.2 "Mudlock"

Although sediments dumped at the Alcatraz site were expected to disperse to the ocean, in late 1982 a mound was discovered. Even after the COE tried various disposal and site management options — including flattening the mound — the mounding continued. The changing peak mound size in comparison to the amount of material dumped is illustrated in Figure 2.2-2. It became apparent that the capacity of the Alcatraz site was less than the amount of material disposed there during the 1980s and was certainly less than could accommodate the substantial volumes of material that would be generated by new work projects that were planned to be constructed over the next several years. Discovery of the Alcatraz mounding was the beginning of a period of fragmented agency management, public environmental concerns, and resulting dredging project delays that eventually became known as "mudlock."

While the navigation problems posed by mounding and the longer range management problems implied by the physical capacity limitations at the Alcatraz site were coming to light, concerns regarding the environmental impacts of dredged material disposal on fisheries and other ecological resources were being expressed by environmental groups, the fishing community, and other members of the public. In general, dredging and dredged material disposal can disturb or bury benthic organisms (such as clams, worms, or crabs), can affect fishing success by temporarily increasing suspended sediment near the disposal site, and can potentially release contaminants that may be bound in the sediments when they are disturbed by dredging and disposal operations. Concerns were therefore raised about impacts from dredging and disposal activities on aquatic organisms and water quality. The fishing community was especially concerned about a sudden decrease in fishing success in and around Central San Francisco Bay during 1987 and 1988. The competing needs and concerns of industry, ports, fishermen and the environment reached a dramatic peak beginning in 1989, when a flotilla of fishing boats and other vessels physically blockaded the Alcatraz disposal site for a short time.

The scope of public concern reached outside of the Estuary as well and brought ocean dumping to a halt for an important dredging project. The B1B ocean dredged material disposal site, located approximately 20 nautical miles offshore of Half Moon Bay, was used between May 12 through 16, 1988 for disposal of 18,000 cubic yards (six hopper bargeloads) of sediments from the Port of Oakland Harbor Deepening Project. This site was selected as part of a project-specific site designation for this project only (USACE 1988). Disposal operations at this site ceased as a result of a lawsuit and a State Court injunction (USACE 1989).

At about the same time, the winter-run chinook salmon that migrates through the Estuary became listed as an endangered species. Populations of this fish have been severely reduced by numerous upstream actions, such as damming and diversion of rivers. This has left the remaining fish potentially more vulnerable to any action that affects successful migrations, including the disposal of dredged material in a manner that promotes widespread dispersion, especially during peak periods of migration.

Mounting scientific and public concern about the health of the Estuary overall, increasing controversy about the effects of dredging and disposal of dredged material within the Estuary, and the realization that disposal volume limitations were necessary at the Bay Area's primary disposal site, led the various agencies with authority over different aspects of dredging projects to begin to review and tighten their regulatory requirements. However, most actions continued to be taken on a case-by-case and agency-by-agency basis. The results were often lack of predictability for dredging project sponsors, lack of public confidence that environmental resources were adequately being protected and, ultimately, project delays and related economic impacts to ports and other dredgers. Regulatory certainty, from many perspectives, was at an all-time low.

In response to mudlock, the COE in 1990 initiated a long range interagency planning process for dredged material management. The resulting effort — the LTMS for San Francisco Bay Area Dredged Material — was organized to address dredging-related issues in detail and to develop a comprehensive dredged material management plan.

Figure 2.2-2. Alcatraz Disposal Site: Material Dumped and Peak Mound Elevations, 1986-1997

2.2.3 Relationship of the San Francisco Estuary Project to the LTMS

During the same period that mounding problems were discovered, efforts to restore and improve environmental quality of the Estuary as a whole were accelerating. The SFEP was established by EPA in 1987 to "promote effective management of the San Francisco Bay-Delta Estuary and to restore and maintain its water quality and natural resources." SFEP was a broad-based and cooperative program that brought together over 100 representatives from private and public interests in the region. The goals of the Estuary Project were to:

- Develop a comprehensive understanding of environmental and public health values attributable to the Bay and Delta and how these values interact with social and economic factors;Achieve effective, united, and ongoing management of the Bay and Delta;

- Develop a Comprehensive Conservation and Management Plan to restore and maintain the chemical, physical and biological integrity of the Bay and Delta, including restoration and maintenance of water quality; a balanced indigenous population of shellfish, fish, and wildlife; recreation activities in the Bay and Delta; and ensure that the beneficial uses of the Bay and Delta are protected; and

- Recommend priority corrective actions and compliance schedules addressing point and nonpoint sources of pollution.

- The SFEP identified five critical areas of environmental concern facing the Estuary: intensified land use; decline of biological resources; freshwater diversion and altered flow regime; increased pollutants; and dredging and waterway modification. The portion of the SFEP's discussions and research that focused on dredging management issues at the time, identified the following as specific objectives needing attention:

- Determine the behavior and fate of sediments in the Estuary and adopt policies to manage their modifications;

- Determine the bioavailability of contaminants released by disposal of dredged material through methods such as bulk chemistry assays, toxicity bioassays, and bioaccumulation tests;

Major Problems Facing the San Francisco Bay/Delta Estuary

- Intensified land use
- Decline of biological resources
- Freshwater diversion and altered flow regime
- Increased pollutants
- Dredging and waterway modification

- Develop a comprehensive regional strategy to better manage dredging and waterway modifications and ancillary activities;

- Encourage the reuse of dredged material for projects such as wetlands creation or maintenance, levee maintenance, landfill cover, and upland building material where environmentally acceptable; and

- Identify threats to and benefits for Estuary resources from future modifications to waterways.

Under the SFEP, numerous studies were initiated to advance technical understanding of the San Francisco Bay/Delta Estuary, and to identify ways to improve management of the Estuary's resources and uses. After five years, the Project's goal of developing a Comprehensive Conservation and Management Plan (CCMP) for the Estuary was achieved. The CCMP (SFEP 1994) includes action recommendations in each of the five problem areas. The actions identified acknowledge the importance of managing the Estuary for both environmental protection and for its many competing human uses. The CCMP's specific dredging-related recommendations are presented in Appendix C.

Since the conclusion of the SFEP process, the LTMS agencies further refined the specific management issues needing to be addressed, identified key gaps in technical knowledge, and conducted numerous additional technical studies to address these information gaps (see the July 1995 LTMS Status Report, *Accomplishments and Tasks Ahead* [LTMS 1995e], for a description of the technical studies conducted under the LTMS). Much of the information from both the SFEP and LTMS technical studies was used in the preparation of this EIS/EIR.

Although the SFEP geographic area of focus included the Delta, the area of focus of the LTMS — a joint effort of federal and state agencies with jurisdiction over San Francisco Bay — did not. Instead, the LTMS focused on the San Francisco Bay, and did not consider Delta dredging projects that are carried out or permitted

by the U.S. Army Corps of Engineers, Sacramento District. However, as a part of the LTMS, upland disposal options located in the Delta region were investigated and existing constraints regarding the use of dredged material in the Delta for levee maintenance, including salinity impacts and restricted barge access, considered. Currently, the LTMS is coordinating with agencies and programs in the Delta, including the Department of Water Resources, the Central Valley Regional Water Quality Control Board, local reclamation districts, and the CALFED program, to address these constraints and potentially expand opportunities for using dredged material for Delta levee maintenance. Perhaps these issues as well as others surrounding dredging and disposal issues in the Delta region could also be addressed through the establishment of a program similar to the LTMS.

2.2.4 National Dredging Policy

At the same time that this region has been developing a plan for dredged material management, national attention has also been directed toward reviewing dredging policies as a whole. In late 1993, an interagency working group was convened at the request of the White House to develop a new national dredging policy that would address existing problems with the dredging process. The "Interagency Working Group on the Dredging Process" was chaired by the Maritime Administration (MARAD) and consisted of EPA, COE, the U.S. Fish and Wildlife Service, and the National Oceanographic and Atmospheric Administration. This group acknowledged the important role ports play in the United States' economy, defense, and environment and also recognized that ports and their related activities can adversely affect the nation's ecological resources. The working group stressed the need to promote greater regulatory certainty, and the importance of long-term management strategies for addressing dredging and disposal needs at both the national and local levels. The working group also recommended the formation of regional dredging teams to better address dredging issues at the local level. The LTMS effort was expressly recognized in their report to the Secretary of Transportation, *The Dredging Process in the United States: An Action Plan for Improvement* (MARAD 1994), as a good example of effective local decisionmaking. Many of the issues identified in the MARAD report mirror the problems that have occurred in the San Francisco Bay region. Similarly, their proposed solutions include undertaking more LTMS-like cooperative efforts nationwide. The working group's proposal for elements of a national dredging policy, and their list of specific recommendations for improving the dredging process, are presented in Appendix D.

2.2.5 Relationship of the LTMS to the CALFED Bay/Delta Program

Another regional program that has overlapping interests and goals with LTMS is the Bay-Delta CALFED program (a joint effort between the California and federal governments), which is working to resolve issues surrounding water allocations and diversions, and the environmental impacts that result from them. A large component of CALFED is ensuring the integrity of the Bay-Delta system, including providing for bolstering Delta levees. Another principal aspect of the program involves actions to restore and protect critical species in the Estuary and reduce stresses on those species. CALFED will allocate hundreds of millions of state and federal funds to projects implementing these components. The use of dredged material for habitat and/or levee projects addressing CALFED concerns provides a way to leverage funds to meet the goals of both CALFED and the LTMS. The LTMS agencies have communicated their interest in coordinating with the CALFED program to meet mutual program objectives.

2.3 EIS/EIR SCOPING PROCESS

The EIS/EIR scoping process effectively began when the LTMS was initiated in 1990. Although much progress had been made toward better environmental protection and coordinated management since the inception of the LTMS, the agencies wanted to continue working toward a management system that addressed the overall LTMS goals in a comprehensive manner. Interested parties, invited to participate in the process of framing the dredged material management issues that needed to be programmatically analyzed in an EIS/EIR, played a major role in developing and reviewing Phase I and Phase II of the LTMS. This extended dialogue, afforded through the LTMS technical workgroups, Policy Review Committee meetings, and the Management and Executive Committee meetings, provided significant early opportunities for both formal and informal public input into the agency policy development process.

Comments related to dredged material management also arose during the public review and comment periods for individual projects (such as the Port of Oakland -42-foot Deepening Project), and during the review process for development of new dredged material disposal and reuse sites (in particular, the recently designated San Francisco Deep Ocean

Disposal Site, and the beneficial reuse associated with the Sonoma Baylands Wetlands Enhancement Project). Public comments expressed on these and other projects were important additional sources of information to the LTMS agencies in deciding whether to prepare an EIS/EIR for the LTMS program, and what its scope should be.

In 1992, the LTMS agencies decided to prepare a Policy EIS/ Program EIR as part of Phase III of LTMS to evaluate and solicit additional public input on different overall approaches for dredged material management in the region. An Interested Parties workgroup was formed to assist with the scoping and development of the EIS/EIR. The LTMS agencies published a Notice of Intent/Notice of Preparation (Scoping Notice) in July 1993, which announced the decision to prepare an EIS/EIR and listed a preliminary set of alternatives approaches.

EIS/EIR Interested Parties Group

George Armstrong	Department of Boating & Waterways
James Patterson	Department of Boating & Waterways
John Beuttler	United Anglers of California
Ellen Johnck	Bay Planning Coalition
Cynthia Koehler	Natural Heritage Institute
Jim McGrath	Port of Oakland
Jim Royce	Sierra Club
David Nesmith	Sierra Club
Barbara Salzman	Marin Audubon Society
Roberta Jones	Port of San Francisco
Mary Howe	State Lands Commission
James Trout	State Lands Commission

The release of the Scoping Notice and the subsequent public comments, provided in writing and during the public meetings, began the formal scoping process for the EIS/EIR. There have been over 10 public scoping meetings, including with the workgroups and the LTMS Policy Review Committee (which also includes interested members of the public), since the formal scoping process began. The release of the LTMS Progress Report and Interim Management Plan in August 1994 afforded an additional opportunity for public comment on the dredged material management activities.

The major issues of concern raised by the public throughout the LTMS process to date can be broadly grouped into the following five overall issue statements:

1. There is a need to ensure adequate, suitable disposal capacity for projected volumes of dredged material;

2. There is a need to ensure appropriate environmental protection;

3. There is a need to improve coordination and integration of agency policies governing the management of dredged material in the region;

4. There is a need for a regional framework to facilitate the use of dredged material for beneficial purposes; and

5. There is a need to identify appropriate funding mechanisms to address these issues and to facilitate the overall goals of the LTMS.

Taken together, these overall issues of public concern were used to define the Need for Action evaluated in this EIS/EIR, as described below in section 2.4. They also formed the basis for the Evaluation Criteria used to compare the alternative management approaches, as discussed in section 2.5. A description of the process used to develop the specific alternatives evaluated in the EIS/EIR is presented in Chapter 5.

Proposed Action of the LTMS EIS/EIR

To select a long-term strategy that will guide the regional agencies' dredged material management decisions in the San Francisco Bay Area over the next 50 years.

2.4 PROPOSED ACTION

The proposed action evaluated in this EIS/EIR is *to select a long-term strategy that will guide the regional agencies' dredged material management decisions over the next 50 years.*

This document has been prepared by the LTMS agencies to evaluate alternative long-term management approaches, and to facilitate public comment on them. The California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) require an environmental review of proposed projects or actions that may significantly affect the quality of the environment. However, selection of a long-term strategy or overall policy approach for managing dredged material is different than evaluating a specific project. This EIS/EIR evaluates a "no-project action" of a policy or programmatic nature. Project-specific reviews and approvals, including NEPA and CEQA compliance as appropriate, will still be necessary, regardless of which overall long-term management approach is selected through this EIS/EIR.

2.4.1 Purpose for Action

The purposes of the proposed action closely mirror the LTMS goals described earlier. A fundamental purpose of the proposed action, described in broad terms, is *to distribute the dredged material among the three environments — in-Bay, ocean, and upland/wetland reuse (UWR) — in a manner that minimizes environmental impacts and maximizes environmental benefits in an economically sound manner*. This objective is discussed in terms of *dredged material placement distributions*. This EIS/EIR analyzes and compares the major environmental impacts and benefits of alternative overall management approaches, made up of different relative distributions of dredged material among upland, in-Bay, and ocean placement environments. Four of the five overall public concerns listed above (adequate suitable capacity, appropriate environmental protection, facilitating beneficial reuse, and identifying funding mechanisms) are addressed in part by this purpose for the proposed action.

A second purpose of the proposed action is *to identify guidelines for use during project planning to avoid or reduce potential environmental harm while conducting necessary dredging and disposal activities.* This objective is discussed in terms of *policy-level mitigation measures common to all alternatives*. These measures, discussed in more detail in Chapter 5, emphasize comprehensive analysis of environmental impacts and risks (including cumulative impacts), and mitigation of potential adverse environmental effects. Many of these policy-level measures already exist as regulatory or policy requirements of one or more of the LTMS agencies.

Three of the overall public concerns are addressed in part by this purpose for the proposed action (environmental protection, improved coordination of agency policies, and facilitating beneficial reuse).

A third purpose of the proposed action is to *develop policies to improve regulatory certainty across all disposal options.* The overall policies discussed in this EIS/EIR have been jointly developed by the LTMS agencies, and would be jointly adopted and implemented via the LTMS Management Plan (Phase IV of the LTMS). An understandable, consistent regulatory framework is one in which dredging interests can plan their projects with a greater degree of predictability, while the public can be confident that a proper dredged material management system is in place so that significant environmental impacts will not occur. Each of the public concerns outlined above is addressed to a degree by a management system that successfully improves regulatory certainty.

Finally, the EIS/EIR introduces for public comment a range of mechanisms that the agencies can consider for later implementation of the overall management approach selected via this EIS/EIR process. These are presented at this time so that the public may comment on them while still in the preliminary stages. Public comment on these implementation options will be used in the design of the subsequent LTMS Management Plan.

2.4.2 Need for Action

During the 7 years since the LTMS was initiated, the public has both formally and informally provided extensive comments on the dredged material management issues requiring attention, as described in section 2.3. The five major issues of public concern listed above have been restated to define the needs for the proposed action evaluated in this EIS/EIR. The action evaluated in this EIS/EIR is intended to:

1. Ensure adequate, suitable disposal capacity for projected volumes of dredged material;

2. Ensure appropriate environmental protection;

3. Improve coordination and integration of agency policies governing the management of dredged material in the region;

4. Develop a regional framework to facilitate the use of dredged material for beneficial purposes; and

5. Identify appropriate funding mechanisms to address these issues and to facilitate the overall goals of the LTMS.

Each of these issues is discussed below.

2.4.2.1 Need to Ensure Adequate Disposal Capacity for Projected Volumes of Dredged Material

The discovery of accumulation, or mounding, of disposed material at Alcatraz, the Bay Area's primary disposal site, highlighted three key issues associated with dredged material disposal capacity: (1) the need to reduce reliance on in-Bay disposal; (2) the need to ensure adequate capacity for contaminated material that cannot be placed at unconfined aquatic disposal sites; and (3) the need to establish multi-user options for beneficial reuse of dredged material.

Reduce Reliance on in-Bay Disposal. The mound at the Alcatraz site indicated that site capacity projections developed during the early 1970s were based on incorrect assumptions about the connection between dispersal and disposal rates. This was very important, because exceeding the physical capacities of the in-Bay disposal sites had the potential to cause navigational hazards should mounds develop near active shipping channels. In addition, since actual disposal capacity was less than projected, additional capacity at new sites would be needed to accommodate planned maintenance and new work dredging projects. This realization complicated the planning process for projects being considered because, at the time, no additional disposal capacity was available. The unanticipated shortfall in capacity at the Alcatraz site underscored the vulnerability and inflexibility of the management system's reliance on one primary aquatic disposal site. The need for a more diverse set of disposal options was clear.

After the initial mounding event at Alcatraz in 1982, and its reappearance in 1985, the agencies that would later form the LTMS began to develop cooperative management practices to control the mounding problems, and launched a search to identify alternative disposal or placement sites outside of the stressed Estuary.

Ensure Adequate Disposal Capacity for Contaminated Material. The immediate need to diversify aquatic disposal options, and/or to decrease reliance on the Alcatraz and in-Bay disposal sites, was partially met in 1994 by the designation of a new Deep Ocean Disposal Site by EPA. However, this new site did nothing to provide disposal capacity for dredged material that is contaminated, or otherwise unsuitable for unconfined aquatic disposal. Currently, the burden of identifying and providing alternate disposal sites for such material, and the associated additional disposal costs, falls on individual project sponsors. There remains a need to provide adequate capacity for the proper management of this material, and to facilitate its beneficial reuse whenever possible. In addition, there remains a need for adequate rehandling capacity so that such material can be processed (dewatered and adequately dried) for transport to appropriate disposal or reuse sites.

Establish Options for Beneficial Reuse. Few multi-user placement or rehandling sites exist in the Bay Area today for the beneficial reuse of dredged material. In addition, as mentioned above, only extremely limited capacity exists today to rehandle dredged material so that it can be transported to various beneficial reuse sites. Instead, beneficial reuse of dredged material to date has been accomplished on a project-specific basis, and dredging project sponsors typically have had to identify and prepare beneficial reuse sites themselves, and/or individually bear the costs for beneficial reuse. As long as there is a significant shortage of beneficial reuse sites that are available to a variety of users (so that acquisition, development, and operations costs can be shared equitably), and as long as mechanisms to efficiently move substantial volumes of dredged material to these sites (e.g., rehandling facilities) are not in place, the region's ability to realize the benefits associated with reusing dredged material as a resource will remain limited.

2.4.2.2 Need to Ensure Appropriate Environmental Protection

Perhaps the most prominent public concern regarding dredged material management is the concern about potential environmental impacts. The SFEP identified dredging and waterway modification as one of the five critical issues facing the Estuary, and public concern has been voiced regarding environmental impacts in each of the potential disposal environments: in-Bay, ocean, and upland/wetland reuse.

The potential impacts resulting from disposal of material at in-Bay disposal sites include the following:

- Redistribution of pollutants and/or release of contaminants during dredging and disposal;
- Burial of bottom-dwelling organisms;

- Resuspension of sediment particles and resulting turbidity;
- Changes in the native sediment characteristics near disposal sites and shifts in the sediment budget and/or dynamics within embayments;
- Impacts on migrating special status species such as the winter run Chinook salmon; and
- Degradation of pelagic and near-bottom habitat around disposal sites that may lead to reduced fishing success.

These potential impacts must be evaluated in the context of an estuarine ecosystem that is already stressed as a result of numerous anthropogenic activities (SFEP 1992b). In particular, the public has voiced concern over the lack of analysis that considers the frequency, duration, and magnitude of disposal in a cumulative impact study of the numerous planned and ongoing dredging projects in the Bay Area.

Public concerns about ocean disposal of dredged material include the potential for disturbance and for impacts to water quality (affecting birds, marine mammals, and fish), and the potential for impacts to the sea floor area around the disposal site (affecting benthic resources).

Significant public concerns were also expressed regarding the potential for environmental impacts to be associated with different kinds of upland disposal and/or beneficial reuse activities. For example, proposals to use dredged material from the Bay for levee enhancement in the Delta have raised concerns regarding effects on salinity in Delta waters. Although the Delta is not included in the geographic area of focus of the LTMS, as part of the LTMS studies, the use of dredged material from the Bay in the Delta region was investigated, and potential constraints, such as salinity impacts, considered. These issues are presently under discussion amongst the LTMS and Delta agencies and various programs (such as CALFED), yet perhaps could be addressed further through the establishment of a program for the Delta similar to the LTMS. Similarly, proposals for using dredged material to create tidal wetlands in the North Bay have raised concerns over the loss of existing seasonal wetland habitat.

Ultimately, ensuring environmental protection requires an overall dredged material management system that includes the following: an appropriate framework for sediment quality testing and interpretation; suitable placement sites that provide adequate capacity for all of the dredged material that is generated (both "clean" and "contaminated"); and appropriate site management and monitoring measures. All of these issues are addressed in various aspects of the alternative management approaches evaluated in this EIS/EIR.

2.4.2.3 Need to Improve Coordination and Integration of Agency Policies

Several state and federal regulatory agencies have responsibility for managing various aspects of dredging and dredged material disposal activities in the San Francisco Bay Area. Historically, these agencies have carried out their mandates more or less individually, while coordinating more formally only around specific issues or projects. During the 1980s, there was a growing public concern that the needs of the Bay Area maritime industry and other waterway-dependent economic sectors were not being met through the normal, issue-specific agency coordination. Specifically, project sponsors experienced delays in initiating and completing projects and there were general difficulties in planning during this period (see section 2.2). Additionally, although the minimum requirements of the federal Clean Water Act (CWA) and the Marine Protection, Research, and Sanctuaries Act (MPRSA) were not met individually, there was growing public concern that, in the absence of a coordinated plan or common decisionmaking framework, the environment was not receiving appropriate protection.

The agencies recognized that improved coordination and integration of policies governing material disposal would be necessary, and to address these concerns they initiated the LTMS. Although much progress has been made toward better environmental protection and coordinated management of dredging projects since the inception of LTMS, it is understood that the current system still lacks some significant elements that are essential to meet the overall LTMS goals (LTMS 1994a). Specifically, improved coordination is needed to increase predictability for project proponents and the public in the review and approval of dredging permits, and to design an interagency decisionmaking framework for determining the appropriate disposal or reuse option(s) for placement of dredged material from particular projects.

2.4.2.4 Need to Develop a Regional Framework to Facilitate Reuse of Dredged Material for Beneficial Purposes

Much of the LTMS discussion has focused on how dredged material can be beneficially reused. "Beneficial reuse" refers to managing dredged material as a valuable resource that can be used to create other benefits, rather than just as a waste product to be disposed of as efficiently as possible. There are no beneficial uses associated with disposal of material at the existing aquatic disposal sites. Potential reuse opportunities within the region include use of dredged material for levee stabilization and maintenance activities; habitat (e.g., wetland) restoration projects; landfill liner, cap, or daily cover; and construction fill. However, attempts to promote the large-scale beneficial reuse of dredged material have been hampered by financial, regulatory, and policy constraints, and by public concerns associated with habitat conversion.

Increasing beneficial reuse of dredged material will help diversify disposal options and promote better environmental protection and enhancement. National COE policy, and the legislative and policy mandates of the environmental agencies, indicate that beneficial reuse of dredged material should be a priority. However, the region currently lacks a coordinated and/or institutionalized framework to facilitate beneficial reuse of dredged material.

2.4.2.5 Need to Identify Appropriate Funding Policies to Support the Above Issues and Facilitate the Goals of the LTMS

Dredging and disposal costs for construction and maintenance of federal channels are shared by the federal government and local non-federal sponsors based on cost-sharing requirements set forth in federal law (e.g., the Water Resources Development Act [WRDA] 1986, WRDA 1992). As described in detail in Chapter 4 (section 4.8, Regulatory Framework), cost-sharing requirements vary depending on the type of project under consideration. Different policies apply depending on whether the proposed project represents maintenance dredging or new construction dredging and whether the project is used for commercial navigation or recreation. Projects funded by the federal government are generally constructed by the COE. (There is no cost-sharing for work by the U.S. Navy, which funds its own dredging, and cost-sharing also does not apply to dredging done by private parties.) Various mechanisms are used today to finance the 25 percent or more of capital costs that typically are the responsibility of the local sponsors of federally dredged projects. States, local governments, ports, special assessment districts, and the private sector are the main sources of such local sponsor financing.

The cost-sharing allocations also depend on whether the disposal method is aquatic or upland. Upland and beneficial reuse sites are not currently included in the definition of "general navigation features" described in the COE regulations, and thus are not normally included in federal cost-sharing. Therefore, the local sponsor currently must pay the often substantial costs of acquiring, developing, and using upland disposal or beneficial reuse sites, as well as the costs of post-construction monitoring and management of such sites.

Overall, then, the current cost-share requirements effectively direct material to available in-Bay sites, which are inexpensive compared to other placement alternatives due to ease of material handling, transport, and location. The "least costly, environmentally acceptable" policy, and the statutory requirement that local sponsors must pay for site development and monitoring in upland and beneficial reuse sites, both serve to focus disposal on existing aquatic sites, resulting in a substantial economic burden to non-federal sponsors who might otherwise wish to pursue the beneficial reuse of material at upland or wetland sites. This system can potentially create overall economic inefficiencies, as well. Such economic inefficiencies occur when dredging and disposal actions are considered on a project-by-project basis rather than a regional basis. In the face of declining in-Bay disposal limits, project-by-project decisions can lead to greater overall costs to the regional economy (for dredging and disposal for all projects combined) than would be the case if allocation of allowable disposal volumes at all the sites in all the placement environments were considered comprehensively. This EIS/EIR evaluates alternative management approaches that represent different long-term ways to comprehensively allocate disposal volumes among the placement environments (in-Bay, ocean, and upland or wetland reuse) by programmatically considering the overall impacts and benefits (including economic ones) of those alternatives.

2.5 EVALUATION CRITERIA FOR THE EIS/EIR ALTERNATIVES

The overall issues of public concern were also used to develop evaluation criteria for comparing the alternative management approaches considered in this EIS/EIR. The first issue — the need for adequate disposal capacity — is not directly used as an evaluation criterion because it is already captured in the Purpose for Action (section 2.4.1). The alternatives will not differ in their ability to address this issue, because only alternatives that satisfy this fundamental need will be considered in detail in this EIS/EIR. Similarly, the fifth issue — the need to identify appropriate funding policies to facilitate the goals of the LTMS — is not used as an evaluation criterion because overall funding mechanisms will not be selected based on this EIS/EIR. However, constraints of existing funding requirements are discussed, and some potential new funding approaches that can be considered are presented in Chapter 7 for preliminary public comment. Comments received will assist the LTMS agencies in their later consideration as to which, if any, of these should be pursued during development of the LTMS Management Plan to be developed subsequent to this EIS/EIR. The remaining three significant issues of concern identified through the public scoping process are directly incorporated into the EIS/EIR evaluation criteria, as follows.

- *Evaluation Criterion A: Potential Risks and Benefits to Ecological Systems*

  This criterion is used to compare the alternatives in terms of the degree to which they present potential environmental impacts or risks, and the degree to which they offer environmental benefits, in the in-Bay, ocean, and upland/wetland placement environments. The need to ensure appropriate environmental protection, and the need to facilitate beneficial reuse of dredged material, are the issues of concern addressed under this criterion. The degree of actual adverse impacts to Estuary resources that is associated with current volumes of in-Bay dredged material is impossible to accurately quantify with existing scientific information. This EIS/EIR therefore generally evaluates the alternatives in terms of the relative *risk* of adverse impacts occurring.

- *Evaluation Criterion B: Regulatory Certainty*

  The issue of concern addressed by this criterion is the need to improve coordination and integration of agency policies governing the management of dredged material. Under this criterion the EIS/EIR alternatives are compared in terms of the degree to which, in conjunction with the policy-level mitigation measures common to all alternatives, they would support an understandable, consistent regulatory framework that provides reasonable predictability for dredging project proponents while assuring the public that significant environmental impacts are avoided.

- *Evaluation Criterion C: Effects on Dredging Related Economic Sectors*

  This criterion is used to compare the EIS/EIR alternatives in terms of their potential effects on the socioeconomic sectors of the Bay Area economy that are most directly associated with dredging and navigation (federal versus non-federal dredgers, and "major" versus "small" dredgers). The different dredging-related sectors have different abilities to absorb or pass along any potential increases in the overall costs associated with dredged material management, and the alternatives differ in the degree to which each sector could be affected.

2.6 OTHER ISSUES OF PUBLIC CONCERN

The overarching issues identified by the public were included in the EIS/EIR objectives and subsequent evaluation criteria, as described above. However, additional issues were raised during the formal and informal scoping processes, related to specific environmental and economic issues associated with current dredged material management activities. Many of these issues would be addressed similarly under any of the overall management approaches being considered by LTMS. Other issues raised are outside the scope of this EIS/EIR. The following sections describe those issues addressed in, and not addressed in, this document.

2.6.1 Issues Addressed in Policy-Level Mitigation Measures Common to All Alternatives

A variety of specific concerns raised by the public about dredged material management are already addressed through existing regulations or policies. These existing requirements and guidelines serve to reduce or eliminate the potential that dredged material disposal or placement may have adverse effects under certain circumstances. Several such "policy-level mitigation measures" are common to all of the action

alternatives evaluated in this EIS/EIR. Although these measures do not affect the assessment of alternatives or the selection of a preferred approach, they are nevertheless important aspects of appropriate dredged material management, and as such are discussed in this EIS/EIR and are directly included as part of all the alternatives considered. These issues and the policy-level mitigation measures that address them are summarized below. These measures are also discussed in detail in Chapter 5.

Material Suitability & Sediment Management. This issue relates to the potential impacts associated with dredged materials that contain elevated levels of pollutants. Such material is typically not suitable for unconfined aquatic disposal (referred to as NUAD material) and requires different management methods to ensure that any risks are properly addressed. It was suggested during the public comment period that the EIS/EIR should address options for how best to manage NUAD material.

This concern is addressed via guidelines defining material suitability for different placement options. Also, an overall LTMS policy is that dredged material will only be permitted for placement in an environment, and at a specific site, where it has been determined that it can be appropriately managed. Chapter 3 provides extensive background on how these determinations are made.

Pollutant Loading Reduction. An often-voiced concern relates to the need to reduce sources of pollution before they enter the sediments. Reducing the original source of pollution would, in the long term, reduce the pollutants in sediments that are dredged, as well as reduce the level of pollutants in the estuarine system overall. In particular, scoping comments suggested that the EIS/EIR include pollutant loading reduction as a primary means of addressing sediments with elevated contaminant levels.

Existing policies already implement a variety of ongoing regulatory efforts, and support non-regulatory efforts, to reduce overall pollutant loading to the Estuary. Some of these are described in Chapter 5.

Dredging Reduction. Members of the public have commented on the need to develop policies that will reduce the overall volume of dredging needed in the first place and, by extension, reducing the volume of dredged material needing disposal. Reducing "unnecessary" dredging is also a stated goal of the overall LTMS effort. Scoping comments suggested that the EIS/EIR evaluate different technologies to reduce the need for dredging and, for specific projects, evaluate the assumption that there is a need for continued dredging at all.

Existing reports have not adequately documented dredging needs assessments, nor have they fully analyzed ways to reduce dredging needs or the use of new technologies. A common, policy-level implementation measure is included that requires review of options for, and potential technologies to, reducing dredging needs on a project-specific basis; and a COE action subsequent to this EIS/EIR is to review and update, as necessary, the Dredged Material Management Plans for all its existing maintenance projects. Also, new LTMS long-range dredging estimates have been developed that reflect a significant decrease in projected dredging needs in the future, in part as a result of military base closures in the San Francisco Bay Area. All of the evaluations in this EIS/EIR are based on these new, lower, estimates of long-range dredging needs.

Habitat Conversion and Siting. There is significant public concern over the conversion of existing valuable habitats that may be present at sites proposed for wetland restoration with the use of dredged material. Concern has also been expressed over the permanent loss of existing habitat values at sites that may be used for rehandling facilities, or dedicated confined disposal facilities. In particular, scoping comments suggested that the EIS/EIR include an analysis of wetland resource values and functions for any proposed use of dredged material in upland or wetland reuse or disposal sites. This concern is addressed by the following policy-level requirements:

- Proposed habitat restoration projects using dredged material should be evaluated in the context of regional habitat goals developed independently (activities being conducted by the SFBRWQCB, the Estuary Institute, and the North Bay Initiative are among the present efforts that could result in habitat goals for certain areas of the Estuary).

- Only habitat restoration/creation projects having positive overall net benefits will be supported as LTMS projects.

- Projects whose purpose is not habitat restoration or creation and that would effectively result in a permanent loss of existing habitat values (such as would occur with new rehandling facilities and confined disposal facilities) must avoid adverse impacts to the maximum extent practicable, and

must fully mitigate for the unavoidable adverse impacts they cause.

Testing Protocols and Streamlining Efforts. Public scoping comments were also directed toward the need for the EIS/EIR to ensure adequate characterization of sediments to be dredged, to support placement or disposal decisions. Comments suggested that existing testing protocols be evaluated in the EIS/EIR, and recommendations made for improving their application. Several policy-level measures address this concern, including the following:

- The use of tiered sediment evaluation procedures that generate adequate and appropriate information without incurring unnecessary costs;
- The use of an evaluation approach designed to appropriately address potential contaminant exposure pathways of concern on a project-by-project or disposal site-by-disposal site basis;
- The development of a Regional Implementation Manual (RIM) covering evaluation and testing needs in all placement environments;
- Sediment data tracking, that may allow streamlining of testing needs in the future;
- The development of a comprehensive sediment classification framework as a basis for potential further streamlining of future testing needs;
- Improved agency coordination through establishment of an interagency Dredged Material Management Office; and
- Other permit application streamlining efforts.

Use of Dredged Material on Levees. Comments were made about the unique set of environmental concerns associated with the reuse of dredged material for levee restoration and stabilization efforts. Public comments suggested that the EIS/EIR describe the potential impacts associated with use of dredged material on levees.

While no specific future levee use sites are identified in this document, general policies that serve to minimize the risks that are unique to the use of dredged material on levees are presented in Chapter 5.

Disruption of Habitat. There is significant public concern over potential for dredging and dredged material disposal to result in degradation or disruption of wildlife habitat, and to cause fish and other wildlife to avoid the areas near dredging and disposal sites. The fishing community and resource agencies have long been concerned that dredging and disposal of dredged material has contributed to fish habitat degradation and interfered with migration.

To minimize the risk of habitat degradation, particularly regarding migrating special status fish species, policies regarding the timing of dredging and aquatic disposal are presented in Chapter 5. To facilitate regulatory certainty, a decisionmaking framework was prepared in consultation with the resource agencies to aid dredgers and the LTMS agencies in determining where and when special status species may be affected. These policies are area specific and are the same for all alternatives. However, there are differences among the alternatives in terms of habitat impacts related to the overall volume of dredged material that may be disposed at existing sites and the frequency at which disposal activities may occur; these are evaluated directly in this EIS/EIR.

2.6.2 Study Limitations: Issues Raised during Scoping that are Outside the Scope of this EIS/EIR

During the scoping process, the public commented on several elements of dredging and disposal that, while part of the LTMS effort, are outside of the scope of this EIS/EIR. Therefore, while developing the EIS/EIR alternatives and framing the analyses, these issues were not directly evaluated. In most cases, these issues will be addressed in the next LTMS phase: development and implementation of the Comprehensive Management Plan. A brief summary of the issues considered outside the scope of this EIS/EIR is presented below.

Impacts of Dredging. This analysis does not include detailed consideration of the potential impacts associated with the act of dredging itself. However, a general description of the generic impacts of dredging (section 3.1.1.3) and mitigation measures for special status species (section 5.1.2.2) are provided. Chapter 3 contains background information about dredging equipment and the dredging process, and the descriptions of the in-Bay environment in Chapter 4 contain information about potential impacts associated with disposal that are the same as or similar to impacts that may be associated with dredging; but the EIS/EIR analysis does not specifically evaluate dredging impacts. These are more appropriately considered at a site-specific and project-specific level.

Site-Specific Analyses: Designation of New In-Bay, Ocean, or Upland Disposal Sites. During the scoping process, many public comments focused on particular disposal sites. Suggestions were made to relocate specific sites, designate new sites, and/or close down existing sites. Evaluation of site-specific impacts is outside the scope of this policy- and program-level document. However, designation of any new disposal or placement sites will require site-specific environmental review that includes an analysis of the types of impacts described generally in this EIS/EIR.

The LTMS is not, in itself, directly making decisions about sediment quality or other specific dredging-related issues in the Delta, which is outside the designated LTMS study area.

This policy EIS/EIR analyzes and compares the major environmental differences among four overall dredged material management strategies over a 50-year planning horizon, and the scope of this environmental analysis corresponds with this broad level of planning. This type of analysis is quite different from the analysis of a specific proposed project. For the purposes of this policy EIS/EIR, the assessment makes use of information regarding existing, specific disposal sites as a way to describe existing impacts; and site-specific impacts may be also be used as a method of describing the types of impacts that could potentially occur under a given alternative. Nevertheless, the majority of the analysis presented is fairly broad: for example, a generic impacts discussion is provided in the beginning of Chapter 6, evaluating the general types of impacts that are likely to occur in each placement environment. Policy-level mitigation measures that have been identified to avoid or reduce the potential for adverse impacts are also included, as described earlier. However, it is recognized that their overall effectiveness depends upon site-specific evaluation and application. Neither the precise impacts of a specific project, nor all the mitigation measures necessary to adequately avoid or reduce those impacts, can be known as much as 50 years ahead of time. Project specific evaluations, including EIS/EIRs as appropriate, will still be necessary.

Evaluating the Need for Individual Dredging Projects, or for Specific Channel Depths. The need for individual projects and/or the necessary depths for those projects will vary on a case-by-case basis. Assessment of individual dredging projects is beyond the scope of this EIS/EIR. For ports in particular, determining the need for dredging will be based not only on site-specific aspects, but also on the port's competitive position compared to other ports in the region and, particularly for intermodal cargo, to other ports up and down the coast that compete for intermodal traffic. The need for deeper channels and berthing areas is only one factor affecting the distribution of intermodal trade. This competition will also vary due to factors such as rail connections and routes, origin and destination of intermodal cargo, alliances between rail and shipping carriers, etc. Such a complex and dynamic analysis is beyond the scope of this document.

Ports have no control over the increasing drafts of cargo ships. However, failure to provide sufficient channel depths will usually result in a loss of port calls and the revenue that would accrue to the regional economy. Instead of a project-by-project assessment of dredging needs, an analysis of historic dredging volumes, and of potential factors that might affect the historic volumes, is presented. From this analysis, a planning estimate of the expected volume of dredged material over the next 50 years was derived. This EIS/EIR evaluates how best to distribute the expected volume of material to each of the placement environments in an environmentally and economically sound manner. In order to prepare for a worst-case scenario, the high-range of the planning estimate is used.

Enforcement of Permit Terms and Conditions. Compliance with the specified terms and conditions of dredged material disposal or reuse permits or authorizations is necessary to ensure that activities will pose a minimal risk of environmental impact. Noncompliance can result in situations where risks or impacts are greater than expected. It is beyond the scope of this EIS/EIR to identify specific terms and conditions for individual projects. Implementation measures, including site management and monitoring requirements and standard permit terms and conditions, will be described as appropriate in the LTMS Comprehensive Management Plan.

Evaluation of Economic Impacts on Specific Projects or Dredgers. The potential economic impacts and benefits associated with the overall policy alternatives evaluated in this EIS/EIR are discussed on a regional scale, and not at a project-specific level. The EIS/EIR discusses how different alternatives might affect different user groups including federal and non-federal dredgers, major dredgers, and small dredgers. However, economic impacts associated with a particular dredging project or dredging user can only be determined on a project-specific basis and, therefore, are not considered in this policy EIS/EIR.

Site Management & Monitoring to Determine Adverse Impacts. Site management and monitoring is an essential component of any dredged material management strategy. However, the particular monitoring and management needs of a particular site are best determined on a site-specific basis. Therefore, this EIS/EIR does not recommend specific site management and monitoring activities for existing sites. However, the EIS/EIR does identify the potential impacts of concern that are associated with disposal in each of the three placement environments. These identified impacts will be used in the subsequent Management Plan to develop guidance for site management and monitoring at each of the existing disposal sites. Public comments on site management and monitoring needs will be addressed in the LTMS Management Plan.

2.7 SELECTING A PREFERRED ALTERNATIVE LONG-TERM APPROACH

Initially the LTMS agencies considered a broad range of possible approaches for managing dredged material including a return to pre-LTMS conditions, placing all dredged material in a single environment, placing all SUAD material in a single environment, and placing various percentages in a variety of environments. For reasons discussed in Chapter 5, the LTMS agencies eliminated all of the options except for those which included placement in a variety of environments. As further described in Chapter 6, based on the generic analysis, the LTMS agencies further eliminated high disposal volumes in any environment due to adverse impacts. Three alternatives which include placement of low and medium amounts of material in three placement environments and the No-Action alternative have been carried through the detailed analysis.

The LTMS agencies decided not to identify a preferred alternative in the Draft EIS/EIR. To continue to encourage such public involvement, the Executive Committee decided against selecting a preferred alternative before the public had the opportunity to provide specific comments on the alternatives. The LTMS agencies requested the help and participation of reviewers in identifying the preferred alternative that best supports the environmental and economic goals and allows for reasonable and effective implementation.

Based on consideration of public comments, the preferred alternative has been selected for the Final EIS/EIR. The LTMS agencies have selected a long-term approach that emphasizes beneficial reuse and ocean disposal of dredged material, with limited in-Bay disposal. However, the management goal of emphasizing beneficial reuse and ocean disposal cannot be achieved immediately. Therefore, a transition period will be required. In particular, policy and management actions will need to be taken by respective LTMS agencies and upland/wetland reuse sites will need to be made available (limited capacity for reuse exists today). The implementation portion of this EIS/EIR discusses the measures that can be taken to achieve the preferred placement emphasis. As upland/wetland reuse sites are developed, less material will be placed in the Bay to fully achieve the goals of the preferred alternative. The transition toward full implementation of the preferred alternative is discussed in greater detail in Chapter 6 (section 6.5). Finally, the LTMS approach that the San Francisco Bay region has used to address dredged material management is unique to this region. It makes sense, then, that the outcome of such an effort should also be unique and designed to address the specific needs and issues of this region.

2.8 FUTURE ACTIONS

Fully implementing the long-term approach selected as a result of this EIS/EIR process will require several different kinds of actions on the part of the LTMS agencies, in order to achieve an appropriate balance between minimizing environmental risk and maximizing environmental benefit in a cost-efficient manner. Several steps are within the existing authorities of the LTMS agencies, and can be implemented fairly rapidly. Other actions that could more fully achieve the placement distributions of the selected alternative are outside the agencies' current authorities. This section outlines the immediate steps the agencies can take. Chapter 7 discusses further steps that would be needed to more fully implement the preferred alternative, and provides a preliminary description of potential financing options that can be considered in the future.

2.8.1 Finalizing the Policy EIS/EIR

The first step, after thoroughly reviewing the public comments on the Draft EIS/EIR, was for the LTMS agencies to identify the preferred alternative. The selected preferred alternative, Alternative 3, was one of the alternatives presented in the Draft EIS/EIR.

The next step, after reviewing comments on the Final EIS/EIR, will be for the COE and EPA to sign a Record of Decision (ROD), thus finalizing the EIS/EIR and Phase III of the overall LTMS process. The state lead agency, the State Water Resources Control Board,

will also certify the final document pursuant to the requirements of the California Environmental Quality Act. The LTMS agencies will adopt the selected alternative as specified in the ROD, and the policy-level mitigation measures associated with it, as the overall approach that will guide the LTMS agencies' implementation actions in Phase IV of the LTMS process.

2.8.2 Development of the LTMS Comprehensive Management Plan

While the EIS/EIR and ROD are being finalized, the LTMS agencies will produce and circulate for public review a draft Management Plan. The Management Plan is intended to implement those policies that are within the LTMS agencies current authorities. A number of potential implementation mechanisms will be considered to achieve the distribution of dredged material targeted in the EIS/EIR preferred approach, as described in Chapter 7.The LTMS agencies will seek public comment on potential implementation options to help them further develop the Comprehensive Management Plan.

The LTMS Comprehensive Management Plan will contain the specific guidance used by each of the LTMS agencies to make decisions about dredging management activities. This Management Plan will replace the existing LTMS Interim Management Plan (LTMS 1994a) as the regional decisionmaking framework for dredged material disposal. The Management Plan will be reviewed and updated every other year or as necessary to reflect changing statutory, regulatory, scientific, or environmental conditions. Specific issues to be addressed in the Comprehensive Management Plan include the following:

- Site monitoring and management requirements and actions for each of the existing dredged material disposal and placement sites;
- Allowable disposal or placement volume limits, as needed, for existing sites;
- Descriptions of new site designation effort(s), as appropriate;
- Description of the coordination measures under which the LTMS agencies will jointly manage dredging project proposals (e.g., the interagency Dredged Material Management Office, when instituted);
- Description of processes to ensure public input and review opportunities;
- Discussion of Related Planning Efforts such as wetlands planning, the Regional Monitoring Program, Regional Implementation Manual for Testing; and
- The process for the periodic review and update of subsequent Management Plans and LTMS policies.

2.8.3 Other Agency Regulatory and Policy Changes

In addition to the work to be jointly undertaken within the LTMS as outlined above, individual agencies will take the following actions as appropriate after completion of the Final EIS/EIR:

- EPA: Designate a permanent allowable disposal volume limit for the San Francisco Deep Ocean Disposal Site.
- BCDC: Revise the Bay Plan and associated regulations to incorporate new policies pertaining to dredging activities; and issue a new Coastal Zone Management (CZM) consistency determination for COE Maintenance Dredging using the findings in this EIS/EIR.
- SFBRWQCB: Revise the Basin Plan to incorporate new dredging policies; and continue to issue Water Quality Certifications (under Section 401 of the CWA) for dredging projects using the findings in this EIS/EIR.
- COE: Confirm or revise Dredged Material Management Plans for existing maintenance dredging projects in San Francisco Bay, and perform NEPA reviews as needed, including supplementing the 1975 Composite EIS for Maintenance Dredging, using the findings in this EIS/EIR.
- SWRCB: Revise statewide policies as appropriate to support the selected alternative.

2.9 NON-STANDARD STRUCTURE OF THE EVALUATION IN THIS EIS/EIR

This section outlines the content of each of the chapters in this Policy EIS/Programmatic EIR, and describes why the document has a somewhat non-standard structure compared to more typical "project" EIS/EIRs.

Chapter 1 of this EIS/EIR presents an Executive Summary of the entire document. The reader is directed to Chapter 1 for a brief overview of the following: the dredged material management problems being addressed; the alternative long-term management approaches being considered on a policy or programmatic basis; the environmental and socioeconomic resources that could potentially benefit or be adversely affected by implementation of any of the alternative management approaches; and what steps the LTMS agencies will take to implement a new management approach upon finalization of this EIS/EIR.

This Chapter 2 presents the following: an introduction to the LTMS process; the LTMS goals and objectives; the purpose and need for agency action evaluated in this EIS/EIR; the public issues of concern identified through formal and informal scoping processes; and the evaluation criteria that will be used to compare the alternative management approaches.

Chapter 3 provides background information on technical and scientific issues that are important to developing and understanding appropriate dredged material management actions. Information is presented on the following: dredging and the kinds of equipment used in typical dredging projects; how sediments move within the Estuary system, and the consequences this can have for managing dredged material; physical-chemical characteristics of sediments and how environmental concerns related to those characteristics can vary in aquatic and upland environments; the behavior of chemicals that can become contaminants in dredged material; contaminant exposure pathways in aquatic versus upland environments, and control measures for those pathways; sediment quality testing approaches for determining when dredged material may be suitable for disposal at estuarine, marine, or upland sites; and management options for contaminated dredged material that is unsuitable for unconfined aquatic disposal. The new LTMS 50-year dredging volume planning estimates used in the EIS/EIR are also described in Chapter 3.

Chapter 4 describes the environmental setting for the LTMS planning area, and identifies those resources of most concern in terms of being adversely or beneficially affected by dredged material disposal. The overall environmental setting of the planning area is presented first for each placement environment (estuarine, marine, and upland), followed by a more detailed discussion of the subset of resources specifically at issue for dredged material management. A description of current socioeconomic conditions in the region is also presented in Chapter 4, as well as an overview of the current regulatory setting under which dredging and dredged material disposal occur.

Chapter 5 presents a discussion of the avoidable impacts, and how they are addressed by the policy-level mitigation measures common to all alternatives. This chapter also describes the alternatives development process, including discussions of the following: the planning variables used to develop an initial range of alternative management approaches; the screening process used to refine the initial range of alternatives; and a description of the alternatives carried forward for full evaluation in the EIS/EIR.

Chapter 6 contains the analysis and evaluation of the alternatives. First, an evaluation of the "generic" impacts and benefits potentially associated with disposal in each of the placement environments is presented. This analysis is generic in that it evaluates the potential impacts and benefits of different levels of dredged material disposal or reuse separately for each placement environment, whereas the alternative LTMS management approaches each consist of combinations of different levels of disposal in each placement environment. Based on the generic analysis, disposal scenarios that could potentially result in significant adverse impacts in individual placement environments (e.g., "high" volumes of disposal at in-Bay sites), or that would not meet the overall LTMS goals and objectives, are eliminated from further consideration. The generic analysis is

Figure 2.9-1 Schematic Reflecting Organization Structure of the EIS/EIR

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therefore the final step in the alternatives development process. Following the generic analysis, the three remaining alternative long-term management approaches are evaluated by comparing their potential impacts and benefits with each other, and with the No-Action alternative (current conditions).

Chapter 7 describes actions that the agencies will take immediately following finalization of the EIS/EIR process to implement the selected alternative approach. In addition, this chapter presents a preliminary set of implementation options that could be used in the LTMS Management Plan, or subsequent versions of it, to more fully achieve the desired long-term distribution of dredged material between the three placement environments called for in the selected alternative. Public comment on these implementation options will be used to develop the LTMS Management Plan.

Chapter 8 summarizes the cumulative impacts and benefits of the alternatives evaluated in the EIS/EIR, as required under CEQA. Chapters 9, 10, and 11 present additional CEQA-required comparisons of the alternatives including, respectively: Short-Term Uses versus Long-Term Productivity; Irreversible Environmental Changes or Irretrievable Commitments; and Growth-Inducing Impacts.

A variety of supporting information is also presented in the appendices, bound separately as Volume II of this EIS/EIR.

The structure and sequencing of the information presented in this EIS/EIR, as outlined above, differs from the "standard" approach recommended in

CEQA and NEPA. The LTMS agencies have determined that there are compelling reasons for adopting this structure. In this case, a more systematic, step-by-step discussion than provided for in the "standard" EIS/EIR structure is needed to assist readers in understanding the complex issues associated with dredged material management in the Estuary region. In particular, this EIS/EIR uses a multiple-step policy design and evaluation process. A special chapter on dredging and technical sediment management issues (Chapter 3), provides background information necessary to understanding why certain resources are described as being of concern (in Chapter 4), while other resources are quickly screened out as being generally unaffected by dredged material disposal or reuse. Similarly, the policy-level mitigation measures (discussed in Chapter 5), many of which represent existing agency requirements, ensure that many kinds of potential adverse impacts will be avoided. By further screening out some impacts that could otherwise theoretically occur, these policy-level measures provide for a more focused evaluation of potential impacts and benefits in Chapter 6. The "generic" impacts analysis in Chapter 6, also not "standard" under the CEQA format, provides the last screening step in the analysis, resulting in an appropriately focused evaluation of the final set of management approach alternatives. The organizational structure of this EIS/EIR is shown schematically in Figure 2.9-1.