THIS IS CHAPTER 5 "POLICY-Level Mitigation Measures and Alternatives Development." It comes from the LTMS report, not the CCMP for the SF Estuary. The bibliographic reference was incorrect.

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5.0 POLICY-LEVEL MITIGATION MEASURES AND ALTERNATIVES DEVELOPMENT

This chapter presents a discussion of 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 further evaluation in the EIS/EIR.

5.1 POLICY/PROGRAM-LEVEL MITIGATION MEASURES

The resources that may be affected by dredged material disposal in each of the three environments (in-Bay, ocean, and upland/wetland reuse [UWR]) are protected by a number of existing agency policies and new policy-level mitigation measures developed for this EIS/EIR. This chapter summarizes those measures that the LTMS agencies are taking or will take to ensure that potentially significant environmental impacts will not occur as a result of dredged material disposal, regardless of which alternative is selected as the preferred approach.

Generally, mitigation measures are presented in a typical EIS/EIR to reduce the potential impact of a project from a level that may be significant to a level that is less than significant. The policy-level mitigation measures contained in this Policy EIS/Programmatic EIR serve a similar function. However, policy-level mitigation measures differ from project-specific mitigation measures in two important ways. First, they address potential adverse impacts on a broad, regional and cumulative level. In this regard, they help direct how and when site-specific measures are needed to avoid or mitigate potential impacts, but they do not replace the need for site-specific mitigation measures. Second, policy-level measures are included in this EIS/EIR as a basic aspect of each of the alternatives to help pro-actively avoid impacts. Therefore, the policy-level mitigation measures effectively reduce the number of resources and pathways that could theoretically be of concern so thatthe subsequent alternatives analysis focuses on those resources that are most likely to be affected by dredged material management activities.

The policy-level mitigation measures presented in this chapter fall into three main categories. The first category includes overall policies that are independent of the placement environment or type of disposal or reuse. For example, general policies related to sediment suitability (quality) and site management and monitoring fall into this category. The second category includes policy-level mitigation measures that apply to specific placement environments (ocean, in-Bay, and upland/wetland reuse). The third category of policy-level mitigation measures are those that apply to individual types of disposal or reuse such as wetland restoration or landfill use. The following sections discuss the policy-level mitigation measures in each of these three categories.

5.1.1 Mitigation Measures that Generally Apply to Dredged Material Disposal and Reuse

The general policies described in this section apply to management of dredged material proposed for disposal or reuse in any of the three placement environments, at any type of site. Additional specific measures that apply to individual placement environments, or to specific kinds of disposal or reuse, are presented in subsequent sections.

5.1.1.1 Material Suitability and Sediment Quality Testing

Chapter 3 provides extensive background information about the behavior of sediment contaminants when the sediments are managed in different placement environments. In particular, each placement environment has a specific set of potential "contaminant exposure pathways" through which adverse effects to environmental quality or human health may occur. However, there are appropriate reliable

control measures that address many of the potential contaminant exposure pathways in each placement environment. The most important measureis to ensure that dredged material is only placed in specific sites where the number of potential exposure pathways are minimized- for example, by avoiding areas above drinking water aquifers that could be affected by leachate from upland dredged material disposal sites, or avoiding placing new rehandling facilities adjacent to land uses or populations that would be impacted by dust or odors that might be generated by the operations. However, all potential impacts cannot be avoided entirely at all sites, and some dredged material is sufficiently contaminated to require special management. Therefore, appropriate design and operational control measures must be included at different kinds of disposal or reuse sites, and sediment quality testing must be appropriate to address the concerns (exposure pathways) inherent at the proposed placement site(s).

To ensure that dredged material placed or disposed at any site will not cause unacceptable contaminant-related effects, the LTMS agency will adopt the following general policies:

- *The LTMS agencies will evaluate proposals for new dredged material placement or disposal sites, consistent with alternatives analysis requirements of state and federal laws (e.g., CEQA, NEPA, and CWA).*
- *For any particular site, the LTMS agencies will address all of the relevant contaminant exposure pathways of concern (as described in Chapter 3 of this EIS/EIR and in other agency guidance documents as appropriate) as part of the environmental assessment.*
- *The LTMS agencies will include specific conditions in authorizations for dredged material disposal or reuse sites that stipulate appropriate design or operational features necessary to control all contaminant pathways identified as being of concern at a given site. Control measures will be adequate to manage the worst-case material that would be considered for placement at a specific site.*
- *Only dredged material determined by the LTMS agencies to be suitable for the proposed placement or disposal option will be authorized for such placement or disposal. The LTMS agencies willrequire that sediments are adequately characterized for the proposed placement environment or specific disposal site, using appropriate physical, chemical, and biological testing methods, as necessary. Sediment quality evaluations will include consideration of potential effects related to the specific pathways of concern identified for the proposed placement environment or disposal site.*

5.1.1.2 Site Management and Monitoring

Dredged material disposal or placement may cause adverse effect through physical, as well as chemical or toxicological, processes. In general, dredged material disposal sites must be actively managed and/or monitored to confirm that the site is performing as predicted, that its capacity is not being exceeded, and that unauthorized use of the site is not occurring. In addition, an important aspect of ongoing management at any site is the periodic review of monitoring information to determine whether specific site use parameters may need adjustment to ensure that unacceptable or unanticipated impacts do not occur. The LTMS agencies will adopt the following general policies to ensure that appropriate site management and monitoring actions are conducted at any placement or disposal site, in any of the placement environments:

- *The LTMS agencies will develop and implement site management and monitoring plans for all multi-user placement or disposal sites. These plans will specify the site use parameters necessary to ensure that impacts are minimized and/or benefits are realized. The plans will also specify the monitoring requirements and post-closure activities as appropriate for each site. Site management and monitoring plans will identify specific conditions that would constitute acceptable site performance, as well as adjustments to site use parameters (including termination of continued site use) that would be triggered by specific findings of non-performance.*
- *The LTMS agencies will provide opportunity for public input and comment on proposed site management and monitoring plans for new disposal or placement sites, and on proposed*

substantive revisions to existing plans. Information from site monitoring efforts will be made available to the public, and opportunity for comment will also beprovided as part of the periodic review for existing sites.

5.1.1.3 Reviewing the Need for Dredging

The impacts and benefits associated with any dredged material management strategy are related to the total amount of material that would be managed under that strategy. This, in turn, depends on the total number, depth, and physical characteristics of each dredging project. The need for ship channels and other navigation features is determined by the COE in its initial evaluation of the costs and benefits of each new project. This assessment must also be periodically reviewed and updated to reflect changing conditions over time. Appropriate mechanisms to ensure that no unnecessary dredging will be conducted in the region include revisions of COE Dredged Material Management Plans, and the COE's Composite EIS for Maintenance Dredging.

In addition, each of the major ports within the region engages in a periodic review of past, present, and future port operations as part of the Seaport planning process. During such reviews, the ports may consider the feasibility of structural and other measures that could reduce dredging requirements.

The LTMS agencies will ensure that only necessary dredging occurs by adopting the following policies:

- *The COE, in consultation with the other LTMS agencies, will confirm or revise the Dredged Material Management plans for existing federal maintenance dredging projects in San Francisco Bay, and perform NEPA reviews as needed including supplementing the Composite EIS for Maintenance Dredging. These reviews will include consideration of channel widths, depths, and configurations in terms of potential changes that could reduce the volume of dredging necessary to meet the navigational needs of each project.*
- *BCDC, in consultation with the other LTMS agencies, will continue to work with area ports within the framework of its joint Seaport planning process within the Metropolitan Transportation Commission to identify potential means to reduce the need for dredging while meeting the navigational needs of each port facility. Inaddition, the LTMS agencies will continue to work to reduce the need for dredging associated with other projects such as recreational marinas.*

Together, these measures will serve to ensure that environmental risks and expenditure of public funds are minimized.

5.1.1.4 Coordinated Dredged Material Management

To improve regulatory certainty for both dredgers and the public, and to ensure that dredged material is managed in a comprehensive manner that addresses relevant concerns and requirements under all of the applicable authorities, the LTMS agencies will adopt the following general policy:

The COE, EPA, SFBRWQCB, and BCDC, together with the State Lands Commission, will formally cooperate in an interagency office for dredged material management to coordinate regulatory requirements and to provide better service to the dredging community and the public. This office will be established by Memorandum of Agreement (MOA) signed by the participating agencies. The office will review and coordinate on proposed dredging projects in accordance with the comprehensive LTMS Management Plan developed to implement the preferred alternative management approach selected in the LTMS Policy EIS/Programmatic EIR.

The general operating principles under which a pilot office is operating, and upon which the MOA will be based, were signed by the LTMS agencies on September 12, 1995. These general operating

principles are presented in Appendix M.

5.1.2 Mitigation Measures that Apply in Specific Environments

The policies described in this section apply to management of dredged material proposed for disposal or reuse in specific placement environments. General measures that apply to all disposal environments are discussed above in section 5.1.1, and measures that apply to specific kinds of disposal or reuse projects are presented below in section 5.1.3.

5.1.2.1 Upland Habitat Conversion Associated with Restoration Projects

Some degree of habitat conversion may occur as a result of any type of habitat restoration project. The types of restoration projects most likely to use dredged material are those that restore lands along the Bay margin that were once tidal wetlands but have been diked off, drained, and used for agriculture or other purposes in recent time. In these areas, dredged material can be used to raise the elevation of subsided diked historic baylands so that when dikes are breached, tidal wetland habitat is restored. Such restoration projects offer a unique opportunity, both to reduce the impacts associated with the historic practice of disposing of dredged material in the Bay, and to provide significant regional environmental benefits. The regional environmental benefits of wetland restoration are discussed further in the alternatives analysis presented in Chapter 6 of this EIS/EIR.

LTMS technical studies have identified and preliminarily evaluated numerous sites around the Bay margin where wetland restoration using dredged material would be feasible (LTMS 1995d). The main physical features commonly present at these sites are perimeter levees, internal levees, drainage ditches, and saline basins. The existing habitat value of these sites depends, in part, on whether the current users drain and pump water, the type of crops grown, and the types of agricultural equipment used. Even though these sites typically have been extensively altered by decades of human activity, they often still provide some important habitat values. For example, many diked historic bayland areas support seasonal wetlands that serve as habitat for migrating shorebirds and other waterfowl.

Restoration of tidal wetlands at these locations would permanently change the existing habitat type (e.g., from seasonal farmed wetland or upland grassland, to tidal wetland), and result in the establishment of different communities of plants, migratory and resident bird populations, fish, and wildlife using these sites. Public concern has been expressed over the regional implications of shifting the ecological values and functions of a site in this manner; in particular, there are differences of opinion about which habitat type(s) may be more important at a given location. To adequately address this issue, it is necessary to definelong-term, regional goals for different habitat types, including the desired acreage and distribution within and among different areas of the region. Developing such goals is called for in the Comprehensive Conservation and Management Plan (CCMP) of the San Francisco Estuary Project. However, this task is extremely complex.

A coordinated effort to develop regional habitat goals is in progress through the coordination of numerous planning and regulatory efforts focused on the recovery of regional wetland and other natural resources. Planning efforts such as the Endangered Species Recovery Plan, BCDC's North Bay Management Program, the Regional Wetlands Management Program of the SFBRWQCB, including the Regional Wetlands Monitoring Program, and the interagency Regional Wetlands Goals effort coordinated through the San Francisco Estuary Institute, are expected to bring the shared vision of habitat restoration into focus to implement the CCMP.

The LTMS agencies support the continuation of these planning efforts, and will rely on their results when considering the use of dredged material in wetland restoration projects by adopting the following policies:

- *The LTMS agencies will encourage, and authorize as legally appropriate, habitat enhancement and restoration efforts using dredged material that are designed to be consistent, to the*

maximum extent practicable, with specific habitat goals established by regional planning efforts for managing the region's natural resources. Implementation of projects in this manner will ensure that such reuse efforts will reflect the regional goals for restoration, thereby maximizing the environmental benefits of such projects for the region.

- *The LTMS agencies will also encourage, and authorize as legally appropriate, independent habitat restoration projects using dredged material (in areas not covered by established habitat goals) when they would clearly result in an overall net gain in habitat quality, and would minimize loss of existing habitat functions.*

Together, these measures will assist in the implementation of established regional habitat restoration goals, ensure long-term enhancement ofhabitat, support beneficial uses associated with that habitat within the region, and improve regulatory certainty for sponsors of restoration projects.

5.1.2.2 In-Bay Fish Habitat Conservation

Dredged material disposal in San Francisco Bay has the potential to affect fish and fish habitat. During the preparation of this EIS/EIR, federal and state resource agencies were informally consulted about the degree of potential impacts to different aquatic resources in different locations. A complete description of the concerns presented by the resource agencies and notations on how they are addressed in this EIS/EIR is presented in Appendix J. Some of the concerns raised in Appendix J are addressed in this EIS/EIR through the programmatic consideration of environmental risks associated with different dredged material placement distributions in the alternatives analysis (Chapter 6). Specifically, all of the action alternatives considered in Chapter 6 include a reduction of in-Bay disposal volumes. A reduction of in-Bay disposal volume and frequency would effectively mitigate some potential impacts. However, there are a number of concerns that relate to specific sensitive species and specific existing in-Bay disposal sites that are not addressed by the more general assessment of material placement distributions. This section describes policy-level mitigation measures that will avoid those particular types of impacts.

There are three specific locations and time periods that represent critical habitat for special status and/or important commercial species that are not adequately addressed by reducing the overall allowable in-Bay disposal volumes. During months when these organisms are present at or near certain disposal sites, frequent disposal events could potentially affect migration and foraging. The intent of the following policy measures is to avoid disposal during periods when the species in question are present within (or in close proximity to) existing in-Bay disposal sites where they could not easily avoid effects from disposal. The LTMS agencies will not approve disposal at these times for the sites noted, unless project sponsors obtain specific concurrence from the appropriate resource agencies. Adoption of the policy-level mitigation measures listed below ensures that there will be no significant impacts to the identified special status fish species in San Francisco Bay due to dredged materialdisposal operations at existing in-Bay disposal sites. Note that additional restrictions may apply to individual projects, based on the potential impacts to fish habitat associated with *dredging* activities (as opposed to *disposal* at designated in-Bay sites).

Appendix J includes information on where and when such additional restrictions, or consultation with the appropriate resource agencies, may be required. Dredging project proponents are advised that, in some cases, restrictions on *dredging* activities may affect project authorizations (permits) even when there are no restrictions on use of the proposed disposal sites. Overall restrictions would be determined on a project-specific basis, and included as permit conditions as appropriate.

Winter-Run Chinook Salmon

Migration of winter-run chinook salmon is not expected to be adversely affected by disposal operations at the Alcatraz and San Pablo disposal sites (particularly if overall allowable disposal volumes are reduced), because these fish would be able to easily avoid any area of degraded habitat near the sites. However, the Carquinez disposal site is of more concern because it lies in a narrow

channel that these migratory fish must pass through, and they would not be able to easily avoid degraded habitat near this disposal site. Disposal may be permitted outside of the restricted period without contacting the resource agencies, thereby precluding the need to conduct a formal consultation for this species.

- *The Carquinez Strait disposal site will generally be closed to disposal activity during the peak migration of winter-run chinook salmon juveniles and adults, from January 1 through May 31. Disposal during this period will not be approved by the LTMS agencies unless, through the Section 7 consultation process, project sponsors obtain project-specific concurrence from the appropriate resource agencies.*

Steelhead Trout

Steelhead trout migrate through the Bay during fall and early winter and congregate at the mouth of the Napa River waiting for high flows before they continue upstream. As discussed in Chapter 4, materialdeposited at the Carquinez Strait site has been shown to move back up into the mouth of the Napa River. During periods of high frequency disposal at this site, plumes may not fully dissipate between dumps and tidal action can potentially transport disposed material back into the area where steelhead congregate. Avoiding, to the extent practicable, high-frequency disposal in the narrow Carquinez Strait area during the peak migration period for steelhead trout is a reasonable and prudent conservation measure.

- *The LTMS agencies will closely review proposed dredging projects to ensure that disposal at the Carquinez Strait site is minimized during the period from October 15 through December 31, when migrating steelhead trout congregate near the mouth of the Napa River. Dredging project proponents are advised that the agencies will require that the need for disposal at this site during the specific period when this species is present must be clearly established.*

Longfin Smelt

The longfin smelt is a candidate for federal listing as a threatened species, and is also commercially important. This species spawns in Suisun Bay and the Delta during late winter and early spring. The larvae float downstream and are abundant in both the deep channels and shallower areas of Suisun Bay. Disposal of sandy material (the only type of material currently approved for disposal at the Suisun Bay site) causes short-term degradation of water quality that is usually limited to the disposal site and immediately adjacent area. Disposal of this material is therefore not expected to significantly affect the longfin smelt population. However, avoiding the period when larvae are most abundant is a reasonable and prudent conservation measure.

- *The COE will minimize the use of the Suisun Bay disposal site during the period from January 15 through March 15 to avoid potential adverse impacts to longfin smelt larvae.*

Since only material from COE maintenance dredging of the Suisun channel is authorized for disposal at this site, and since the COE's dredging typically occurs in the fall, this disposal site closure period is not expected to affect COE maintenance dredging activities.

The measures listed above, in combination with reduced in-Bay disposal under any of the action alternatives described later in this chapter, would constitute appropriate, programmatic mitigation for the potential impacts of dredged material disposal on aquatic species of concern. The Policy-level Mitigation measures regarding fish window closure periods are summarized in Table 5.1-1.

Disposal Site Location	*Species of Concern*	*Potential Impact*	*Policy-Level Mitigation*	**Period During Which Recommended Action Necessary**										
				Nov	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*
Alcatraz	Winter-run Chinook salmon adults and juveniles Coho salmon Steelhead trout Recreational marine fisheries	Degradation of habitat	Reduction of in-Bay disposal	No disposal timing restrictions at this site are propose for any species [b]										
San Pablo Bay	Winter-run Chinook salmon - adults and juveniles Coho salmon Steelhead trout Recreational marine fisheries	Degradation of habitat	Reduction of in-Bay disposal	No disposal timing restrictions at this site are propose for any species [b]										
Carquinez	Winter-run Chinook salmon adults and juveniles	Degradation of habitat and inter-ference with foraging habitat and food re-sources	Restrict disposal Jan 1-May 31											

Strait	Steelhead trout	Degradation of habitat and inter-ference with foraging habitat and food re-sources	Minimize disposal Oct 15- Dec 31
Suisun Bay	Longfin smelt	Degradation of habitat affecting larval stages (feeding and respiratory)	Minimize disposal Jan 15- Mar 15

Notes:(a)The complete recommendations of the state and federal resource agencies, based on the No-A Alternative, are presented in Appendix J.

(b)Protection of special status fisheries species will be achieved at this site through the reduction of in-B dredged material disposal volumes associated with the implementation of an action alternative.

Table 5.1-1. Policy-Level Mitigation Measures: Dredged Material Disposal Restrictions for In-Bay Fisheries and Habitat Protection [a]

5.1.2.3 Ocean Site Monitoring

Extensive site management and monitoring requirements have been established for the San Francisco Deep Ocean Disposal Site (SF-DODS). These requirements are set out in the EPA final rule formally designating the site, and thus are already codified in law. Additional rulemaking would be required to substantively change these existing site management and monitoring requirements. EPA will prepare an additional rule following completion of this EIS/EIR to designate a permanent capacity for the SF-DODS (see Chapter 7). However, the basic site management and monitoring requirements already established for this site are not expected to be significantly changed. The existing site management and monitoring plan for the SF-DODS is fully in accord with the general LTMS Site Management and Monitoring policies listed above under section 5.1.1.3.

5.1.3 Mitigation Measures Applicable to Specific Types of Projects or Facilities

Increased upland or wetland reuse and disposal of material that is not suitable for unconfined aquatic disposal (NUAD-class material) may require a number of new projects and facilities within the region over the 50-year planning period. The most likely types of new facilities that may be constructed in the future include rehandling facilities, dedicated confined disposal facilities, wetland restoration projects, and confined aquatic disposal sites. In addition, the LTMS agencies expect that a substantial amount of dredged material will be used in place of other sources of fill material to repair or stabilize existing levees.

Construction and operation of any of these projects or facilities has the potential to affect on-site and nearby environmental quality including, but not limited to, the following: plant communities, migratory and resident bird populations, fish and wildlife, water quality, air quality, traffic, and noise. A complete environmental review of proposed projects and facilities is necessary to evaluate these potential impacts at specific sites. However, numerous existing policies and regulations currently being implemented by the LTMS agencies serve to programmatically avoid and minimize

environmental impacts associated with these types of projects and facilities (e.g., NEPA and CEQA requirements; the Clean Water Act 404(b)(1) Guidelines, etc.). The LTMS agencies will fully and appropriately apply the existing regulations and policies to ensure that any adverse impacts associated with the construction and operation of specific new projects or facilities will be minimized and, as necessary, mitigated.

The following sections briefly list issues that should be addressed in site-specific environmental analyses for specific types of dredged material disposal or reuse facilities.

5.1.3.1 Rehandling Facilities and Dedicated Confined Disposal Facilities

Rehandling facilities provide a key link between dredging projects and the ultimate use of material in upland projects. Material is typically offloaded from barges, dewatered, dried, then shipped off-site to a final use. These facilities can also sort and potentially treat contaminated material. Material that requires confinement may be transported to a dedicated confined disposal facility (CDF) constructed specifically for the permanent storage of such dredged material, or to other appropriate, existing sites (such as landfills) that provide adequate containment. A number of existing rehandling facilities and CDFs have been used to process or manage relatively small volumes of material from specific dredging projects within the planning area. However, the existing capacity of these facilities is not sufficient to handle the volume of material that would go to upland or wetland reuse or disposal under the action alternatives described in Chapter 6. The existing capacity is also insufficient for the overall volume of material that is projected to be not suitable for unconfined aquatic disposal (10 to 20 percent of all material dredged is expected to be NUAD-class material). Thus any of the alternatives (other than No-Action) would require the construction of new facilities or expansion of existing facilities.

The potential impacts of construction and operation of specific new rehandling facilities or CDFs must be identified and evaluated in project-specific environmental assessments. As overall guidance, the construction/expansion and operation of rehandling facilities and CDFs must carefully consider, but not be limited to the evaluation of, the following issues: (1) site selection; (2) facility construction practices; (3) facility operations; (4) facility administration and maintenance; and (5) regulatory, mitigation, and monitoring requirements. Specific engineering guidance can be obtained from the LTMS Reuse/Upland Site Ranking, Analysis, and Documentation report (LTMS 1995d) and other LTMS upland/reuse technical studies reports. To ensure that these environmental assessments appropriately address all the issues of concern, the LTMS agencies will adopt the following general policy:

- *The LTMS agencies will address, as appropriate, the issues identified in Table 5.1-2 in site-specific assessments of the development, expansion, or operation of dredged material rehandling facilities or dedicated confined disposal sites.*

Type of Issue	*Issues to be Addressed During Project-Specific Review*
Maximization of Wetland Restoration and Enhancement - Wetland restoration and enhancement using dredged material will be emphasized to enhance and restore the natural resources of the Estuary.	
Site Selection	Water access to the site for dredged material off-loading - deep-water access (-15 to -17 feet MLLW) is optimal
	Evaluation of proposed site conditions in terms of their suitability for the restoration effort, including: • Average elevation of areas to be filled • Tidal range and flood elevation • Alignment and elevation of existing levees • Area available for dredged material use (fill depth) • Total restoration area possible

	• Typical foundation conditions • Location and size of existing culverts and pumps • Characteristics of the dredged material to be used (e.g., grain size, material density, dredging method, etc.)
	Assessment of utility crossings, easements, and adjacent land uses
Site Construction	Assessment of adequately engineered and constructed perimeter and interior levees
	Analyses of the suitability of proposed spillways and water controls
	Assessment of the feasibility of proposed dredged material off-loading facilities and the adequacy and location of proposed pipelines for transporting dredged material
Projects Designed for Ecological Restoration - Projects using dredged material for wetland restoration and enhancement will be designed in a manner that provides for ecological restoration of the site and provides for a diversity of habitat values, particularly for threatened and endangered species.	
Site Development	Proximity to a channel with sufficient water depth to allow access by off-loading scows, with little or no hindrance to local navigation
	The ability to moor full scows waiting to be unloaded and empty scows waiting to be towed back to the dredging site
	Evaluation of a suitable off-loading site in terms of proximity to the restoration site and its ability to handle the proposed types of off-loading equipment
	Evaluation of the proposed means for dredged material placement at the restoration site
	Evaluation of the ability to prevent overfilling of the restoration site
Facility Administration & Maintenance	Evaluation of the proposed management of all construction operations and post-construction maintenance
	Evaluation of the proposed inspection and supervision of contractors working on site
Regulatory, Mitigation, & Monitoring Requirement	Determination of the need for federal permits or reviews
	Determination of the need for state permits or reviews
	Determination of the need for local approvals
	Evaluation of proposed mitigation and monitoring plans to ensure compliance with all applicable federal and state regulations and policies

- **Table 5.1-2. Overall Guidance for Rehandling Facilities and Dedicated Confined Disposal Facilities**

5.1.3.2 Wetland Restoration

As described in more detail in section 5.1.2.1, one of the most important beneficial uses of dredged material in the region is in the restoration of historic habitats, including tidal wetland areas around the margins of the Bay. There are several potential environmental impacts that should be addressed in the design and site-specific environmental assessments of wetland restoration projects. As overall

guidance, the reuse of dredged material for wetland restoration must carefully consider, but not be limited to the evaluation of, the following issues: (1) site selection; (2) site construction; (3) site development (i.e., dredged material placement); (4) facility administration and maintenance; and (5) regulatory, mitigation, and monitoring requirements. Specific engineering guidance can be obtained from the LTMS Reuse/Upland Site Ranking, Analysis, and Documentation report (LTMS 1995d) and other LTMS upland/reuse technical studies reports. The following policy ensures that the necessary issues will be evaluated:

- *The LTMS agencies will address, as appropriate, all of the issues identified in Table 5.1-3 in site-specific assessments of proposed wetland restoration projects using dredged material.*

Type of Issue	***Issues to be Addressed During Project-Specific Review***
Maximization of Wetland Restoration and Enhancement - Wetland restoration and enhancement using dredged material will be emphasized to enhance and restore the natural resources of the Estuary.	
Site Selection	Water access to the site for dredged material off-loading -deep-water access (-15 to -17 feet MLLW) is optimal
	Evaluation of proposed site conditions in terms of their suitability for the restoration effort, including: • Average elevation of areas to be filled • Tidal range and flood elevation • Alignment and elevation of existing levees • Area available for dredged material use (fill depth) • Total restoration area possible • Typical foundation conditions • Location and size of existing culverts and pumps • Characteristics of the dredged material to be used (e.g., grain size, material density, dredging method, etc.)
	Assessment of utility crossings, easements, and adjacent land uses
Site Construction	Assessment of adequately engineered and constructed perimeter and interior levees
	Analyses of the suitability of proposed spillways and water controls
	Assessment of the feasibility of proposed dredged material off-loading facilities and the adequacy and location of proposed pipelines for transporting dredged material
Projects Designed for Ecological Restoration -Projects using dredged material for wetland restoration and enhancement will be designed in a manner that provides for ecological restoration of the site and provides for a diversity of habitat values, particularly for threatened and endangered species.	
Site Development	Proximity to a channel with sufficient water depth to allow access by off-loading scows, with little or no hindrance to local navigation
	The ability to moor full scows waiting to be unloaded and empty scows waiting to be towed back to the dredging site
	Evaluation of a suitable off-loading site in terms of proximity to the restoration site and its ability to handle the proposed types of off-loading equipment
	Evaluation of the proposed means for dredged material placement at the restoration site
	Evaluation of the ability to prevent overfilling of the restoration site

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Facility Administration & Maintenance	Evaluation of the proposed management of all construction operations and post-construction maintenance
	Evaluation of the proposed inspection and supervision of contractors working on site
Regulatory, Mitigation, & Monitoring Requirement	Determination of the need for federal permits or reviews
	Determination of the need for state permits or reviews
	Determination of the need for local approvals
	Evaluation of proposed mitigation and monitoring plans to ensure compliance with all applicable federal and state regulations and policies

Table 5.1-3. Overall Guidance for Wetland Restoration

5.1.3.3 Confined Aquatic Disposal (CAD)

The LTMS agencies may consider a number of options for the disposal of NUAD material in the future, including confined aquatic disposal (CAD). CAD can include nearshore fill or wetland creation projects where NUAD-class dredged material is used as "non-cover" material, as well as the more traditional concept of capping in open water environments. Issues associated with CAD in nearshore or wetland creation situations are addressed by policy-level mitigation measures related to material suitability and habitat conversion. As overall guidance, the LTMS agencies will evaluate any CAD site proposed in the Estuary following the general guidance provided in Appendix G (Palermo et al. 1995), and in the COE/EPA national capping guidance document *Guidance for Subaqueous Dredged Material Capping* (Palermo et al. 1995) and its future revisions.

CAD projects must include careful consideration of siting, design, construction, and monitoring. Contaminated sediments must be placed at the CAD site with acceptable levels of dispersion, and the cap must be successfully placed and maintained. The evaluation process for a CAD project includes selection of an appropriate site, characterization of both contaminated and capping sediments, selection of compatible equipment and placement techniques, prediction of material dispersion during placement, determination of the required cap thickness, evaluation of cap stability against erosion or bioturbation, and development of a monitoring program. In the San Francisco Bay Area, CAD projects may be considered in association with habitat enhancement or restoration, or other beneficial reuses.

The LTMS agencies are adopting the following policy to ensure that the appropriate issues are adequately addressed in any consideration of CAD in the future:

- *The LTMS agencies will address, as appropriate, the issues identified in Table 5.1-4 during site-specific assessments of proposed CAD sites for NUAD-class dredged material.*

5.1.3.4 Levee Reuse

The potential environmental impacts evaluated in this EIS/EIR that are associated with use of dredged material on levees generally include only those impacts that are unique to the use of dredged material for this purpose. Impacts that could occur as a result of levee maintenance or stabilization, independent of the source of fill used (such as temporary loss of vegetation on the levees), would have to be addressed in project-specific evaluations and are not directly covered here. The material suitability/sediment quality policies (section 5.1.1.2) will ensure that pollutant levels do not pose environmental impacts. The other potential environmental concern is that the salinity of dredged materials may be higher than that normally found in waters or habitats adjacent to levees. As overall guidance, the reuse of dredged material for levee maintenance and rehabilitation must carefully consider, but not be limited, to the evaluation of the following issues: (1) site selection; (2)

construction; (3) facility administration and maintenance; and (4) regulatory, mitigation, and monitoring requirements. Specific engineering guidance addressing the reuse of dredged material for levee maintenance and rehabilitation can be obtained from the LTMS Reuse/Upland Site Ranking, Analysis, and Documentation report (LTMS 1995d) and other LTMS upland/reuse technical studies reports. To ensure that these issues are appropriately addressed in project-specific evaluations of the use of dredged material on levees, the LTMS agencies will adopt the following general policy:

- *The LTMS agencies will address, as appropriate, all of the issues identified in Table 5.1-5 in site-specific assessments of proposed levee maintenance, stabilization, or construction projects using dredged material.*

Table 5.1-4. Overall Guidance for Open-Water Confined Aquatic Disposal (CAD) Sites

Type of Issue	*Issues to be Addressed During Project-Specific Review*
Site Selection	Depositional/erosional characteristics • Relatively depositional locations reduce dispersion during placement, the potential for later cap erosion, and the need for armoring or long-term cap maintenance • Relatively erosional locations increase concerns about dispersion during placement, the potential for cap erosion, and the need for armoring or long-term cap maintenance Current velocities • Water column currents (affect dispersion during placement) • Bottom currents (affect resuspension; erosion of mound and cap) • Storm-induced waves (affect maximum bottom current velocities) Bathymetry that may confine the material and reduce dispersion and erosion • Natural or man-made depressions • Other geometric features including constructed subaqueous berms Other siting issues • Location relative to sensitive resources • Capacity to meet the disposal need (including multiple projects) • Depth and width needed to contain the spread of material during placement • Depth needed for barge access • Potential for interference with navigation traffic or other activities Potential water column impacts during placement • Release of contaminants • Water column toxicity • Mass loss of contaminants • Initial mixing
Design	Efficacy of cap placement • Type of capping material

- Dredging/placement method for contaminated sediment
- Dredging/placement method for capping material
- Compatibility of site conditions, material types, and dredging/placement methods

Long-term cap integrity

- Physical isolation of contaminants
- Bioturbation of the cap by benthos
- Consolidation of the sediments (confined and cap material)
- Long-term contaminant loss (due to advection/diffusion)
- Potential for physical disturbance of the cap (e.g., by currents, waves, anchors, ship traffic)

Cap composition and thickness (interim versus final cap designs may differ)

- Thickness needed for physical isolation (~20 cm typically needed for chemical seal)
- Thickness needed for bioturbation (~40 to 50 cm typically needed in San Francisco Bay)
- Consolidation of both confined and cap material
- Potential need for cap armoring against worst-case erosive events

Ensure contaminated sediments are placed as intended, with acceptable levels of dispersion/release

- Pre-disposal bathymetry/baseline surveys using a SVPC[1] system, as appropriate
- Plume monitoring during placement

Ensure cap material is placed as intended, and that required thickness is attained and maintained

Monitoring

- Intermediate post-capping bathymetry/SVPC[1] surveys
- Core samples through cap immediately after capping

Ensure cap remains effective in isolating the contaminated material

- Periodic post-capping bathymetry/SVPC[1] surveys
- Periodic core samples through cap

Note: 1. SVPC = Sediment Vertical Profiling Camera system

Type of Issue	*Issues to be Addressed During Project-Specific Review*
Beneficial Reuse of Dredged Material for Levee Repair and Stabilization - Use dredged material for levee repair and rehabilitation to the maximum extent possible, taking full consideration of engineering and environmental constraints.	

Site Selection	Evaluation of the suitability of the proposed dredging technique in terms of site limitations (e.g., ability to construct containment facilities for hydraulically dredged material, material stockpile capabilities, etc.)
	Evaluation of the ability to transport material to a site (e.g., deep-water access [-15 to -17 feet MLLW], suitable roadways for land transport of material, etc.)
	Evaluation of proposed site conditions, including: • Condition of existing levees • Existing habitat and special status species • Geological engineering evaluations of the ability of levees to handle the weight of the new dredged material for repair/stabilization • Extent of levee repair and stabilization material needed • Characteristics of the dredged material to be used (e.g., grain size, concentrations of chemical constituents, etc.)
	Suitability of the location in terms of avoiding impacts to agricultural, industrial, and municipal water supply intakes
Construction	Evaluation of the suitability of proposed material off-loading and on-site placement
	Compliance with identified geo-engineering constraints at the placement site
	Evaluation of the ability to avoid potential adverse environmental impacts (e.g., surface and groundwater, plant communities, sensitive wildlife species, and riparian or other wetland habitat areas)
	Evaluation of proposed site monitoring activities during the construction phase
	Evaluation of the suitability of a levee repair/stabilization site to reduce pollutant concentrations (salinity, metals, etc.) in the dredged material
	Preferential use of sandier dredged material for Delta levee repair and rehabilitation work
	Compliance with applicable design standards for levee repair/stabilization, as specified by state and federal regulations and policies
Coordinated Approach for Dredged Material Reuse-LTMS agencies will aid, to the extent possible in the development of an organization and a mean of communication between dredgers, the California Department of Water Resources, the COE, and local flood control reclamation districts to identify levee repair/rehabilitation sites that can best use dredged material.	
Facility Administration & Maintenance	Evaluation of the proposed management of all construction operations and post-construction maintenance
	Evaluation of the proposed inspection and supervision of contractors working on site
Regulatory, Mitigation, & Monitoring Requirements	Determination of the need for federal permits or reviews
	Determination of the need for state permits or reviews
	Determination of the need for local approvals
	Evaluation of proposed mitigation and monitoring plans to ensure compliance with all applicable federal and state regulations and policies

Table 5.1-5. Overall Guidance for Levee Reuse

5.1.4 Clean Air Act Conformity Analysis

5.1.4.1 Introduction

As required by the CAA, states establish State Implementation Plans (SIPs) to ensure that areas in attainment of the National Ambient Air Quality Standards (NAAQS) remain in compliance with these standards and that they have a viable plan for nonattainment areas to reach attainment. Section 176(c) of the CAA requires that federal actions conform with the most recent federally approved SIP. Conformity to an implementation plan means that:

1.A project will conform to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards, and

2.A project will not (a) cause or contribute to any new violations of any standard in any area, (b) increase the frequency or severity of any existing standard violation in any area, or (c) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area. The determination of conformity shall be based on the most recent estimates of emissions, as determined by the metropolitan planning organization or other agency authorized to make such estimates.

In accordance with Section 176(c) of the CAA, the EPA promulgated the final conformity rule for general federal actions on November 30, 1993, which is codified as 40 CFR 51 Subpart W, and 40 CFR 93 Subpart B. The 40 CFR 93 Subpart B applies to federal agencies until states revise their SIPs to adopt a conformity rule at least as stringent as EPA's rule (40 CFR 51 Subpart W).

For the programmatic level of analysis considered in this document, air quality emissions are not yet reasonably foreseeable and therefore no conformity determination will be made at this time. However, on a project-specific basis, projects implemented under any of the alternatives considered as part of the LTMS program may (depending on dredge material quantity, dredging locations, disposal locations, and transport routes) result in air emissions sufficient to trigger the need for a conformity determination. The conformity process is discussed in the following sections, but final conformity determinations would have to be made on a case-by-case basis as individual projects are defined. Maintenance dredging and debris disposal projects where "no new depths are required, applicable permits are secured, and disposal will be at an approved disposal site" are exempt from the conformity rule requirements [Subpart 93.153(c)(2)(ix)].

5.1.4.2 Regulatory Background

According to 40 CFR 93 Subpart B, determining conformity is essentially a two-step process: (1) applicability analysis and (2) conformity analysis. The applicability analysis is performed according to Subpart 93.153, wherein de minimisthresholds based on the region's nonattainment status and regional emission levels are established for total project direct and indirect pollutant emissions. The conformity analysis is not required for projects where the total direct and indirect emissions caused by the federal action are less than the respective thresholds. The definitions of total direct and indirect emissions for conformity purposes distinguish emissions according to timing and location rather than the type of emission source. Direct emissions occur at the same time and place as the federal action. Indirect emissions include those that may occur later in time or at a distance from the federal action. In addition, the conformity rule limits the scope of indirect emissions to those that can be quantified and are reasonably foreseeable by the federal agency at the time of analysis, and those for which the federal agency can practicably control and maintain control through its continuing program responsibility.

If required by the applicability analysis, the conformity analysis should consider whether the project conforms to the guidelines of the most recent federally approved SIP, as stated in section 176(c) of the CAA. Until recently, the San Francisco Bay Area Air Basin (SFBAAB) portion of the SIP approved by the EPA was the *1982 Bay Area Air Quality Plan* (Air Quality Plan) (Bay Area Air Quality Management District [BAAQMD], Association of Bay Area Governments [ABAG], and the Metropolitan Transportation Commission [MTC] 1982). This plan was required to demonstrate attainment of the ozone and carbon monoxide NAAQS by 1987 in the SFBAAB, but ultimately failed to reach its goals. In response to the amended CAA, the *San Francisco Bay Area Redesignation Request and Maintenance Plan for the National Ozone Standard* (Maintenance Plan) was prepared by the BAAQMD, ABAG, and the MTC (1993). This plan was submitted to the EPA on November 15, 1993. Since the national ozone standard has not been exceeded in the SFBAAB more than once annually over the last 3 years, the BAAQMD believes the region is in attainment of thisstandard. The Maintenance Plan adopts most of the emission control measures identified in the 1982 SIP, includes new transportation emission control measures, and demonstrates continued attainment of the national ozone standard in the SFBAAB. The EPA approved the Maintenance Plan on May 22, 1995, effective June 21, 1995. As part of the approval process for the Maintenance Plan, the EPA determined that reliance on volatile organic compound (VOC) control measures would be sufficient to maintain the ozone standard and the nitrogen oxides (NO_x) class of compounds was given the status of an exempt pollutant (60 FR 27028-27041). However, the O_3 Maintenance Plan contains contingency measures that would implement NO_x Reasonably Available Control Technologies (RACT) in the event of an O_3 standard violation.

In addition to the O_3 redesignation, the BAAQMD has requested the EPA to redesignate the SFBAAB as in attainment of CO, since the region did not record any violations of the 8-hour CO NAAQS for the 2-year period of 1992-1993 (the 1-hour standard for CO has not been exceeded in the region since 1985). Credit for this air quality improvement can be traced to improvements in the vehicle inspection and maintenance (I&M) program, additional contingency measures adopted in 1990, and the introduction of a winter-time oxygenated fuels program, as required by the 1990 CAA. The request for redesignation is presented in the *Redesignation Request and Maintenance Plan for the National CO Standard* (BAAQMD, ABAG, and MTC 1994). This CO Maintenance Plan contains a contingency measure that would improve the effectiveness of the existing I&M program in the event of a CO standard violation.

5.1.4.3 Applicability Analysis

All activities associated with the LTMS, except activity occurring in the Delta area and disposal at sites outside of the 3-mile limit of BAAQMD regulatory jurisdiction, are located within the SFBAAB. The SFBAAB is currently designated as a maintenance area for ozone, attainment for nitrogen dioxide and sulfur dioxide, and unclassified for particulate matter less than 10 microns in diameter (PM_{10}). The urbanized areas of the SFBAAB are classified as in "moderate" nonattainment of federal CO standards. To determine applicability, project emissions within the SFBAAB therefore need to be compared to the area-specific deminimis thresholds for ozone (100 tons per year of VOC for a maintenance area) and CO (100 tons per year) [Subpart 93.153(b)(2)]. In addition, the emissions of ozone precursors (VOC only, NO_x is exempt) and CO must not exceed 10 percent of the total SFBAAB inventories of VOC and CO emissions [Subpart 93.153(i)]. If total project direct and indirect VOC and CO emissions are less than the de minimis thresholds and less than 10 percent of the area inventory for VOC and CO, the project is assumed to conform, and further conformity analysis would not be required.

Emissions from LTMS-related activity occurring in the Delta area could potentially affect the Sacramento County portion of the Sacramento Valley Air Basin (SVAB) and/or the San Joaquin County portion of the San Joaquin Valley Air Basin (SJVAB). Sacramento County is designated as in

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"severe" nonattainment of the federal ozone standard, "moderate" nonattainment of the federal CO standards, and "moderate" nonattainment of the federal PM_{10} standards (see section 4.7.2 for an explanation of the nonattainment classification scheme). The applicable de minimis thresholds for emissions occurring within Sacramento County are therefore 25 tons per year for ozone precursors, 100 tons per year for CO, and 100 tons per year for PM_{10} [Subpart 93.153(b)(1)]. San Joaquin County is in "serious" nonattainment for ozone and PM_{10}, and the Stockton urbanized area is in "moderate" nonattainment for CO. The de minimis thresholds for emissions in these areas are therefore 50 tons per year of ozone precursors, 100 tons per year of CO, and 70 tons per year of PM_{10} [Subpart 93.153(b)(1)].

The applicability analysis would focus on the direct short-term emissions associated with dredging, transport, and disposal activities. Long-term emissions from the change in shipping activities that would occur upon completion of project dredging, transport, and disposal activities are assumed to decrease and provide beneficial air quality impacts. Ship emissions are the only source that would need to be considered for long-term analysis, since they would be the future source most exclusively affected by the proposed LTMS projects, and they are the only indirect source that could possibly be considered as being under the practicable control of the COE (i.e., use of the harborsand shipping lanes by larger vessels would not be possible without the proposed dredging projects).

Due to the deepening of the navigational channels and harbors provided by the LTMS projects, ships would be able to call more fully loaded, and future cargo throughput per ship visit would increase. As a result, fewer ships would be required to transport the same amount of cargo compared to the existing fleet, and fewer emissions would be produced over the long term for a given amount of cargo throughput. The main reason for this decrease in emissions is that a decreased number of ship visits would eliminate a substantial amount of emissions from cruising, maneuvering, and queuing activities, and tugboat assistance.

5.1.4.4 Conformity Determination

If total project short-term emissions from a proposed LTMS action would exceed the de minimis thresholds, conformity would have to be demonstrated in one of the following ways:

1.Show that total project emissions are accounted for in the applicable SIP;

2.For O_3 and NO_2, provide offsets of total project emissions so there is no net increase in emissions;

3.For criteria pollutants other than O_3 and NO_2, perform dispersion modeling of project emissions to show no violations of the NAAQS;

4.For O_3 and NO_2, where EPA has approved a revision to an area's attainment/maintenance plan after 1990,

a.Demonstrate that the federal activity emissions plus baseline emissions would not exceed the emissions budget in the applicable SIP, or

b.When the federal activity emissions plus baseline emissions exceed the emissions budget in the applicable SIP, obtain a written commitment from the state governor to revise the SIP to include the emissions; or

5.For O_3 or NO_2, where EPA has not approved a revision to an area's attainment/maintenance plan after 1990, demonstrate that the federal activity emissions will not increase emissions with respect to the baseline emissions.

5.2 ALTERNATIVES DEVELOPMENT

This section of the EIS/EIR describes development of a range of alternative long-term management approaches for San Francisco Bay Area dredged material that meet the overall goals and objectives of the LTMS. Public comments (see Chapter 2) and initial agency evaluation have identified that any alternative should be based on disposal in a *combination* of the three placement environments. Public comment also indicated the need to address cumulative environmental and economic impacts and benefits over the entire 50-year LTMS planning period. In the first sections of this chapter, an initial range of alternatives is developed based on the LTMS planning estimates for long-term dredging and disposal volumes, and on distributing this dredged material among the three placement environments in a variety of ways. Section 5.2.3 describes the alternative management approaches retained for preliminary consideration. Each alternative consists of a dredged material distribution scenario, coupled with the policy-level mitigation measures presented earlier in this chapter (section 5.1). Final screening of the preliminary alternatives, and evaluation of the final alternative management approaches, is presented in Chapter 6.

5.2.1 Options Eliminated from Consideration Based on Scoping

The formal and informal scoping process for this EIS/EIR is described in Chapter 2. One of the key issues identified during the scoping period was a need to balance disposal among the three types of environments. In response to these and other comments, several potential approaches for long-term dredged material management were eliminated from consideration during the process of developing dredged material distribution scenarios. These included eliminating dredging, returning to pre-LTMS conditions, placing all dredged material in a single environment, and placing all material suitable for unconfined aquatic disposal in a single environment. These options are discussed below.

Eliminating Dredging is not considered a viable option for the San Francisco Bay Area. Failing to maintain and construct necessary navigational channels would eventually lead to shoaling in all of the shipping lanes and, in the worst case, effectively limit vessel traffic in the Estuary to recreational boats. This approach would not meet the overall goals of the LTMS, and would result in dire economic consequences for the region. It would also preclude realization of the environmental benefits that could be gained through reuse of dredged material.

A Return to Pre-LTMS Conditions is a second option that was eliminated from detailed consideration. In the late 1980s, a situation commonly referred to as "mudlock" created substantial economic hardship, uncertainty over regulatory policies and procedures, a lack of predictability for dredging project planning, and environmental concerns. The No-Action alternative considered in this EIS/EIR reflects important management changes that have come about *after* the establishment of the LTMS, such as improved interim sediment testing requirements, improved management of mounding at the Alcatraz disposal site, and designation of a deep ocean disposal site, which represents the first, major alternative to in-Bay disposal of most of the area's dredged material. A return to the situation in effect prior to the LTMS would be a significant step backward for all aspects of dredged material management in the Bay Area, would be inconsistent with the San Francisco Estuary Project's (SFEP) Comprehensive Conservation Management Program (CCMP), and would not achieve the objectives of the LTMS.

Placing All Dredged Material in a Single Environment was eliminated from consideration because this action also does not meet LTMS goals. Not all dredged material is suitable for disposal in all environments. For example, NUAD material may not be disposed at unconfined aquatic disposal sites in the Estuary or in the ocean under existing law. All classes of dredged material could theoretically be placed in hazardous waste landfills, but a large fraction of that material would be appropriate to reuse for beneficial purposes, and the volumes of material would quickly overwhelm disposal capacity for actual hazardous wastes that could then not be disposed of properly. In addition, reliance on any one disposal environment would leave the region once again vulnerable to "mudlock" if

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thechosen disposal environment were suddenly to become unavailable for any reason.

Placing All SUAD Material in a Single Environment was also eliminated from consideration for many of the reasons outlined above. The public scoping notice for this EIS/EIR included options that heavily emphasized disposal in individual environments. Further agency evaluation indicated a strong need to broaden the proposed material distributions. A mix of different disposal environments is also necessary to account for variation in disposal volumes over time; to address changing circumstances, project sizes, and economies of foreseeable dredging projects; and to avoid potentially significant impacts associated with disposal in one environment.

5.2.2 Development of Material Distribution Scenarios

A range of distribution scenarios was developed to reflect reasonable volume projections that could be managed in each type of environment. These scenarios were constructed in a step-wise fashion, as outlined below.

First, projections of the volume of material that will need to be dredged from existing navigation and berthing areas were made. These projections are outlined in Chapter 2, and more fully described in Appendix E. For the purpose of developing long-term management approaches, the high range estimate of 5.93 mcy per year (a total of 296.5 mcy over a 50-year period) is used.

Second, a range of feasible disposal options for upland/wetland reuse was developed. The capacity of potentially feasible UWR sites, and the timeframe within which these capacities could be developed, was evaluated (LTMS 1995d; BCDC 1995a). These upland/wetland site reuse capacities, together with the allowable disposal volume limits at existing aquatic disposal sites, were used to define the maximum levels of disposal that would be considered for each of the three disposal environments.

Third, historic data on the physical, chemical, and toxicity properties of dredged material was reviewed to estimate the volume of material that would be suitable for unconfined aquatic disposal (a framework fordetermining suitability is presented in Chapter 3). Based on this review, 80 to 90 percent of the material to be dredged over the next 50 years is expected to be suitable for unconfined aquatic disposal (SUAD-class material). Current regulations and policies would require the remaining 10 to 20 percent (NUAD-class material) to be confined in some manner. A portion of the NUAD material, depending on its characteristics, would be suitable for use in wetland restoration, landfill cover, construction fill, and other reuse options. (Confinement at any CAD sites that may be designated in the future is also possible.) A very small fraction of this material &emdash; expected to be less than 1 percent of the total dredged volume &emdash; would require handling and disposal as hazardous waste (see Chapter 3). For the purpose of this analysis, the high range estimate of 20 percent of all dredged material being NUAD (an average of 1.18 mcy per year, or 59 mcy over 50 years) is used. This volume of material would require appropriate management under any of the alternative management approaches, and would not be generally available for distribution among the placement environments. In contrast, the other 80 percent of all material (~4.7 mcy per year, or 237 mcy over 50 years) would be SUAD-class material that would theoretically be available for distribution among all of the placement environments.

The fourth step was to define an upper bound on the amount of SUAD material that would be considered for placement in any one environment. In response to public comments regarding a need for a balance among the three disposal environments, the LTMS agencies determined that no alternative long-term management approach would include more than 80 percent or less than 5 percent of the total volume of dredged SUAD material in any of the three environments.

The fifth step was to develop scenarios for material distribution using these upper (80 percent) and lower (5 percent) bounds. Three volume categories were defined:

·*High*: 60 to 80 percent of the material suitable for aquatic disposal; this corresponds to 3.1 to 3.8

mcy per year and 154.1 to 189.6 mcy over the 50-year planning period;

·*Medium*:35 to 50 percent of the material suitable for aquatic disposal; this corresponds to 1.7 to 2.4 mcy per year and 83.0 to 118.5 mcy over the 50-year planning period; and

·*Low*: 5 to 20 percent of the material suitable for aquatic disposal; this corresponds to 0.2 to 0.9 mcy per year and 11.9 to 47.5 mcy over the 50-year planning period.

Discontinuous ranges (e.g., 20 percent, 40 percent, and 60 percent) were used to highlight the differences between use levels as much as possible.

Refer to Figure 2.9-1, which illustrates this evaluation process.

Based on the above considerations, six distribution scenarios were constructed that, overall, include the range of potential disposal volume categories (high, medium, and low) in each placement environment. The six scenarios are presented in Table 5.2-1. Three of the six scenarios involve placing a high percentage of dredged material in one environment with the remainder split between the other two environments. The other three scenarios achieve a more even balance of dredged material disposal by placing no more than a medium amount in any one environment.

	Average Annual Target Volume (mcy) per Placement Environment		
Preliminary Alternative	*In-Bay*	*Ocean*	*UWR*
A (No Action)	Very High (3.8+)	Very Low (0.48)	Very Low (0.48)
B	Medium (to 2.4)	Medium (to 2.4)	Low (to 0.9)
C	Low (to 0.9)	High (to 3.8)	Low (to 0.9)
D	Medium (to 2.4)	Low (to 0.9)	Medium (to 2.4)
E	Low (to 0.9)	Medium (to 2.4)	Medium (to 2.4)
F	Low (to 0.9)	Low (to 0.9)	High (to 3.8)

Table 5.2-1. Scenarios for Distribution of Dredged Material in In-Bay, Ocean, and Upland/Wetland Reuse Environments

5.2.3 Preliminary Alternatives Carried Forward for Consideration

Each of the alternative long-term approaches for management of Bay Area dredged material evaluated in this EIS/EIR consist of one of the distribution scenarios for SUAD-class material (presented in section 5.2) combined with the policy-level mitigation measures (described in section 5.1). The policy-level mitigation measures effectively mitigate and minimize many of the environmental risks that would otherwise be associated with dredged material disposal. The six preliminary alternatives are summarized in the following paragraphs. Taken together, this set of preliminary alternatives presents a range of policy options for achieving a dredged material management system that attempts to maximize environmental benefits and minimize environmental impacts, in an economically sound manner.

The environmental consequences of these alternatives are presented in Chapter 6. The evaluation there is presented in two stages. First, a "generic analysis" of the environmental impacts, risks, and benefits associated with different volumes of dredged material placed in each of the three environments is presented. This analysis serves as the final screening of the preliminary alternatives. The second stage is a detailed evaluation of the remaining alternatives, using the evaluation criteria

developed in Chapter 2 based on public issues of concern.

5.2.3.1 Preliminary Alternative A: No-Action (Current Conditions)

The No-Action alternative is based on continuation of current management practices that emphasize the maximum use of in-Bay unconfined aquatic disposal sites. Conditions under the No-Action alternative are presented in Table 5.2-2. This alternative is not based on conditions in San Francisco Bay that occurred prior to the formation of the LTMS in 1990. Rather, No-Action includes continued disposal of about 4.0 mcy per year at Alcatraz (SF-11) consistent with COE Public Notice 93-3. It also includes continuation of existing levels of disposal at the Carquinez Strait site (SF-9), which has an allowable disposal volume limit of 2.0 or 3.0 mcy (depending on the year), and at the San Pablo Bay site (SF-10), which has a target disposal volume limit of 0.5 mcy per year.

Accordingly, the No-Action distribution scenario would involve the continued use of in-Bay sites up to a maximum level of 5.5 to 6.5 mcy per year, with low use of the SF-DODS, and upland or wetland reuse only as opportunities arise. All of the other distribution scenarios would involve less in-Bay disposal, and more upland or wetland reuse, than the No-Action scenario.

Conditions	*In-Bay Use*	*Ocean Use*	*Upland/Wetland Reuse*
Material Distributions			
Disposal Volume Limit	5.5 - 6.5[1] mcy/yr	6 mcy/yr[2]	NA
Annual Average Use	3.8+ mcy/yr	0.48 mcy/yr	0.48 mcy/yr
Total 50-yr Volume (SUAD)	190 mcy	24 mcy	24 mcy
Total 50-yr Volume (NUAD)	NA	NA	59 mcy (avg 1.18 mcy/yr)
Policy-Level Mitigation Measures	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs · Fish Habitat Conservation · Site-Specific Review of CAD	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Need · Habitat Conversion · Site-Specific Review of Rehandling and Confined Facilities, CAD, Wetland Restoration, and Levee Use

Note:1.Volume limits only include Carquinez, San Pablo, and Alcatraz sites. 2.The volume limit for the ocean site will be finalized by EPA after completion of this EIS/EIR and will be based on the preferred alternative and the need to provide for flexibility (see Chapter 7 discussion on agency actions following the final EIS/EIR).

Table 5.2-2. Preliminary Alternative A: No-Action &emdash; Current Conditions (Very High In-Bay, Very Low Ocean, Very Low UWR)

Four major characteristics distinguish No-Action from the other five alternatives:

·The vast majority of dredged material disposal would continue to occur within the already-stressed Estuary.

·This alternative relies primarily on the ocean disposal site for situations when in-Bay capacity is reached, but otherwise does not require specific levels of ocean disposal.

·It does not establish, provide for, or facilitate the beneficial reuse of dredged material in a coordinated fashion.

·It is associated with the lowest quantifiable economic costs when calculated on a project-by-project basis (but not necessarily on a regional basis).

Based on current 50-year projections, it appears that existing allowable disposal volume limits at in-Bay sites would be sufficient to manage all SUAD-class dredged material most of the time under No-Action.

However, the No-Action Alternative represents an approach that leaves the region potentially vulnerable to situations where dredging needs periodically exceed in-Bay capacity. In this regard, the No-Action alternative does not meet the LTMS goals. Nevertheless, as required by NEPA and CEQA, it must be fully evaluated in this EIS/EIR to compare the relative benefits and consequences of the other action alternatives.

5.2.3.2 Preliminary Alternative B: Emphasize Aquatic Disposal (Minimal Upland/Wetland Reuse)

Preliminary Alternative B &emdash; Emphasize Aquatic Disposal &emdash; would include medium levels of disposal at both the existing in-Bay unconfined aquatic disposal sites and the SF-DODS. This represents a substantial reduction of long-term in-Bay disposal volumes (a long-term average of up to 2.4 mcy per year, as opposed to 4.8 mcy per year under No-Action). It also represents a substantial increase in ocean disposal(from less than 1 mcy per year under No-Action, to an average of as much as 2.4 mcy per year). Only low volumes of dredged material would go toward beneficial reuse in the UWR environment; however, substantially more material would be beneficially reused compared to No-Action. Conditions under Preliminary Alternative B are presented in Table 5.2-3.

Conditions	*In-Bay Use*	*Ocean Use*	*Upland/Wetland Reuse*

Material Distributions Disposal Volume Limit Annual Average Use Total 50-yr Volume (SUAD) Total 50-yr Volume (NUAD)	see note 1 1.7 - 2.4 mcy/yr 83.0 - 118.5 mcy NA	6 mcy/yr[2] 1.7 - 2.4 mcy/yr 83.0 - 118.5 mcy NA	NA 0.2 - 0.9 mcy/yr 11.9 - 47.5 mcy 59 mcy (avg 1.18 mcy/yr)
Policy-Level Mitigation Measures	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs · Fish Habitat Conservation · Site-Specific Review of CAD	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs · Habitat Conversion · Site-Specific Review of Rehandling and Confined Facilities, CAD, Wetland Restoration, and Levee Repair Use

Notes: 1. Administrative volume limits on in-Bay disposal are one option for implementing any dredged material placement scenario. This and other options are discussed more fully in Chapter 7.

2. The volume limit for the ocean site will be finalized by EPA after completion of this EIS/EIR and will be based on the preferred alternative and the need to provide for flexibility (see Chapter 7 discussion on agency actions following the final EIS/EIR).

Table 5.2-3. Preliminary Alternative B: Emphasize Aquatic Disposal (Medium In-Bay, Medium Ocean, Low UWR)

5.2.3.3 Preliminary Alternative C: Emphasize Ocean Disposal

Preliminary Alternative C &emdash; Emphasize Ocean Disposal &emdash; would include high levels of disposal at the SF-DODS, and only low levels at existing in-Bay sites. This alternative represents the largest reduction of long-term in-Bay disposal volumes (an average of less than 1 mcy

per year, as opposed to 4.8 mcy per year under No-Action) and therefore avoids or minimizes, to the greatest extent, the impacts and risks associated with disposal of large volumes of dredged material within the already-stressed Estuary. Similar to Preliminary Alternative B, only low volumes of dredged material would go toward beneficial reuse in the UWR environment; however, substantially more material would be beneficially reused compared to No-Action. Conditions under Preliminary Alternative C are presented in Table 5.2-4.

5.2.3.4 Preliminary Alternative D: Balance Upland/Wetland Reuse and In-Bay Disposal (Minimal Ocean Disposal)

Preliminary Alternative D &emdash; Balance UWR and In-Bay Disposal &emdash; would include medium volumes of material going to both existing in-Bay disposal sites, and to upland or wetland reuse. Only low volumes of material would be directed to the SF-DODS. Similar to Preliminary Alternative B, this alternative represents a substantial reduction of long-term in-Bay disposal volumes (an average of up to 2.4 mcy per year, as opposed to 4.8 mcy per year under No-Action). At the same time, it represents a substantial increase in the volume of dredged material that would go toward beneficial reuse in the UWR environment. Conditions under Preliminary Alternative D are presented in Table 5.2-5.

Conditions	*In-Bay Use*	*Ocean Use*	*Upland/Wetland Reuse*
Material Distributions			
Disposal Volume Limit	see note 1	6 mcy/yr[2]	NA
Annual Average Use	0.2 - 0.9 mcy/yr	3.1 - 3.8 mcy	0.2 - 0.9 mcy/yr
Total 50-yr Volume (SUAD)	11.9 - 47.5 mcy	154.1 - 189.6 mcy	11.9 - 47.5 mcy
Total 50-yr Volume (NUAD)	NA	NA	59 mcy (avg 1.18 mcy/yr)
Policy-Level Mitigation Measures	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs	· Material Suitability and Sediment Quality Testing · Site Management and	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs · Habitat Conversion

	· Fish Habitat Conservation · Site-Specific Review of CAD	Monitoring · Review of Dredging Needs	· Site-Specific Review of Rehandling and Confined Facilities, CAD, Wetland Restoration, and Levee Use
Notes: 1. Administrative volume limits on in-Bay disposal are one option for implementing any dredged material placement scenario. This and other options are discussed more fully in Chapter 7. 2. The volume limit for the ocean site will be finalized by EPA after completion of this EIS/EIR and will be based on the preferred alternative and the need to provide for flexibility (see Chapter 7 discussion on agency actions following the final EIS/EIR).			

Table 5.2-4. Preliminary Alternative C: Emphasize Ocean Disposal(Low In-Bay, High Ocean, Low UWR)

Conditions	*In-Bay Use*	*Ocean Use*	*Upland/Wetland Reuse*
Material Distributions			
Disposal Volume Limit	see note 1	6 mcy/yr[2]	NA
Annual Average Use	1.7 - 2.4 mcy/yr	0.2 - 0.9 mcy/yr	1.7 - 2.4 mcy/yr
Total 50-yr Volume (SUAD)	83.0 - 118.5 mcy	11.9 - 47.5 mcy	83.0 - 118.5 mcy
Total 50-yr Volume (NUAD)	NA	NA	59 mcy (avg 1.18 mcy/yr)
Policy-Level Mitigation Measures	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs	· Material Suitability and Sediment Quality Testing · Site Management and	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs · Habitat Conversion

	· Fish Habitat Conservation · Site-Specific Review of CAD	Monitoring · Review of Dredging Needs	· Site-Specific Review of Rehandling and Confined Facilities, CAD, Wetland Restoration, Levee Repair Use
Notes: 1. Administrative volume limits on in-Bay disposal are one option for implementing any dredged material placement scenario. This and other options are discussed more fully in Chapter 7. 2. The volume limit for the ocean site will be finalized by EPA after completion of this EIS/EIR and will be based on the preferred alternative and the need to provide for flexibility (see Chapter 7 discussion on agency actions following the final EIS/EIR).			

Table 5.2-5. Preliminary Alternative D: Balance UWR and In-Bay Disposal (Medium In-Bay, Low Ocean, Medium UWR)

5.2.3.5 Preliminary Alternative E: Balance Upland/Wetland Reuse and Ocean Disposal (Minimal In-Bay Disposal)

Preliminary Alternative E &emdash; Balance UWR and Ocean Disposal &emdash; would include medium levels of disposal at the SF-DODS, similar to Preliminary Alternative B. It would also include medium levels of material going toward beneficial reuse in the UWR environment, similar to Preliminary Alternative D. This alternative, like Preliminary Alternative C, also represents the largest reduction of long-term in-Bay disposal volumes (an average of less than 1 mcy per year, as opposed to 4.8 mcy per year under No-Action) and therefore avoids or minimizes, to the greatest extent, the impacts and risks associated with disposal of large volumes of dredged material within the already-stressed Estuary. Conditions under Preliminary Alternative E are presented in Table 5.2-6.

Conditions	*In-Bay Use*	*Ocean Use*	*Upland/Wetland Reuse*
Material Distributions			
Disposal Volume Limit	see note 1	6 mcy/yr[2]	NA
Annual Average Use	0.2 - 0.9 mcy/yr	1.7 - 2.4 mcy	1.7 - 2.4 mcy/yr
Total 50-yr Volume (SUAD)	11.9 - 47.5 mcy	83.0 - 118.5 mcy	83.1 - 118.5 mcy
Total 50-yr Volume (NUAD)	NA	NA	59 mcy
	· Material Suitability		

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Policy-Level Mitigation Measures	and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs · Fish Habitat Conservation · Site-Specific Review of CAD	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs · Habitat Conversion · Site-Specific Review of Rehandling and Confined Facilities, CAD, Wetland Restoration, and Levee Use

Notes: 1. Administrative volume limits on in-Bay disposal are one option for implementing any dredged material placement scenario. This and other options are discussed more fully in Chapter 7.

2. The volume limit for the ocean site will be finalized by EPA after completion of this EIS/EIR and will be based on the preferred alternative and the need to provide for flexibility (see Chapter 7 discussion on agency actions following the final EIS/EIR).

Table 5.2-6. Preliminary Alternative E: Balance UWR and Ocean Disposal (Low In-Bay, Medium Ocean, Medium UWR)

5.2.3.6 Preliminary Alternative F: Emphasize Upland/Wetland Reuse

Preliminary Alternative F &emdash; Emphasize UWR &emdash; would include high levels of material going toward beneficial reuse in the UWR environment, the greatest amount of beneficial reuse of any of the alternatives. At the same time, like preliminary alternatives C and E, this alternative represents the largest reduction of long-term in-Bay disposal (an average of less than 1 mcy per year, as opposed to 4.8 mcy per year under No-Action) and therefore avoids or minimizes, to the greatest extent, the impacts and risks associated with disposal of large volumes of dredged material within the already-stressed Estuary. Only low levels of disposal activity would occur at the SF-DODS, similar to Preliminary Alternative D. Conditions under Preliminary Alternative F are presented in Table 5.2-7.

Conditions	*In-Bay Use*	*Ocean Use*	*Upland/Wetland Reuse*

Material Distributions Disposal Volume Limit Annual Average Use Total 50-yr Volume (SUAD) Total 50-yr Volume (NUAD)	see note 1 0.2 - 0.9 mcy/yr 11.9 - 47.5 mcy NA	6 mcy/yr[2] 0.2 - 0.9 mcy 11.9 - 47.5 mcy NA	NA 3.1 - 3.8 mcy/yr 154.1 - 189.6 mcy 59 mcy
Policy-Level Mitigation Measures	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs · Fish Habitat Conservation · Site-Specific Review of CAD	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs	· Material Suitability and Sediment Quality Testing · Site Management and Monitoring · Review of Dredging Needs · Habitat Conversion · Site-Specific Review of Rehandling and Confined Facilities, CAD, Wetland Restoration, and Levee Use

Notes: 1.Administrative volume limits on in-Bay disposal are one option for implementing any dredged material placement scenario. This and other options are discussed more fully in Chapter 7.

2.The volume limit for the ocean site will be finalized by EPA after completion of this EIS/EIR and will be based on the preferred alternative and the need to provide for flexibility (see Chapter 7 discussion on agency actions following the final EIS/EIR).

Table 5.2-7. Preliminary Alternative F: Emphasize UWR (Low In-Bay, Low Ocean, High UWR)

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