Table 6.1-8. Summary of Policy-Level Mitigation Measures Specific to Placement Environments and Resources, by Alternative

Placement Environment	*Resource*	*Policy-Level Mitigation Measure (a)*	*Significance of Benefit*	*Significance of Impact/Risk After Mitigation*
Alternative 3 — Medium Ocean, Low In-Bay, Medium UWR (cont'd)				
In-Bay	Transportation Systems	See note (c)	0	0
	Air Quality	See note (c)	0	-3
Upland/Wetland Reuse	Water Quality			
Habitat Restoration		SMM1, SMM2; SQ1, SQ2, SQ3, SQ4; WR1	+2	0
Levee Maintenance		LR1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	-1
Rehandling Facility		RF1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Upland/Wetland Reuse	Fish & Wildlife Habitat			
Habitat Restoration		HC1, HC2; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4; WR1	+2	-1
Levee Maintenance		LR1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Rehandling Facility		RF1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Upland/Wetland Reuse	Special Status Species			
Habitat Restoration		HC1, HC2; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4; WR1	+2	0
Levee Maintenance		LR1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Rehandling Facility		RF1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Upland/Wetland Reuse	Transportation Systems			
Habitat Restoration		See note (c)	0	0
Levee Maintenance		See note (c)	0	-3
Rehandling Facility		See note (c)	0	-3
Upland/Wetland Reuse	Air Quality	See note (c)	0	-3
No-Action (Current Conditions) — Low Ocean, Very High In-Bay, Low UWR				
Ocean	Water Quality	SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
	Fish & Wildlife Habitat	SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
	Special Status Species	SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
	Transportation Systems	See note (c)	0	0

Table 6.1-8. Summary of Policy-Level Mitigation Measures Specific to Placement Environments and Resources, by Alternative

Placement Environment	*Resource*	*Policy-Level Mitigation Measure (a)*	*Significance of Benefit*	*Significance of Impact/Risk After Mitigation*
No-Action — Low Ocean, Very High In-Bay, Low UWR (cont'd)				
	Air Quality	See note (c)	0	-3
In-Bay	Water Quality	CAD1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	-2
	Fish & Wildlife Habitat	CAD1; HP2; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	-2
	Special Status Species	CAD1; HP2; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	-1
	Transportation Systems	See note (c)	0	0
	Air Quality	See note (c)	0	-3
Upland/Wetland Reuse	Water Quality			
Habitat Restoration		SMM1, SMM2; SQ1, SQ2, SQ3, SQ4; WR1	+1	0
Levee Maintenance		LR1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	-1
Rehandling Facility		RF1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Upland/Wetland Reuse	Fish & Wildlife Habitat			
Habitat Restoration		HC1, HC2; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4; WR1	+1	0
Levee Maintenance		LR1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Rehandling Facility		RF1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Upland/Wetland Reuse	Special Status Species			
Habitat Restoration		HC1, HC2; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4; WR1	+1	0
Levee Maintenance		LR1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Rehandling Facility		RF1; SMM1, SMM2; SQ1, SQ2, SQ3, SQ4	0	0
Upland/Wetland Reuse	Transportation Systems			
Habitat Restoration		See note (c)	0	0
Levee Maintenance		See note (c)	0	0
Rehandling Facility		See note (c)	0	0
Upland/Wetland Reuse	Air Quality	See note (c)	0	-3

Notes:

a. Key to abbreviations for policy-level mitigation measures:

CAD Confined Aquatic Disposal (see Chapter 5)

CAD1. The LTMS agencies will address, as appropriate, the issues identified in Table 5.1-5 during site-specific assessments of proposed CAD sites for NUAD-class dredged material.

CAP Establishment of Additional Capacity for Rehandling and for Upland/Wetland Reuse or Disposal (see Chapter 6)

CAP1. The LTMS agencies will establish or support, to the full extent of their authorities, sufficient capacity at rehandling facilities and at upland/wetland reuse or disposal sites to appropriately manage NUAD-class dredged material and to meet the dredged material placement distribution for SUAD-class dredged material established in the Policy EIS/Programmatic EIR's preferred alternative.

CDM Coordinated Dredged Material Management (see Chapter 5)

CDM1. The COE, EPA, SFBRWQCB, and BCDC, together with the State Lands Commission, are formally cooperating in an interagency Dredged Material Management Office (DMMO), to coordinate regulatory requirements and to provide better service to the dredging community and the public. The DMMO was established as a pilot program by the Memorandum of Agreement (MOA), signed by the participating agencies. The DMMO will likely continue to 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.

HC Upland Habitat Conversion Associated with Restoration Projects (see Chapter 5)

HC1. 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.

HC2. 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. Whenever feasible, such projects will provide, as part of the project design, for a no net loss in the habitat functions existing on the project site or, where necessary, provide compensatory mitigation for lost habitat functions in accordance with state and federal mitigation requirements.

HP Habitat Protection (see Chapter 5)

HP1. Dredging activities will be restricted as indicated on Table 5.1-1. Any dredging projects proposing deviations from these tables 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.

HP2. Dredged material disposal activities will be minimized or restricted as indicated on Table 5.1-2. The LTMS agencies will closely review disposal projects proposed for the designated in-Bay disposal sites to ensure that disposal during the indicated time frames is minimized or avoided as indicated. Disposal project proponents are advised that the agencies will require that the need for disposal at these sites during the specified time frames must be clearly established. Any disposal projects or new disposal sites proposing deviations from these tables 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.

LR Levee Reuse (see Chapter 5)

LR1. The LTMS agencies will address, as appropriate, all of the issues identified in Table 5.1-6 in site-specific assessments of proposed levee maintenance, stabilization, or construction projects using dredged material.

LR2. To address water quality concerns associated with the reuse of dredged material for levee repair and stabilization in the Delta region, only material determined to be suitable in regard to pollutant and salinity concentrations, as well as material which has been processed to reduce pollutants and salinity to suitable concentrations, will be used for this purpose. This may involve such control measures as directing only material dredged from the eastern portion of San Francisco Bay, where sediment salinity concentrations are lowest, for reuse purposes in the Delta region.

ND Reviewing the Need for Dredging (see Chapter 5)

ND1. 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.

ND2. 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. In addition, the LTMS agencies will continue to work to reduce the need for dredging associated with other projects.

RF Rehandling Facilities and Dedicated Confined Disposal Facilities (see Chapter 5)

RF1. The LTMS agencies will address, as appropriate, the issues identified in Table 5.1-3 in site-specific assessments of the development, expansion, or operation of dredged material rehandling facilities or dedicated confined disposal sites.

SD Special Consideration for "Small Dredger" Projects (see Chapters 5 and 6)

SD1. The LTMS agencies will give special consideration in the LTMS Management Plan to minimizing potential economic impacts to "small dredger" projects, for example, by reserving some of the available capacity at the least expensive disposal or reuse sites or by other means. The specific approach/policy for minimizing economic impacts to small dredgers will be established with public input as the LTMS Management Plan is developed, and will be incorporated as appropriate under the overall Management Plan in the specific Site Management and Monitoring Plan(s) for the in-Bay sites.

SD2. 250,000 cy of the in-Bay disposal capacity under the disposal cap will be reserved each year for small dredgers. This small dredger set-aside volume will not be decreased over time. Further, small dredgers will be allowed to exceed the 250,000 cy set-aside in any given year, on a case-by-case basis. Small dredgers will still be required, on a case-by-case basis, to evaluate and implement UWR or ocean disposal if feasible and practicable.

SMM Site Management and Monitoring (see Chapter 5)

SMM1. The LTMS agencies will develop and implement site management and monitoring plans for all multi-user placement or disposal sites. (Note: The development of individual Site Management and Monitoring Plans for single-user placement and disposal sites, such as the Suisun Bay and San Francisco Bar sites, is not necessary because the project environmental and management documents for single-user sites include such management and monitoring plan development requirements.) 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.

SMM2. 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 be provided as part of the periodic review for existing sites.

SQ Material Suitability and Sediment Quality Testing (see Chapter 5)

SQ1. 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 the Clean Water Act).

SQ2. 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.

SQ3. 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.

SQ4. 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 will require 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.

WR Wetland Restoration (see Chapter 5)

WR1. The LTMS agencies will address, as appropriate, all of the issues identified in Table 5.1-4 in site-specific assessments of proposed wetland restoration projects using dredged material.

b. UWR = Upland/Wetland Reuse

c. Project-specific mitigation measures would be developed on a case-by-case basis.

disposed at dispersive, in-Bay sites compared to No-Action. However, for the purposes of assigning numbers in Table 6.1-8, the reduction in risk from decreased in-Bay disposal is considered instead. The preferred alternative has the least amount of impact/risk for the in-Bay environment because it has the least amount of in-Bay disposal. The other alternatives have low impact/risk for water quality and fish and wildlife habitat from in-Bay disposal and high impact/risk to air quality. The preferred alternative has negligible impact/risk to water quality and fish and wildlife habitat and high impact/risk to air quality from disposal in-Bay.

Alternative 3 and Alternative 2 have the highest benefits to the upland/wetland reuse placement environment of all of the final action alternatives. They have moderate benefits for water quality, fish and wildlife habitat, and special status species for habitat restoration projects. In comparison, these benefits are low for Alternative 1. Alternative 3 and Alternative 2 have some impact/risk, some of which are increased over Alternative 1, in the UWR environment. The preferred alternative has low impact/risk to water quality for levee maintenance projects. This is the case for all of the final action alternatives. However, the impact/risk for Alternative 3 and Alternative 2 is low to fish and wildlife habitat for habitat restoration projects. This is an increase over negligible ratings given to Alternative 1. In addition, the transportation system impact/risk for Alternative 3 and Alternative 2 are high for levee maintenance and rehandling facility projects. This compares with a negligible rating for Alternative 1.

6.2 EVALUATION OF THE FINAL ALTERNATIVES AGAINST THE FINAL EVALUATION CRITERIA

The three final "action" alternatives listed above, along with the No-Action alternative, are being considered by the LTMS agencies for implementation as the basis for development of a detailed, comprehensive Management Plan for San Francisco Bay Area dredged material. The evaluation and comparison of these alternatives is based largely on the environment-specific "Generic Analysis" presented in the preceding pages (section 6.1), and on an assessment of how well each of the final alternatives addresses the broad "evaluation criteria" developed as a result of the LTMS scoping and problem identification process. The evaluation criteria, described in Chapter 2, were developed to address a variety of public concerns about the management of dredged material. They provide for an over-arching comparison of the alternatives, that supplements the resource-by-resource evaluation and comparison presented for the individual placement environments in the Generic Analysis above (section 6.1). The final evaluation criteria include the following:

Criterion A: Benefits and Risks to Ecological Systems. How the alternatives compare in terms of overall potential benefits, and risks or impacts, to resources of concern in the ocean, in-Bay, and upland/wetland/reuse environments.

Criterion B: Regulatory Certainty. The degree to which each alternative, including the common policy-level mitigation measures, supports an understandable, consistent regulatory framework that provides reasonable predictability for dredging project proponents while assuring the public that significant environmental impacts are being avoided.

Criterion C: Dredging-Related Economic Sectors. The effects of the alternatives on different dredging-related socioeconomic sectors of the region.

The remainder of this chapter consists of a general comparison of the No-Action and action alternatives according to these broad evaluation criteria. This is followed by a separate air quality evaluation of the alternatives.

6.2.1 Benefits and Risks to Ecological Systems

Each of the three action alternatives can be implemented without significant adverse impacts to the environment. However, the three alternatives differ from each other, and from No-Action, in terms of (1) the degree to which benefits may be realized from reuse of dredged material as a resource; and (2) the degree to which risks to the already-stressed Estuary system may be reduced by reducing disposal at the dispersive in-Bay sites. Please see Table 6.2-1 for a summary of the discussion below.

6.2.1.1 No-Action (Current Conditions)

No-Action is characterized by high levels of in-Bay disposal, and low levels of ocean disposal and upland or wetland reuse.

Benefits

The least degree of environmental benefits of any alternative would occur under No-Action, because the lowest volumes of dredged material would go to

Table 6.2-1. Comparison of Alternatives with Respect to Benefits and Risks to Ecological Systems

Alternative	*Significance of Benefit**	*Significance of Impact/Risk after Mitigation**
Alternative 1	+1	-1
Alternative 2	+2	-2
Alternative 3	+2	-1
No-Action	0	-2

* Potential Benefits: +3 = High Benefit; +2 = Moderate Benefit; +1 = Low Benefit; 0 = Negligible Benefit.
Potential Impacts: -3 = High Impact; -2 = Moderate Impact; -1 = Low Impact; 0 = Negligible Impact.

beneficial reuse. The majority of all material dredged throughout the Estuary would be disposed as a waste at existing in-Bay sites. Reuse projects that are constructed would continue to occur on an opportunistic, case-by-case basis and would be associated mainly with large, new work projects. Since multi-user beneficial reuse sites would not exist, the smallest number of beneficial reuse projects would be expected under this alternative. Therefore, no benefit to ecological systems is expected under No-Action.

Risks/Impacts

Environmental risks and impacts to the in-Bay placement environment are greater under No-Action than under any of the action alternatives. This is because, on average, twice as much dredged material would be disposed at the existing, dispersive in-Bay sites under this alternative than under Alternatives 1 or 2, and four times as much as under Alternative 3 (see Figure 6.1-1 for schematic of each alternative). As discussed in the Generic Analysis, the potential adverse impacts of in-Bay disposal are related primarily to the occurrence of high-frequency disposal activities occurring at the disposal sites. High levels of in-Bay disposal would mean that high-frequency disposal could occur relatively often. No-Action carries a moderate risk of cumulative impacts to water quality and to fish and wildlife habitat quality, and a low risk of causing adverse effects to some special status species. At the same time, the risks and impacts to the ocean and upland/wetland/reuse environments would be as low as the lowest of the action alternatives for each of these environments (Alternative 2 for the ocean, and Alternative 1 for upland/wetland/reuse). Therefore, due to the potential impacts to the in-Bay environment, water quality, and fish and wildlife habitat, No-Action poses a moderate risk of impact to ecological systems.

6.2.1.2 Alternative 1 — Emphasize Aquatic Disposal (Minimal UWR)

Alternative 1 includes medium levels of disposal at the existing in-Bay and ocean sites, and only low placement volumes at upland or wetland reuse sites. This alternative thus emphasizes aquatic disposal overall: 80 percent of all SUAD material, equally divided between sites in the Estuary and in the ocean, would be disposed at aquatic sites *without realizing the potential for regional environmental benefits*.

Benefits

Alternative 1 would have the least environmental benefits of any of the "action" alternatives, because only low volumes of dredged material would go into beneficial reuse applications, including low levels of benefit to fish and wildlife habitat, and to special status species.

However, greater environmental benefits would be expected under this alternative than under No-Action, because coordinated, interagency effort would be expected to result in at least some multi-user reuse sites being developed (only opportunistically developed, project-specific reuse sites are anticipated under No-Action).

Multi-user sites are considered to result in greater benefits because more comprehensive planning can generally go into location, design, and monitoring considerations. Multi-user habitat restoration sites also have the potential to be larger, and to provide for a broader range of habitat types, than would single projects that may have a more specific emphasis.

Alternative 1 would also benefit the in-Bay environment to a degree, by reducing the overall volume of dredged

material being disposed at dispersive, in-Bay sites compared to No-Action. However, for the purposes of assigning numbers in Table 6.2-1, reduction in risk from decreased in-Bay disposal is considered instead. Even though Alternative 1 (and Alternative 2) includes the greatest volume of in-Bay disposal of the action alternatives, this still represents reducing No-Action volumes by one half, as a long-term average. Overall, Alternative 1 provides a low benefit to ecological systems over No-Action.

Risks/Impacts

Alternative 1 (and Alternative 2) would have the highest level of risk to in-Bay resources of the action alternatives, since medium volumes of dredged material would be disposed at in-Bay sites. As discussed in the Generic Analysis, the potential adverse impacts of in-Bay disposal are related primarily to the occurrence of high-frequency disposal activities occurring at the disposal sites. Medium levels of in-Bay disposal would mean that high-frequency disposal could still occasionally occur. Alternative 1 (and Alternative 2) carries a low risk of cumulative impacts to water quality and to fish and wildlife habitat quality. However, these risks are substantially reduced relative to No-Action. Regarding the ocean, medium volumes of disposal are not expected to result in any adverse effects outside the disposal site. Alternative 1 would have the least risk of adverse impact in the upland/wetland/reuse environment of any of the action alternatives because only low volumes of dredged material would be placed in that environment, similar to No-Action.

Therefore, Alternative 1 has an overall low risk of impact to ecological systems compared to No-Action.

6.2.1.3 Alternative 2 — Balance Upland/Wetland Reuse and In-Bay Disposal (Minimal Ocean Disposal)

Alternative 2 includes medium levels of disposal at the existing in-Bay sites, low disposal volumes in the ocean, and medium placement volumes at upland or wetland reuse sites. This alternative thus realizes additional environmental benefits from reuse of dredged material as a resource, but retains the risks associated with relatively high volumes of disposal within the Estuary.

Benefits

Alternative 2 (and Alternative 3) would have the greatest environmental benefits of any of the action alternatives, because the greatest volumes of dredged material would go into beneficial reuse applications. Moderate benefits to fish and wildlife habitat and to special status species, and low levels of benefit to water quality, would be expected.

Alternative 2 would also benefit the in-Bay environment to a degree, by reducing the overall volume of dredged material being disposed at dispersive, in-Bay sites compared to No-Action. However for the purposes of assigning numbers in Table 6.2-1, reduction in risk from decreased in-Bay disposal in considered instead. Even though Alternative 2 (and Alternative 1) includes the greatest volume of in-Bay disposal of the action alternatives, this still represents reducing No-Action volumes by one half, as a long-term average. Overall, Alternative 2 provides moderate benefits to ecological systems over No-Action.

Risks/Impacts

Alternative 2 (and Alternative 1) would have the highest level of risk to in-Bay resources of the action alternatives, since medium volumes of dredged material would be disposed at in-Bay sites. As discussed in the Generic Analysis, the potential adverse impacts of in-Bay disposal are related primarily to the occurrence of high-frequency disposal activities occurring at the disposal sites. Medium levels of in-Bay disposal would mean that high-frequency disposal could still occasionally occur. Alternative 2 (and Alternative 1) carries a low risk of cumulative impacts to water quality and to fish and wildlife habitat quality. However, these risks are substantially reduced relative to No-Action. Regarding the ocean, low volumes of disposal are not expected to result in any adverse effects outside the disposal site. Potential ocean impacts are less under this alternative than the other action alternatives, and are similar to No-Action. However, Alternative 2 would have a low risk of adverse impact in the upland/wetland/reuse environment because, at medium placement volumes, some sensitive resource areas could not be completely avoided. Overall, because this alternative has a low risk of impact in both the upland/wetland/reuse and in-Bay environments, it is assigned a moderate level of impact/risk to ecological systems.

6.2.1.4 Alternative 3 — Balance Upland/Wetland Reuse and Ocean Disposal (Minimal In-Bay Disposal)

Alternative 3 includes low disposal volumes at in-Bay sites, medium disposal volumes in the ocean, and medium volumes of upland/wetland/reuse placement.

This alternative combines the maximum environmental benefit of any of the action alternatives, with the minimum risks to the Estuary and negligible risks to the ocean.

Benefits

Alternative 3 (and Alternative 2) would have the greatest environmental benefits of any of the action alternatives, because medium volumes of dredged material would go into beneficial reuse applications. Moderate benefits to fish and wildlife habitat and to special status species, and low levels of benefit to water quality, would be expected. In addition, Alternative 3 would benefit the in-Bay environment to a greater degree than the other action alternatives, because the overall volume of dredged material being disposed at dispersive, in-Bay sites would be reduced to the greatest extent. This would represent a very substantial reduction compared to No-Action. However, for the purposes of assigning numbers in Table 6.2-1, reduction in risk from decreased in-Bay disposal is considered instead.

Risks/Impacts

Alternative 3 would have the lowest level of risk to in-Bay resources of the action alternatives, since only low volumes of dredged material would be disposed at in-Bay sites. As discussed in the Generic Analysis, the potential adverse impacts of in-Bay disposal are related primarily to the occurrence of high-frequency disposal activities occurring at the disposal sites.

At low levels of in-Bay disposal, high-frequency disposal activities would generally be avoidable. Alternative 3 carries only a negligible risk of cumulative impacts to water quality and to aquatic fish and wildlife habitat quality; and these low risk levels are substantially reduced relative to No-Action. Medium volumes of disposal at the ocean site are not expected to result in any adverse effects outside the disposal site. However, Alternative 3 (and Alternative 2) would also have a low risk of adverse impact in the upland/wetland/reuse environment because, at medium placement volumes, some sensitive resource areas could not be completely avoided. Alternative 3 has the lowest level of risk of impact compared to the other alternatives. Overall, the risk of impact to ecological systems is considered low compared to No-Action.

6.2.2 Regulatory Certainty

The issue of concern addressed by this evaluation criterion is the need to improve coordination and integration of agency policies governing the management of dredged material. In this section, the EIS/EIR alternatives are compared in terms of the degree to which, in conjunction with the common policy-level mitigation measures, 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 being avoided. Please see Table 6.2-2 for a summary of the discussion below.

Table 6.2-2. Comparison of Alternatives with Respect to Regulatory Certainty

Parameter	*Alternative 1*	*Alternative 2*	*Alternative 3*	*No-Action*
Regulatory Certainty for Disposal of SUAD material	Relatively high in short term, increasing over time	Lower than Alternative 1 in short term, increasing over time	Lower than Alternative 1 in short term, increasing over time	Relatively high in short term; uncertain over the long term
Regulatory Certainty for Disposal of NUAD material	Low in short term, increasing over time	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Regulatory Certainty in Terms of Enhancement of Overall Environmental Quality	Low	Medium	High	Lowest

of their dredged material that must be dewatered before being transported to a final placement site; and negotiating testing requirements with individual landfills. Even when project proponents are interested in the beneficial reuse of their SUAD-class dredged material, under current conditions they generally must identify, arrange for, and pay any cost-difference associated with such use. If appropriate upland or confined disposal locations with adequate capacity cannot be found or are not affordable, dredging project proponents have little choice but to reconfigure their project (if possible) to avoid dredging the NUAD material, or leaving the NUAD material in place and suffering the logistic or economic consequences until circumstances change. The consequences of inadequately maintained navigation channels can be severe to others, as well, and can include risks to public health and safety if ships run aground, collide, or cause spills.

The general public also faces a degree of uncertainty, even given the improvements in the regulatory system since the inception of the LTMS. In particular, although significant adverse effects are avoided under current management practice, little of the potential environmental benefit of reusing dredged material as a resource is being realized. At the same time, as noted above, NUAD-class dredged material is often left in place if dredgers cannot identify appropriate or adequate confined disposal capacity. Therefore, public concerns about overall environmental trends in the region, and about the overall health of the Estuary, may not be satisfactorily addressed.

Overall, the No-Action alternative would provide the lowest degree of regulatory certainty of any of the alternatives, in both the short term and over the 50-year LTMS planning period.

6.2.2.2 Alternative 1 — Emphasize Aquatic Disposal (Minimal UWR)

This alternative includes the least amount of change from current conditions, in that most material would be disposed at existing unconfined aquatic disposal sites within the Estuary and in the ocean. In addition, since this is an action alternative, it would include implementation of the policy-level mitigation measures described in Chapter 5. These include establishment of a Dredged Material Management Office (DMMO) that would coordinate and, where appropriate, streamline the regulatory processes of the LTMS agencies.

From the standpoint of dredging project proponents, Alternative 1 would have a relatively high degree of regulatory certainty during the initial years of LTMS implementation. This is particularly true for dredging projects that are predominantly comprised of SUAD-class material. The existing aquatic disposal sites would be immediately able to handle the average annual volumes of material projected to go to them, without significant adverse environmental effects. In this regard, permitting would be relatively straightforward for most material. Projects having substantial quantities of NUAD material, on the other hand, would face a degree of uncertainty in the short term, similar to that under No-Action. Until multi-user upland/wetland reuse or confined disposal facilities could be made available, project sponsors would still be expected to identify and acquire on their own suitable disposal options for NUAD material. In the long run, as Alternative 1 moves toward full implementation, regulatory certainty would be improved for both SUAD and NUAD material.

For members of the public concerned about enhancing overall environmental quality by reusing dredged material for beneficial purposes rather than disposing of it as a waste, this Alternative provides the lowest level of certainty of any of the action alternatives. Although Alternative 1 would eventually result in a greater degree of beneficial reuse than No-Action, it provides less than either Alternative 2 or Alternative 3. Especially in the initial years of LTMS implementation, only relatively small volumes of dredged material would be expected to go to beneficial reuse projects.

6.2.2.3 Alternative 2 — Balance Upland/Wetland Reuse and In-Bay Disposal (Minimal Ocean Disposal)

This alternative includes substantially less in-Bay disposal than No-Action, and more beneficial reuse of dredged material than either No-Action or Alternative 1. However, only limited ocean disposal would occur under Alternative 2.

Dredging interests would find regulatory certainty to be improved over No-Action, but in the short-term to be lower than Alternative 1 for SUAD-class material since allowable in-Bay disposal volume (coupled with only low levels of ocean disposal) would not always be sufficient to manage all of the SUAD material likely to be dredged. This could mean that some projects would be delayed or otherwise adversely affected. This situation would not improve until multi-user upland or wetland placement capacity could be made available.

cost estimates higher than what is likely to actually be the case:

1. The high estimate of total dredged material volume is assumed. Actual long-term dredging volumes may be much lower.

2. Immediate and full implementation of upland disposal is assumed. In reality, targeted capacity for upland disposal will be phased in over time, as sites are developed. In addition, it is likely that costs for upland disposal will decline with increased experience in upland site development and management.

3. Existing cost-sharing requirements and regulatory policies are assumed to apply throughout the 50-year planning period. The financing and institutional options outlined in Chapter 7, if implemented, could lower the overall costs associated with each alternative, and would change the allocation of costs among local and federal sponsors.

Please see Table 6.2-3 for a comparison of the alternatives in terms of dredging-related economic sectors. It is a summary of the following discussion.

6.2.3.1 Background on Cost Estimates

Total cost estimates were prepared by the LTMS agencies for the dredging and disposal of clean dredge material over the 50-year planning period for No-Action conditions and for the three LTMS alternatives. The methods, data, and assumptions used to develop cost estimates and volume distributions among placement environments are described in Appendix P (Derivation of Dredging and Disposal Costs).

This analysis examined three major factors that influence total costs and the incidence of those costs: the activities encompassed by each alternatives; the types of dredging work that are typically conducted; and the relative share of the costs borne by federal and non-federal entities.

This analysis divided dredging and disposal activities among three major categories of dredging work (referred to in this document as *work categories*): maintenance, new work, and small dredging projects (defined as projects with a channel depth of less than 12 feet below MLLW). The work categories have important implications for calculating dredging and disposal costs and identifying the sectors that will bear those costs.

Several factors affect the costs faced by dredgers for the three work categories. For example, in many cases the volume of material dredged will provide economies of scale for larger projects, and the composition of the dredged material may vary among the work categories, affecting the equipment and Table 6.2-2. Comparison of Alternatives with Respect to Regulatory Certainty methods needed for dredging and disposal. In addition, the financing available for dredging and disposal differs among the work categories.

The dredging/disposal activities that were examined to develop the cost estimates are summarized in the text box below. Estimates of dredging and placement unit costs are based on a Gahagan & Bryant model used to estimate dredging bid calculations. A high-cost and low-cost estimate was developed for the various work categories and placement environments. The unit costs for each activity vary among the placement environments based on factors such as transport distance to disposal sites, site preparation requirements, and disposal site operations and maintenance requirements.

Table 6.2-3. Comparison of Alternatives with Respect to Dredging-Related Economic Sectors

Parameter	*Alternative 1*	*Alternative 2*	*Alternative 3*	*No-Action*
Potential socioeconomic impact (worst case)*	Low	Medium	High	Lowest

* See section 6.2.3. The LTMS agencies do not expect that these worst-case cost increases discussed in section 6.2.3 will actually occur because the estimates use worst-cast assumptions and the alternative must be practicable on a case-by-case basis.

Activities Considered in Cost Estimates

Testing

- Sediment evaluation and testing to determine its suitability for disposal

Dredging and Placement

- Dredging: Mobilizing/demobilizing dredge equipment and dredging a project site
- Transport: Hauling dredged material to a disposal or rehandling site
- Placement: Placing dredged material at the site
- Rehandling (for certain disposal sites): Drying dredged material at a rehandling facility, excavating the dried material, and hauling the material to a final disposal site

Site Development and Management

- Initial site preparation (e.g., initial site acquisition, environmental assessments and mitigation, planning, design, engineering, construction, and construction management)
- Site operations and maintenance
- Site monitoring

The range of unit costs for dredging and disposal, including testing, are summarized in Table 6.2-4. See Appendix P for a description of the Gahagan and Bryant model and the model output used to develop unit costs for the high- and low-cost scenarios. Site development, site operations, and monitoring costs were estimated from other sources, and are summarized in Table 6.2-5.

Total 50-year cost estimates were prepared for each of the four alternatives using the volumes attributed to each alternative, the distribution of material among the three work categories explained in Appendix P, and the range of unit costs shown in tables 6.2-4 and 6.2-5. Table 6.2-6 presents estimates of the cumulative costs of dredging and disposing of the entire 237 mcy of SUAD material over the 50-year study period. Monitoring costs for ocean, in-Bay, and tidal wetland disposal are included in the total costs for each alternative, and allocated among the work categories by the relative percentage each category contributes to the placement environment.

Using a simplified approach to existing federal cost-sharing requirements, Table 6.2-7 shows the estimates of federal and non-federal costs associated with each alternative. The assumptions used to develop these estimates are explained in the notes to Table 6.2-7 and in Appendix P. Many factors determine the actual split of costs between the federal government and local project sponsors. This analysis should only be used to assess the *relative* change in federal and non-federal costs across the LTMS alternatives.

Where appropriate, this analysis has incorporated conservative assumptions in order to capture possible costs associated with the range of dredging and disposal activities. In general, these assumptions mean that the estimates of overall costs are likely to be higher than actual costs, as described above. Table 6.2-8 summarizes the potential effects of the assumptions on the estimates of unit costs and total costs.