

LONG-TERM MANAGEMENT STRATEGY FOR THE PLACEMENT OF DREDGED MATERIAL IN THE SAN FRANCISCO BAY REGION

12-YEAR REVIEW FINAL REPORT



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EXECUTIVE SUMMARY

The San Francisco Bay (Bay) Long-Term Management Strategy for Placement of Dredged Material in the San Francisco Bay Region (LTMS) Management Plan called for periodic review and/or modification to ensure that the program remains achievable and relevant in light of changing conditions. The LTMS agencies review the disposal volumes annually and the basic program components every 3 years, as well as conduct a thorough analysis of the program every 6 years with input from interested parties. In 2012, the LTMS agencies completed the transition to substantially reduce in-Bay dredged material disposal as well as a comprehensive 12-year review of the program. The review process involved collecting, analyzing, disseminating, and presenting data about the program's performance as well as a series of public meetings (each focused on a different key topic suggested by stakeholders) and preparation of a Final 12-Year Review Report summarizing the review findings. The overall outcome of the review process forms the basis for continuing discussion regarding potential changes to the implementation of the LTMS program. The 12-Year Review Draft Final Report was issued in April 2013. The LTMS agencies have reviewed stakeholder comments received at a public meeting as well as written correspondence on the 12-Year Review Draft Final Report in preparing this revised version. Issuance of the 12-Year Review Final Report marks the end of the program's 12-year review process.

The 12-year review focused on how well the Management Plan has been implemented to date. A variety of metrics, both quantitative and qualitative, were used for this assessment, including applicable metrics described in the Management Plan, interim objectives of the transition period, additional measures that have been applied to help meet the LTMS goals, and consideration of the adaptability of the program to changing conditions. The 12-Year Review Final Report identifies the most significant findings of the 12-year review process as follows:

- **Reduced in-Bay Disposal.** The in-Bay disposal volume reduction targets were successfully met for each 3-year increment of the transition period between 2000 and 2012, and allocations were not triggered. Looking forward, however, maintaining the in-Bay disposal target volume of 1.25 million cubic yards could be challenging due to the budget issues faced by many of the dredging project sponsors and the fewer than desired placement sites.
- **Increased Beneficial Reuse.** More than 44 percent of the total volume of material dredged from the Bay during the past 12 years has been beneficially reused, which is significant. Most of this material came from USACE channel deepening projects and was placed at a few large restoration sites. Only one of these sites remains open today, although several smaller reuse sites are also (or will soon be) available. Substantial capacity for beneficial reuse still exists, but the distance of beneficial reuse

sites from the majority of the dredging activity and the need for dredging projects to provide offloading equipment at certain sites remain challenges in providing economical reuse options.

- **Navigation.** Necessary channels and other navigation facilities in the Bay Area have been generally maintained; however, full depths have not been consistently achieved in all channels or facilities for numerous reasons, many of which are unrelated to LTMS goals and placement site objectives. To date, dredging in a manner that comports with the LTMS goals has been conducted in an “economically sound” manner, in that it has been achieved in aggregate by individual projects for which beneficial reuse or ocean disposal have been practicable and feasible.
- **Changed Conditions.** The LTMS agencies considered whether a change to the program was needed to address increasing sea levels and a reduced sediment supply from the Delta; the agencies concluded that the goal of maximizing beneficial reuse of dredged sediment remains appropriate and even more important now than it was in the early days of the LTMS program. Additionally, disposing of clean sediment in the ocean is less desirable now because it results in the loss of sediment from the Bay system. The program has been able to successfully adapt to many changed regulatory conditions, such as new limitations on dredged material discharges of mercury and polychlorinated biphenyls (PCBs) into the Bay, among others.

Based on this review process, the LTMS agencies believe that the LTMS goals remain appropriate and largely implementable, and the program has been successfully implemented to date. The LTMS agencies recommend that the basic program continue into the future, which calls for approximately 80 percent of dredged sediment to be targeted for beneficial reuse or out-of-Bay disposal and only 20 percent targeted for in-Bay disposal. Given the changed conditions since establishment of the program, the LTMS agencies recommend adopting increased flexibility and innovation in implementing the program’s goals. Specifically, the LTMS agencies are assessing potential changes in the program’s implementation to accommodate changing or adding flexibility to in-Bay disposal volume limits, encouraging more beneficial reuse, and encouraging new kinds of beneficial reuse. Additional priorities for ongoing LTMS program attention have also been identified.

1 INTRODUCTION

Development of the San Francisco Bay Long-Term Management Strategy for Placement of Dredged Material in the San Francisco Bay Region (LTMS) began in 1990 to address: potential impacts from navigational maintenance dredging and dredged material disposal on water quality, wildlife, and uses of the San Francisco Bay; issues regarding the mounding of dredged material at the Alcatraz Island Disposal Site (SF-11); and a permitting process that was viewed as untenable. The agencies that created the LTMS included the San Francisco Bay Conservation and Development Commission (BCDC), State Water Resources Control Board (SWRCB), San Francisco Bay Regional Water Quality Control Board (Water Board), U.S. Army Corps of Engineers San Francisco District (USACE), U.S. Environmental Protection Agency (USEPA), and State Lands Commission (SLC). After an extensive public outreach process, the goals adopted in the LTMS program included:

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

Following several years of studies and substantial public coordination, the LTMS agencies issued a Policy Environmental Impact Statement/Programmatic Environmental Impact Report (EIS/EIR) in 1998. The EIS/EIR evaluated alternative long-term dredged material management strategies for dredged material placement in the Bay, in the ocean, and at beneficial reuse sites. The environmentally preferred alternative, and the one selected for implementation, was designed to maximize beneficial reuse and minimize in-Bay disposal. Placement of dredged material at the new San Francisco Deep Ocean Disposal Site (SF-DODS) was included as a “safety valve” so that in-Bay disposal could gradually be reduced while additional reuse capacity was being developed.

Specific guidance for implementing the strategy selected in the LTMS EIS/EIR was presented in the 2001 LTMS Management Plan (Management Plan). To allow time for planning, budgeting, and creating alternatives to in-Bay disposal, the Management Plan established a 12-year transition period for achieving the reduced in-Bay disposal goal of 1.25 million cubic yards (mcy) annually. The transition period’s disposal volume limits were voluntary as long as in-Bay goals were met overall. Public assurance that in-Bay disposal would in fact decrease was provided by strict volume allocations to individual dredgers that could be triggered if goals were not met. The transition period was successfully concluded in 2012,

with in-Bay disposal targets met every 3 years as described in the Management Plan. The Management Plan also formalized the Dredged Material Management Office (DMMO) to address:

- Permit processes for dredging and dredged sediment placement projects
- Sediment sampling and testing and sediment suitability determinations
- Managing and monitoring multi-user in-Bay placement sites
- Managing the in-Bay placement volumes
- Implementing environmental work windows
- Aligning beneficial reuse with regional habitat goals

Some aspects of the Management Plan became state policy and regulation, such as the transition targets and in-Bay disposal volumes.

The Management Plan called for periodic review and/or modification to ensure that the program remains achievable and current in light of changing conditions over time. Specifically, the LTMS agencies committed to providing annual reports through the DMMO summarizing the dredging and disposal activities of the previous year, and to completing basic reviews of the program every 3 years with input from interested parties. More comprehensive reviews were to occur every 6 years. A 6-Year Review Report was issued in May 2006 and can be found on the LTMS website: <http://www.spn.usace.army.mil/Missions/DredgingWorkPermits/LTMS.aspx>. It should be noted that these reviews were intended to ensure the viability of the program, not to revisit outcomes reached in the LTMS EIS/EIR.

The LTMS agencies began the comprehensive 12-year review process in early 2012, and this report culminates that review. The process involved collecting, analyzing, and disseminating data about the program's performance to date, and holding a series of public meetings (each focused on a different key topic suggested by stakeholders). Section 2 summarizes each of the stakeholder meetings. Section 3 presents the LTMS agencies' specific findings related to the degree of success achieved in implementing the existing Management Plan over the last 12 years. Section 4 summarizes the conclusions and recommendations from the 12-year review process. The overall outcome of the review process forms the basis for discussing potential changes to the program's implementation, and Section 5 discusses next steps in that regard.

2 STAKEHOLDER MEETINGS

For each stakeholder meeting, the LTMS agencies prepared background information, presentations, and meeting highlights. All documentation prepared for the meetings is included in Appendices A through D. The LTMS agencies reached out to a diverse array of stakeholders (e.g., members of the environmental, restoration, science, fisher, regulatory, dredging, and political communities) to ensure that each meeting was as productive and all inclusive as possible. LTMS stakeholders provided a large amount of feedback throughout the meetings, and a summary of their comments is included in Appendix E. The following sections summarize the purpose of, and discussions from, each of the stakeholder meetings.

2.1 Program Data Assessment

This initial meeting provided data and information regarding implementation of the first 12 years of the LTMS program to agencies and stakeholders to identify whether the original goals were accomplished and to evaluate whether the program is a sustainable and practicable management strategy for dredged material disposal.

Presentations at this meeting included:

- Overview of the LTMS program's development and the metrics used throughout the review process to assess the program's ability to meet its goals
- Data on dredged material disposal, reuse, and trends in the industry
- Review of the program in accordance with the qualitative and quantitative criteria as described in Chapter 8 of the Management Plan
- Overview of the permitting and sediment testing benefits derived from the establishment and continued operation of the DMMO
- Summary of the programmatic consultations that have led to more efficient permitting processes and increased resource protection
- Overview of the beneficial reuse of dredged material that has occurred in and around the Bay Area
- Overview of USACE's costs for maintenance dredging within the Bay

Overall, the targets for in-Bay disposal were met throughout the transition period for in-Bay disposal levels.

At this meeting, LTMS stakeholders identified the following topics for future meetings:

- Beneficial Reuse (June 19, 2012)
- Costs and Contracting (September 11, 2012)
- Policy and Strategy Development (November 20, 2012)

2.2 Beneficial Reuse

The issues identified for beneficial reuse at the March 29 meeting were used as the framework for developing this meeting's agenda. The meeting format (inclusive of breakout sessions) was organized to encourage discussions on beneficial reuse and to bring forth recommendations for improving beneficially reusing sediment under the LTMS program.

To ensure that all meeting participants had a common understanding of how the term "beneficial reuse" is used in the LTMS program, the LTMS agencies provided relevant context and background. The LTMS definition of beneficial reuse is broad so as to allow a variety of projects to be considered for beneficial reuse as long as the required criteria are met and to minimize unnecessary limits on projects as they are developed. For a project to be considered a beneficial reuse site, it must demonstrate that what it proposes to accomplish is needed, that its benefits outweigh any environmental impacts or trade-offs, and that these impacts will be mitigated. Ultimately, beneficial reuse projects must be permissible in respect to related laws and policies, as well as provide appropriate mitigation for impacts.

Stakeholder viewpoints on beneficial reuse vary, depending on interests and needs, for example: highest and best land use versus most economical option; wetland restoration versus agriculture in diked Baylands; and impacts versus benefits of aquatic placement for beneficial reuse.

Three breakout groups convened during the meeting, providing an opportunity for meeting participants to discuss the logistics and habitat considerations of beneficial reuse as well as potential methods for incentivizing beneficial reuse projects. Participants of both the logistics and incentives breakout groups expressed a desire for additional flexibility on the environmental work windows for beneficial reuse projects and supported the concept of bundling projects to improve the feasibility of carrying out beneficial reuse. Participants in all three groups agreed that pre-dredging planning and scheduling would allow both dredgers and beneficial reuse site proponents to better match their projects.

During the course of the meeting and breakout group discussions, stakeholders pointed out several current efforts supportive of beneficial reuse. The San Francisco Bay Joint Venture is developing a database to assist in matching beneficial reuse sites and dredging projects. The South Bay Salt Ponds project proponents expressed interest in receiving up to 25 mcy of dredged sediment for their restoration project. The Association of Bay Area Governments and Coastal Sediment Management Workgroup included beneficial reuse in their Coastal Regional Sediment Management Plan and requested that LTMS agencies and stakeholders provide recommendations on coastal beneficial reuse projects. It was determined that more work is needed to further the implementation of beneficial reuse as part of all these projects.

2.3 Costs and Contracting

The third stakeholder meeting was intended to share relevant information on costs and contracting, as well as identify opportunities for the dredging community to reduce costs and improve contracting processes. Since project costs and individual contracting processes are beyond the LTMS program's direct purview, the LTMS agencies hosted the meeting as a facilitator, directing attention to areas in which the agencies could provide assistance or adjust practices to help alleviate cost and contracting issues. The agencies were also able to learn more about the issues faced by the dredging community.

Contracting issues were reviewed in two presentations. The first presented efficiency-improvement concepts identified in a Value Engineering (VE) study that was conducted in 2011 by USACE to consider how its own contracting processes could be adjusted to help reduce costs. The second presentation discussed the applicability of those concepts to non-USACE dredging projects. Cost issues were also reviewed in two presentations: the first reviewed USACE-contract dredging costs throughout the United States and the second described the two largest San Francisco Bay beneficial reuse projects sponsored by USACE, the State Coastal Conservancy, and the Port of Oakland—the Hamilton Wetlands Restoration Project (HWRP) and Middle Harbor Enhancement Area (MHEA)—as case studies for analysis of cost issues.

A facilitated panel presented the non-federal perspective on contracting and dredging costs. The five panelists included Patrick Royce (Ahtna Construction), Anne Whittington (Port of Oakland), Jay Ach (Port of San Francisco), Oriana Duranczyk (Dutra), and John Lazorik (Valero Benicia Refinery). As representatives of a diversity of stakeholder types, the panelists engaged the audience in a discussion on contractors, refineries, and ports. A municipal marina representative intended to join the panel; however, the representative was unable to attend.

2.4 Policy and Strategy

The final meeting of the series was designed for the LTMS agencies to collect stakeholders' input on the effectiveness of key policies and strategies administered over the past 12 years.

Meeting presentations briefly reviewed the formal and informal policies that have been implemented in the Management Plan over the past 12 years on a variety of issues from the analysis of alternative disposal sites to allocations. Discussions focused on the rationale for each of the strategies and touched on alternative strategies that were not implemented. The presenters offered opportunities for stakeholders to propose different strategies for attaining the goals.

The LTMS agencies also presented the preliminary conclusions of the 12-year review process. The conclusions reached to date include: the DMMO has been effective in streamlining the permitting process without reducing environmental protections; beneficial reuse sites are available and need material, but additional incentives to use the sites would aid the process; the strong stakeholder support for federal funding of the program and USACE's dredging program have been key; and the economic recession and recent changes in the federal funding climate represent significant challenges for the program and stakeholders.

Stakeholders requested that the LTMS agencies consider the following: requiring USACE to facilitate beneficial reuse projects; preparation of a list of all of the recommendations made during the 12-year review process; reviewing all LTMS-funded science studies (Appendix F); identifying the obstacles of each beneficial reuse site; and terminating the existing step-down process to avoid allocations, among other items noted in Appendix D.

3 FINDINGS

This section presents specific findings from the program’s review that focus on how well the Management Plan has been implemented to date. A variety of metrics were used to determine these findings, including Management Plan evaluation measures in Chapter 8; interim objectives of the transition period; additional measures that have been applied to help meet the LTMS goals; and consideration of the adaptability of the program to changing conditions.

3.1 Findings Based on Management Plan Evaluation Measures

The Management Plan set forth a number of quantitative and qualitative evaluation measures to be used in assessing program performance. The table on Page 8 summarizes those quantitative and qualitative evaluation measures (“+” denotes the measure was generally met; “=” means it was partially met; and “-” means it was generally unmet). See Appendix A (Background Information Document [Section 2] and presentation [slides 21 through 26]) for a more detailed discussion.

Key Findings: Most of the Management Plan’s evaluation measures were substantially met during the first 12 years of program implementation. The unmet measures are generally outside LTMS agencies’ direct control. Quantitative measures that were not met include: annual increases in funding for beneficial reuse projects; reduced cost for upland disposal; and adequate funding for the LTMS program itself, although for much of the initial 12 years, funding was sufficient. Mixed results were achieved concerning maintaining navigability and project depths. Qualitative measures that were only partially met include: a sustained economic contribution from the maritime community; and full participation of stakeholders and local governments in LTMS implementation.

3.2 Findings Based on Dredged Material Distribution Objectives (Transition Targets)

The LTMS transition objectives are discussed in greater detail in Appendix A (Background Information Document and presentation [slides 8 through 20] for the March 29 meeting). At that meeting, final dredging volumes for 2012 were not available. The following discussion and figure include updated data from 2012 and an updated table has also been added to Appendix A.

Summary of Evaluation Measures Included in the LTMS Management Plan

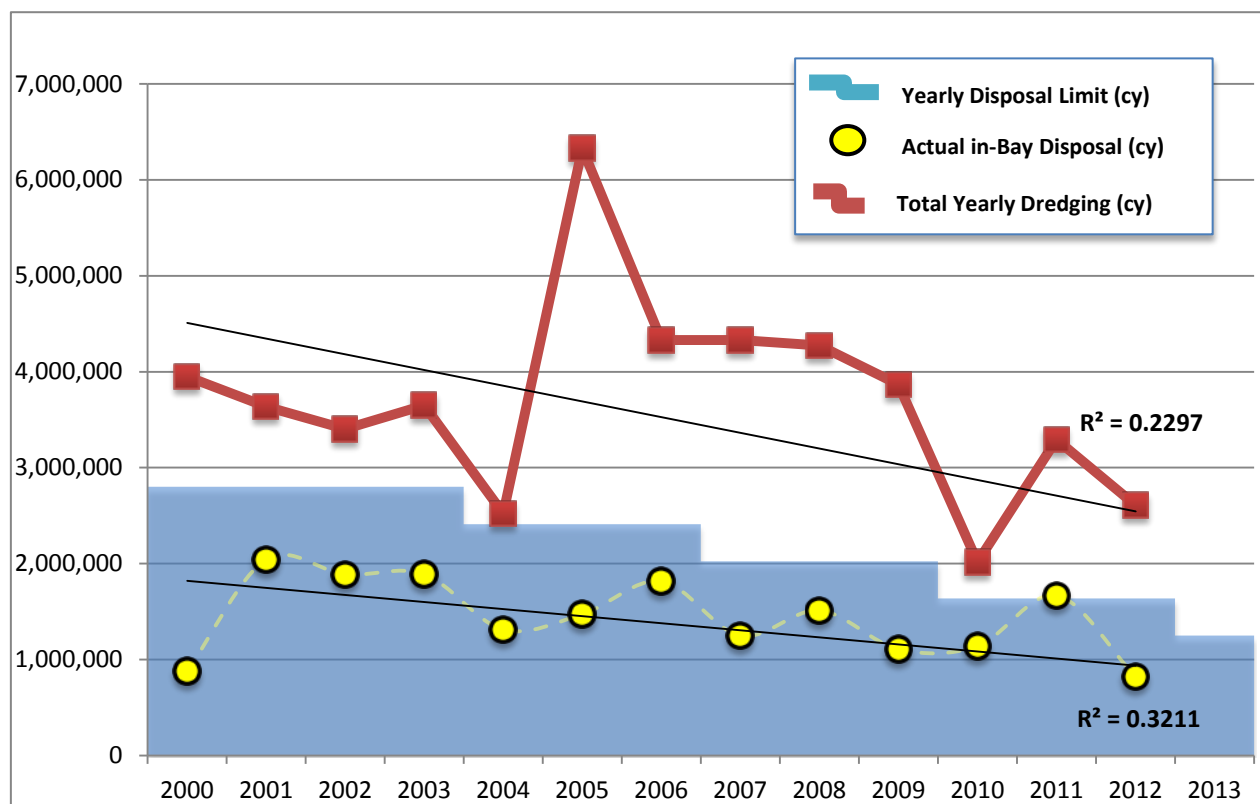
Measures	Performance
<i>Quantitative</i>	
Document long-term trends and variability in dredging volumes	+
Meet or beat transition glide path	+
Increased number of approved alternatives to in-Bay disposal	+
Available in-Bay disposal capacity	+
Number of sites for material that is not suitable for unconfined aquatic disposal to be reused	+
Increased number of re-handling facilities	+
10% increase in funding for upland disposal annually	-
Adequate funding for LTMS	-
Reduced cost for upland disposal (beneficial reuse)	-
Acreage of Bay habitat restored using dredged material	+
Acreage of habitat created for threatened and endangered species	+
Reduced impact of dredged material on native species	+
Footprint of Alcatraz and other sites	+
Maintain navigability and project depths	=
Reduced navigational incidents or accidents (i.e., groundings)	+
Depth of Alcatraz disposal site	+
No lawsuits	+
<i>Qualitative</i>	
Do we have upland sites?	+
Is regional planning under way?	+
Documented participation of all stakeholders	=
Local governments aware of LTMS process and taking action in reviewing dredging and disposal projects in support of LTMS (CEQA)	=
Sustained regional economic contribution from maritime community	=
In-Bay monitoring efforts of LTMS and RMP linked	+
Healthier Bay	+
Reduce uncertainty as to adverse effects of disposal or reuse of dredged material	+
Predictability of testing (Regional Implementation Manual approved/adopted)	+
Process for dredging is “predictable”	+
Consensus on nomenclature for suitability of dredged material	+

Notes:

CEQA = California Environmental Quality Act

RMP = Regional Monitoring Program

Transition Period Limits and Total Dredging Versus In-Bay Disposal*



* In-Bay disposal compared to total dredging during the LTMS transition period. In-Bay disposal remained below transition period volume targets during every 3-year period, and accounted for 40 percent of all dredged material. On average, both in-Bay disposal and total dredging decreased during the transition, although the total dredging volume was particularly variable year-to-year.

Maximizing beneficial reuse of dredged sediment and minimizing in-Bay disposal are the principal objectives of the LTMS program. The dredged material volume beneficially reused during the first 12 years totaled approximately 21 mcy, or 44 percent of the total volume dredged. Most of the reused material came from USACE channel deepening projects as opposed to maintenance dredging projects, which played a large part in the program meeting its goals for beneficial reuse, and most of the reused material was placed at just a few large restoration sites: HWRP, Montezuma Wetland Restoration Project (MWRP), and MHEA. Although the HWRP and MHEA are completed and no longer accepting additional dredged material, the MWRP remains open, and several smaller reuse sites are available or in the process of becoming available. Overall, substantial capacity for beneficial reuse still existed at the close of the transition period, but some reuse sites are not located near the majority of the dredging activity.

The in-Bay disposal volume reduction targets were successfully met for each 3-year increment of the transition period. This occurred despite the overall dredging volumes in

the Bay Area averaging 3.7 mcy per year, which is greater than the average of 2.6 mcy per year dredged during the 10-year baseline planning period for the LTMS program. A total of approximately 48 mcy were dredged from the Bay between 2000 and 2012. During this same period, approximately 19 mcy of sediment was placed at in-Bay sites (39 percent of the total volume dredged).

For aquatic disposal of dredged sediment, either in the Bay or at SF-DODS, the sediment must be physically, chemically, and biologically suitable for the disposal option proposed. Sediment disposed at SF-DODS can have levels of contaminants slightly above that of sediment disposed at in-Bay disposal sites. Therefore, the LTMS EIS/EIR determined disposal at SF-DODS to be environmentally superior to disposal of the same material at the traditional unconfined disposal sites within the more sensitive San Francisco Bay and Estuary. Since 2000, approximately 8 mcy of dredged material that was not practicable to beneficially reuse at the time was diverted from in-Bay placement to SF-DODS, representing 17 percent of the material dredged during the transition period. Extensive monitoring of SF-DODS confirmed that no significant adverse impacts to ocean resources occurred as a result of this placement.

Key Findings: The Management Plan’s transition period targets for reducing in-Bay disposal volume have been fully met. Significant progress toward the long-term LTMS objective for beneficial reuse has also been achieved, and the long-term target of 40 percent reuse was slightly exceeded for the first 12 years; however, much of the reused material came from USACE channel deepening and maintenance projects as opposed to private maintenance dredging projects. SF-DODS has successfully served its “safety valve” role as envisioned.

3.3 Findings Based on the Original LTMS Goals

The evaluation measures included in the Management Plan alone do not allow for a thorough evaluation of the LTMS program as it has been implemented to date. An assessment of other LTMS efforts undertaken to accomplish the program’s overall goals that were not specifically envisioned in the Management Plan’s evaluation measures is provided in Appendix A (Background Information Document [Section 3] for the March 29 meeting).

3.3.1 Continue the Cooperative Permitting Process

Information specific to achieving the goal to continue the cooperative permitting process is presented in Appendix A (Background Information Document [Section 3.1] and presentation [slides 29 through 33] for the March 29 meeting).

The interagency DMMO was established to coordinate, streamline, and increase the consistency and transparency of the permitting process. Some of the notable DMMO accomplishments include:

- A coordinated and improved permitting process, including:
 - Bimonthly public meetings that offer more efficient coordination
 - Improved permit processing time, consistency, and predictability
 - A consolidated permit application used by all LTMS agencies
 - Availability of 10-year permits from all agencies
 - Multi-year sediment testing schedules where appropriate
 - Completion of the LTMS Programmatic Essential Fish Habitat (EFH) consultation
- Flexibility in meeting the LTMS goals, through:
 - Integrated Alternatives Analyses (IAAs): multi-year IAAs for larger projects
 - Small Dredger Programmatic Alternatives Analysis: Programmatic alternative disposal site analysis for small projects
 - Authorization for advance maintenance dredging where effectiveness is demonstrated
 - Authorization for in-place knock-downs in lieu of full dredging episodes as appropriate
- A significantly improved sediment testing program, that:
 - Meets national testing guidelines (Inland Testing Manual and Ocean Testing Manual)
 - Allows reduced cost (less frequent testing) where existing data are adequate
 - Is integrated with the Programmatic EFH consultation
 - Is integrated with Total Maximum Daily Loads (TMDLs) for mercury and polychlorinated biphenyls (PCBs)
 - Is coordinated with the RMP

Key Findings: Despite recent challenging budgetary constraints, the LTMS agencies have continued to meet their commitments to staff and operate the DMMO, as called for by this LTMS goal. Permit process coordination and streamlining efforts have been ongoing under the DMMO, and the agencies continually improve the permitting process.

3.3.2 Conduct Environmentally Sound Dredged Material Disposal

Information specific to achieving the goal to conduct environmentally sound dredged material disposal is presented in Appendix A (Background Information Document [Section 3.2] and presentation [slides 34 through 49] for the March 29 meeting).

Before implementation of the LTMS program, most dredged material was disposed in the Bay as a waste product of maintenance dredging activities. The quality of the disposed sediment was not comprehensively monitored, and the main disposal site near Alcatraz Island became a navigation hazard and was perceived as a toxic “hot spot.” Public trust that agencies were adequately protecting the health of the Bay and its uses—including the ability to support recreation, habitat, and fisheries—was extremely low. The LTMS program’s success at changing those conditions cannot be overstated.

Conducting dredged material disposal in the most environmentally sound manner began with the goal to minimize disposal in the Bay in the first place to the extent practicable—a goal that has been achieved. The transition targets for reducing in-Bay disposal have all been successfully met. Some of this reduction was made possible by diverting suitable material from in-Bay disposal to SF-DODS. An even greater volume of material has been beneficially reused, further reducing in-Bay disposal volumes. Accordingly, the mercury and PCB TMDL load allocations recognize the LTMS program for its net removal of these contaminants from the Bay. No less important, the program’s success in meeting this goal has increased public trust that the health of the Bay is being appropriately protected even as major capital dredging projects and maintenance dredging have proceeded effectively unimpeded, and have contributed significantly to habitat restoration projects around the Bay.

Other important components of the Management Plan (and ongoing agency efforts associated with its implementation) that to date have contributed to sediment disposal being conducted in an environmentally sound manner include:

- The significantly improved DMMO sediment testing program, which ensures all material dredged is physically, chemically, and biologically suitable for its placement site
- Ongoing coordination to update the LTMS programmatic Endangered Species Act (ESA) consultation, and substantial effort dedicated to maximizing compliance with environmental work windows so that disposal operations avoid impacts to special status species
- Completion of the LTMS Programmatic EFH consultation process, which reduces the potential for environmental impacts while further streamlining the approval process
- Completion of numerous LTMS scientific studies (many originally focusing on the possibility of modifying aspects of the environmental work windows) that have enhanced knowledge of the Bay environment within which disposal occurs

Key Findings: This original LTMS goal has been met through implementation of the Management Plan to date. The quantity of sediment disposed (versus beneficially reused) has been successfully reduced; the quality of that disposed material is now comprehensively

determined and appropriately managed, and public acceptance that the health of the Bay is being adequately protected has fundamentally improved.

3.3.3 Maximize the Beneficial Reuse of Dredged Material

Information specific to how the LTMS program has achieved the goal to maximize the beneficial reuse of dredged material is presented in Section 2.2 of this report and in Appendix B (Background Information Document and presentation for the June 19 meeting). The dredged material volume beneficially reused during the program's first 12 years totaled approximately 21 mcy, or 44 percent of the total 48 mcy dredged. Thus, the LTMS long-term target for reuse has successfully been met to date. Major accomplishments included the placement of: 5.8 million cy of dredged material at the HWRP to restore 962 acres of tidal and seasonal wetlands; nearly 4 mcy of dredged material at the MWRP (Phase 1) to restore 560 acres of tidal marsh; and 5.8 mcy of dredged material at the Port of Oakland's MHEA to restore 180 acres of shallow water habitat including eelgrass beds.

However, most of the reused material originated from USACE channel deepening projects as opposed to maintenance dredging projects.¹ No further deepening projects are currently being constructed, although three are proposed for the future. Similarly, most of the reused material was placed at the few large restoration sites mentioned above. Of those, the HWRP and MHEA are completed and are no longer accepting dredged material.² Nevertheless, the MWRP remains open and several smaller reuse sites are available or in the process of becoming available. Overall, substantial capacity for beneficial reuse still existed at the close of the 12-year transition, but it is unclear whether the pace of reuse that the region has supported to date can be maintained with current practices and funding levels.

Key Findings: Significant progress toward achieving the long-term LTMS objective for beneficial reuse has occurred, and substantial capacity for beneficial reuse still existed at the close of the 12-year transition period. However, a number of constraints to further increase beneficial reuse were discussed. The need was identified for the LTMS program and its stakeholders to find and make available new beneficial reuse and funding options (Appendix B).

¹ It is generally easier for a capital improvement project such as channel deepening to cover any additional costs associated with beneficial reuse as compared to a maintenance dredging project.

² Planning for a major expansion of the HWRP at the adjacent Bel Marin Keys property is not moving forward at this time due to concerns about costs of hydraulic offloading and potential impacts to sensitive fish species if a more cost-effective "aquatic transfer facility" were used instead.

3.3.4 Maintain Channels Necessary for Navigation in an Environmentally and Economically Sound Manner, and Eliminate Unnecessary Dredging

Information specific to achieving the goal to maintain in an environmentally and economically sound manner those channels necessary for navigation, and eliminate unnecessary dredging, is presented in Appendix A (Background Information Document [Section 3.4] and presentation [slides 51 through 62] for the March 29 meeting). This category of analysis is perhaps the most challenging to characterize. The LTMS agencies recognize that additional information would be helpful to fully quantify the program's effectiveness in meeting this goal and the actual costs to the dredging and reuse community. The first part of this goal addresses how well "necessary" navigation channels have been maintained. As stakeholder comments noted, this portion of the goal was not extensively evaluated in the Background Information Documents, so additional discussion is presented here. A general presumption of the LTMS program is that all existing navigation channels, harbors, berths, and marinas are necessary to the extent that they are in continued use because they have already been approved and permitted. As long as they are not abandoned or their navigation-related use fundamentally changed, they are authorized (and in many cases required) to be maintained. Much of the attention of the LTMS program has focused on coordinating the permitting process for ongoing maintenance dredging of existing facilities and helping project proponents achieve the broader LTMS goals to minimize in-Bay disposal and maximize beneficial reuse.

However, when changes are proposed to existing navigation facilities (i.e., deepening, reconfiguring, or changing uses) or when completely new projects are proposed, there is no automatic presumption that the changes are necessary. In such instances, the permitting process has a very different focus. In fact, a number of navigation channels in the Bay have undergone changes in use during the first 12 years of the LTMS's implementation. For example, some channels formerly maintained at certain depths for U.S. Navy operations have since closed down (e.g., Mare Island Strait and Alameda Point Channel) and no longer need to be dredged as deeply. In other cases, facilities have been deepened to accommodate new uses (e.g., ferry terminals at several locations) or larger commercial vessels (e.g., at the ports of Oakland and Richmond). Each of these changes or new uses has received increased agency scrutiny before permitting to determine whether it is truly necessary.

How well the permitted navigation facilities have been maintained is also difficult to evaluate. In some cases, different entities (e.g., USACE versus Bar Pilots) use different definitions for whether a channel is fully "open." Beyond this, numerous and often project-specific factors affect the timeliness and even the degree to which maintenance dredging actually takes place. Some of the more significant factors that have affected maintenance dredging are timeliness and completeness.

Timeliness

- When some sediment in a channel or facility is not suitable for the proposed disposal or placement site, permittees often prefer to do additional testing in hopes of finding a greater volume of suitable material before initiating any dredging.
- If permits are not in place (or any sediment testing is not complete) in time to allow dredging to occur within the relevant environmental work window, permittees often must wait for the next window to initiate (or complete) their dredging. The DMMO works closely with permittees to maximize their readiness to dredge within their window.
- Equipment availability can affect permittees' ability to begin dredging when they would like to, given that there is a limited amount of dredging equipment in the area and the dredging season for all projects overlaps to a substantial degree.
- Budget availability often affects how early in the dredging window a project can start. This is especially true for USACE, whose dredging budget is often not available on October 1 (the beginning of the federal fiscal year). Delays in availability of federal funding are particularly troublesome in the Bay Area, where the dredging windows for most USACE projects close at the end of November or December.
- USACE's VE study identified a large number of potential modifications to its planning, approval, and contract solicitation processes that could improve the timeliness of USACE maintenance dredging. The VE study recommendations are included as an appendix to Appendix C (Background Information Document for the September 11 meeting).

Completeness

- When some material is not suitable for the proposed disposal or placement site, and an appropriate alternative placement or disposal site is either unavailable or perceived as too costly to use, permittees often choose not to immediately dredge that portion of the project.
- Dredging and disposal cost is often a significant factor, not only for dredgers of small marinas or homeowners' associations but also for USACE. In some instances, these dredgers opt not to maintain a facility to its full authorized depth simply because they can only afford to dredge a lesser volume at the time.

The second part of this goal addresses whether the necessary dredging (in contrast to disposal or reuse) has been accomplished in an environmentally and economically sound manner. In addition to avoiding dredging as much as possible when sensitive species are present, other environmental controls are placed on dredging operations when necessary. For example, turbidity is managed closely when dredging near eelgrass zones, and special attention is placed on minimizing and mitigating effects of hydraulic dredging operations. However, the

economics of maintenance dredging under the LTMS program was the subject of numerous stakeholder comments. This topic is discussed extensively in Appendix C (Background Information Document and presentation for the September 11 meeting) and further below.

Nationwide, costs for dredging and dredged material management have gone up over the last 12 years (USACE's Navigation Construction Index has increased by approximately 70 percent since 2000). But the cost evaluation conducted for the 12-year review process did not identify clear patterns or causes for specific costs incurred in the Bay Area. For example, USACE's overall costs for contract dredging have followed a trend similar to the national pattern, but there is great variability in costs from project to project, and even from year to year on the same project.

Every dredging project has different challenges that can affect cost. Typical issues that can affect cost for any dredging project include: design depth; project volume; dredging equipment type; dredge timing; local constraints (such as the ability to work 24 hours per day); competition issues (including equipment availability); distance to disposal or placement sites; and any offloading or placement site costs. A host of other project-specific issues may also be relevant, including but not limited to whether: sediment rehandling would be involved; special dredging techniques or equipment are needed (e.g., for contaminated sediment or when dredging adjacent to sensitive resources); compensatory mitigation is required (such as when eelgrass is destroyed or take of special status species would occur); or contractors demand a premium for last-minute projects.

Ultimately, what constitutes “environmentally and economically sound” dredging in many ways is in the eye of the beholder.³ At a basic level, despite increasing costs during the last 12 years, necessary dredging has continued while the LTMS goals have largely been met. Even with effectively flat maintenance budgets, USACE has been able to substantially meet the LTMS volume objectives by taking advantage of reuse sites underwritten by USACE Civil Works projects when available, and by assigning three major channels to out-of-Bay disposal at SF-DODS at the beginning of the LTMS development process. Other dredgers, including the Ports and refineries, have successfully sent substantial percentages of their material to reuse when feasible, and to SF-DODS when necessary, to keep track with the transition to the LTMS volume objectives. Thus, the LTMS program is considered economically sound because when examining the feasibility of the volume targets, the dredging community as a whole has shown that it can meet the targets while still accomplishing their dredging needs.

³ The qualitative term “economically sound” should not be confused with the regulatory terms “practicable” (under the Clean Water Act Section 404[b][1] Guidelines) or “feasible” (under BCDC’s Dredging Policies). One key difference is that “economically sound” is meant to be programmatic (i.e., an overall, multi-year LTMS program goal), while “practicability” and “feasibility” are applied to individual project permit decisions.

In any given year, some dredged sediment is disposed in the Bay, at beneficial reuse as well as at the deep ocean disposal sites. There are trade-offs of costs at the individual project level where beneficial reuse is feasible for some, and not others, but while examining the program in aggregate, it appears to remain economically feasible as a program. But USACE and other dredgers have expressed growing concerns about whether the degree of success in meeting the LTMS objectives for the past 12 years is economically sustainable in the future. The LTMS agencies agree that beneficial reuse and ocean disposal cost more than in-Bay disposal, and anticipate that it will continue to be more expensive due to staff and equipment needs for this activity. However, the agencies are committed to continuing to identify cost saving measures wherever possible. This topic will be a key focus of LTMS evaluation and stakeholder coordination in the future.

Key Findings: Key findings specific to how well this goal has been achieved include:

- Necessary channels and other navigation facilities in the Bay Area have generally been maintained; however, full depth has not been consistently achieved in all channels or facilities for numerous reasons, many of which are unrelated to LTMS disposal volume or placement site objectives.
- Unnecessary dredging does not occur. Channels and other navigation facilities are maintained to depths justified by their ongoing use; and, where use changes, the need for dredging is reevaluated.
- To date, dredging in a manner that comports with the LTMS goals has been conducted in an “economically sound” manner in that it has been achieved in aggregate by individual projects for which beneficial reuse or ocean disposal have been practicable and feasible.
- Dredging has also been conducted in an increasingly environmentally sound manner.

3.4 Findings Regarding Changed Conditions and Adaptive Management

The LTMS Management Plan was instituted in 2000. Since that time, a number of regulatory changes have taken place. In addition, knowledge about the Bay system and habitats has improved, and some physical conditions of the Bay have changed. The LTMS agencies have monitored these changes and their potential effects on dredging and dredged material management, as well as how dredged sediment may be used to adapt to these changes.

3.4.1 Physical Changes

3.4.1.1 Climate Change and Sea Level Rise

Over the last decade, the science and knowledge regarding climate change and the resulting increase in sea level rise has grown exponentially. It is now recognized that the low-lying

areas of the Bay, which were once historical marshes, are in jeopardy of being inundated both by increasing sea level and through storm surges that are occurring more frequently and at greater intensity than previously experienced. These changes threaten to damage both existing marshes and those being restored over time, as well as many developed areas around the Bay including business centers and residential areas.

3.4.1.2 *Reduced Suspended Sediment Loading to the Bay*

Fine grain sediment, which makes up the majority of the Bay's muddy subtidal areas, is delivered via tributaries, rivers, and streams into the marshes and the Bay proper, and ultimately out to the sea during large storms and river flows. The Sacramento-San Joaquin river system is the largest of these tributaries, draining 40 percent of the land mass of the State of California and bringing sediment from as far away as the Sierras into the Bay. Historically, this system was also the largest contributor of sediment to the Bay.

In the mid-2000s, scientists from the U.S. Geological Survey identified a significant reduction in suspended sediment loading from the Sacramento-San Joaquin river system. Less sediment in suspension and circulation within the Bay impairs the ability of shorelines, mudflats, and tidal wetlands to withstand erosion and inundation, especially as sea level rises. During the review process, considerable discussion occurred on whether and how the LTMS Management Plan should reflect this situation.

As understanding of the seriousness of these issues has evolved, the LTMS agencies have begun to evaluate the role of and mechanisms for beneficially reusing dredged material as one component of regional adaptation. The fledgling Regional Sediment Management (RSM) program, which looks at sediment sources and needs beyond dredging, is directly related to this topic. The LTMS agencies have already begun to consider RSM issues and to coordinate with other RSM efforts up and down the California coast. In addition, the agencies have initiated preliminary computer modeling studies focusing on whether and where unconfined in-Bay placement could be managed to benefit shorelines, mudflats, and tidal wetlands more affordably, in both the North and South Bay.

3.4.2 *New Regulatory Requirements*

As new regulatory issues emerge, the LTMS agencies will continue to meet with the relevant entities to discuss how the program is adapting or can be adapted to address the new regulations.

3.4.2.1 *Total Maximum Daily Loads for Mercury and PCBs*

Since the Management Plan took effect, new limitations on discharges of mercury and PCBs into the Bay have been instituted by the Water Board and approved by the USEPA. The LTMS agencies worked with the Water Board to clarify how the TMDLs would apply to dredged material management. Through this process, the Water Board recognized that dredging projects managed under the LTMS program were “net removers” of contaminants from the Bay. As a result, dredging does not have a waste load allocation for these pollutants; rather, dredged material containing mercury and PCBs is regulated based on current “ambient” levels in Bay sediment.

3.4.2.2 *Programmatic Essential Fish Habitation Consultation*

An EFH consultation as required by the Magnuson Stevenson Fisheries Management Act was not conducted at the time the LTMS EIS/EIR or Management Plan was published. As a result, each project went through individual consultations at the time the USACE permit was issued. This caused delays to the permitting process and dredging project execution. To assist the dredging community in compliance with the EFH requirements, as well as to reduce workload, the agencies initiated a programmatic consultation on EFH with the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NOAA Fisheries). This effort eliminated the need for project-specific consultations in many cases, and clarified consultation requirements in other cases. The programmatic consultation also resulted in improved predictability of sediment testing, improved resource protection, and tied the sediment testing program directly to the Water Board’s TMDLs for the first time.

3.4.2.3 *Federal and State Listed Species and Their Critical Habitats*

As additional fish species have become listed as threatened or endangered and species-specific critical habitats have been designated at the state or federal level, the agencies have re-initiated or updated the ESA consultations originally conducted for the program. In some cases, environmental work windows have been refined, and additional information has been provided to better inform the consultations. While some of this work is still underway, close coordination with the resource agencies has allowed dredging to continue in a protective manner while protection measures are being developed and implemented.

3.4.3 *Economic Climate*

3.4.3.1 *Economic Recession Beginning in 2008*

In the midst of the transition period for reducing in-Bay disposal, the Bay Area (and the nation as a whole) suffered the most significant economic recession since the Great

Depression. Although the region has continued to meet the transition period goals, the dredging community raised concerns during the review about their continued ability to afford doing so. The periodic review process, built into the existing Management Plan, is an appropriate venue to raise such concerns, and the LTMS agencies will consider whether and when any economic relief is warranted, and if so, how it might be provided.

3.4.3.2 *USACE Maintenance Dredging Budget Constraints*

Mirroring national trends, USACE's budgets for maintenance dredging in the Bay have not increased appreciably since the Management Plan took effect. Worse, USACE's ability to fund maintenance dredging, with or without the LTMS program, has decreased substantially when inflation is taken into account. The loss of past budget management options such as the ability to reprogram funds between federal projects has made the situation even more acute. In response, USACE has undertaken efforts to improve the cost-effectiveness of its project management and contracting processes, including the VE study conducted in 2011. Also, the LTMS agencies considered—and have at times allowed—innovative measures for achieving increased beneficial reuse on USACE projects without increasing overall project cost (i.e., within the Federal Standard). Nevertheless, as currently structured, limited USACE budgets for maintenance dredging can be expected to present an ongoing, significant challenge to both USACE's and the region's ability to achieve the LTMS goals over the long term. As a result, USACE is relying more heavily on SF-DODS as a feasible alternative to in-Bay disposal. The restoration community has raised serious concerns about the loss of valuable sediment from the system, and specifically, from restoration sites whose sediment needs are not being met as quickly as desired. Creating a climate where beneficial reuse costs are equal to or less than ocean disposal is a key aspect of increasing beneficial reuse options for USACE projects.

Key Findings: Understanding that dredging and placement does not increase the amount of sediment already in the system, the LTMS agencies considered whether a change to the program was needed to address sea level rise implications and reduced sediment inputs into the Bay. The agencies concluded that, given the benefits, the need for additional marsh habitat, and the need for sediment along shorelines and within marshes to keep up with sea level rise, the goal of maximizing beneficial reuse of dredged sediment is appropriate and even more important now and into the future than it was in the early days of the program. Additionally, allowing disposal of large volumes of clean sediment at SF-DODS is less desirable now because this practice loses sediment from the system.

The agencies and stakeholders have encountered a number of changed conditions since the Management Plan was written. To varying degrees, the program has been able to successfully address or adapt to many of these changes over time, while others are in process

today. In this regard, the Management Plan's objective of creating a program capable of adapting to changes and remaining relevant has been met.

The LTMS agencies recognize that continued adaptations will be necessary in the future. The agencies are grateful for participation from the stakeholders, as stakeholders have provided a variety of ideas for potential improvements.

4 CONCLUSIONS AND RECOMMENDATIONS

Based on this review process, the LTMS agencies believe the LTMS goals remain appropriate and largely implementable. Accordingly, they recommend that the basic program continue into the future. However, given the changed conditions since establishment of the program, the LTMS agencies recommend adopting increased flexibility and innovation in implementing the program's goals. Specifically, the LTMS agencies are assessing potential changes in the program's implementation to accommodate changing or adding flexibility to in-Bay disposal volume limits, encouraging more beneficial reuse, and encouraging new kinds of beneficial reuse. More information on these potential changes is presented in Appendix G. It is possible that carrying out these changes could require updates to the Management Plan, and/or changes to the Basin or Bay Plans.

Regardless of how the LTMS program is implemented in the future, a number of requests and recommendations were made by stakeholders and agency staff throughout the review process that are summarized in Appendix E. The LTMS agencies evaluated this input and developed the following preliminary list of ongoing priorities for program attention:

- Continue to improve the cooperative permitting process
- Work with partners to identify a new funding strategy for the LTMS program, including beneficial reuse projects
- Identify and develop additional beneficial reuse sites
- Develop and pursue legislation at the state and federal level (Federal Standard change) that supports beneficial reuse
- Work to better align USACE planning and contracting to increase beneficial reuse
- Coordinate dredging and restoration projects
- Work with NOAA Fisheries to complete the re-initiated LTMS programmatic ESA consultation
- Work collaboratively in developing the RSM program

The LTMS agencies accepted comments on the draft version of this report in person at the April 24, 2013, Management Committee meeting and by mail and email through May 8, 2013. This final version of the 12-Year Review Report was revised to address these comments (included in Appendix H), as needed. Issuance of this 12-Year Review Final Report marks the end of the 12-year review process.

5 REFERENCES

USACE et al. (U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, and San Francisco Bay Regional Water Quality Control Board), 1998. *Long-Term Management Strategy for Bay Area Dredged Material Final Environmental Impact Statement/Environmental Impact Report*. Available from:
http://www.bcdc.ca.gov/dredging/ltms/ltms_mgemnt_eis-eir.shtml.

USACE et al. (U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, and San Francisco Bay Regional Water Quality Control Board), 2001. *Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region Management Plan*. Available from: http://www.bcdc.ca.gov/dredging/ltms/ltms_mgemnt.shtml.

APPENDIX A PROGRAM DATA ASSESSMENT MEETING MATERIALS PACKAGE

Additional information prepared after the public meeting has been added to this appendix.

This appendix is available at

<http://www.spn.usace.army.mil/Missions/DredgingWorkPermits/LTMS/LTMSProgram12YearReviewProcess>

APPENDIX B

BENEFICIAL REUSE MEETING

MATERIALS PACKAGE

Additional information prepared after the public meeting has been added to this appendix.

This appendix is available at

<http://www.spn.usace.army.mil/Missions/DredgingWorkPermits/LTMS/LTMSProgram12YearReviewProcess>

APPENDIX C
COSTS AND CONTRACTING MEETING
MATERIALS PACKAGE

This appendix is available at

<http://www.spn.usace.army.mil/Missions/DredgingWorkPermits/LTMS/LTMSProgram12YearReviewProcess>

APPENDIX D
POLICY AND STRATEGY MEETING
MATERIALS PACKAGE

This appendix is available at

<http://www.spn.usace.army.mil/Missions/DredgingWorkPermits/LTMS/LTMSProgram12YearReviewProcess>

APPENDIX E
SUMMARY OF COMMENTS FROM
STAKEHOLDER MEETINGS HELD IN 2012

This appendix is available at

<http://www.spn.usace.army.mil/Missions/DredgingWorkPermits/LTMS/LTMSProgram12YearReviewProcess>

APPENDIX F
SUMMARY OF LTMS-ACCOMPLISHED
SCIENCE STUDIES

This appendix is available at

<http://www.spn.usace.army.mil/Missions/DredgingWorkPermits/LTMS/LTMSProgram12YearReviewProcess>

APPENDIX G
LTMS OPTIONS PAPER

This appendix is available at

<http://www.spn.usace.army.mil/Missions/DredgingWorkPermits/LTMS/LTMSProgram12YearReviewProcess>

APPENDIX H
COMMENTS RECEIVED ON THE 12-YEAR
REVIEW DRAFT FINAL REPORT

This appendix is available at

<http://www.spn.usace.army.mil/Missions/DredgingWorkPermits/LTMS/LTMSProgram12YearReviewProcess>