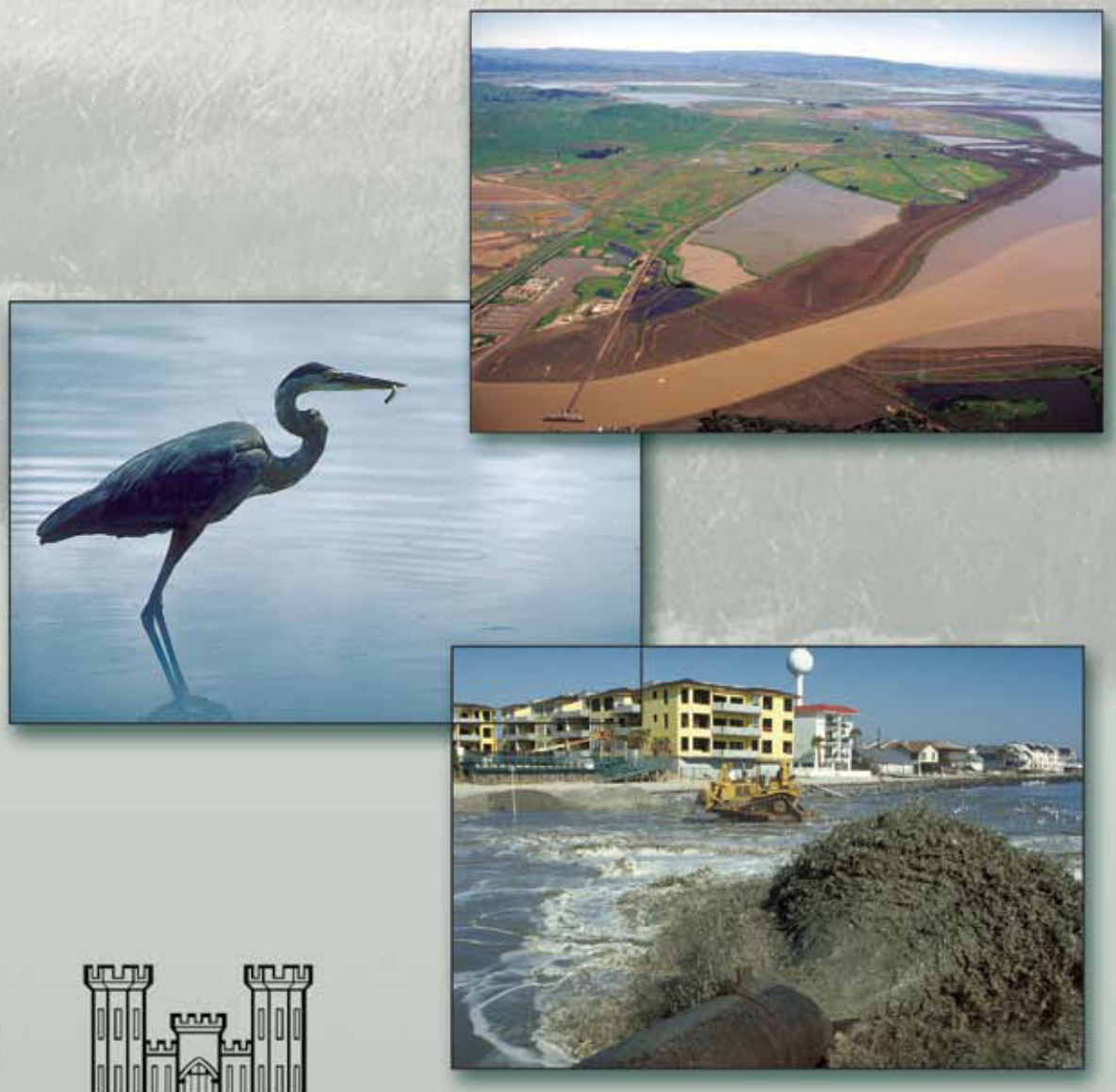
Identifying, Planning, and Financing Beneficial Use Projects Using Dredged Material

Beneficial Use Planning Manual



U.S. Environmental Protection Agency, Washington, DC

U.S. Army Corps of Engineers, Washington, DC

Cover Photos

Background: Aransas National Wildlife Refuge, Texas. Maintenance dredged material was used for stabilization of eroded marsh shoreline.
U.S. Army Corps of Engineers

Top: Aerial view of Sonoma Baylands Wetlands Restoration Project, Sonoma County, California.
U.S. Army Corps of Engineers

Middle: A Great Blue Heron in a small creek in South Georgia.
U.S. Army Corps of Engineers

Bottom: Beach nourishment on Tybee Island, Georgia.
U.S. Army Corps of Engineers

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Contents

Acronyms

CDF . . . . confined disposal facility
CWA . . . . Clean Water Act
CW-SRF . . . Clean Water State Revolving Fund
CZMA . . . . Coastal Zone Management Act
EA . . . . . environmental assessment
EIS . . . . . environmental impact statement
EPA . . . . . United States Environmental Protection Agency
ESA . . . . . Endangered Species Act
FACA. . . . . Federal Advisory Committee Act
FONSI . . . . Finding of No Significant Impact
FY . . . . . fiscal year
LERR . . . . lands, easements, rights-of-way, and relocations
MPRSA . . . Marine Protection, Research, and Sanctuaries Act of 1972 (commonly called the Ocean Dumping Act)
NED . . . . . National Economic Development plan
NEP . . . . . National Estuary Program
NEPA . . . . National Environmental Policy Act
NHPA . . . . National Historic Preservation Act
NOAA . . . . National Oceanic and Atmospheric Administration
OMRR&R . . operation, maintenance, replacement, repair, and rehabilitation
O&M . . . . operations and maintenance
OMB . . . . . Office of Management and Budget
PIANC . . . . International Navigation Association (formerly called Permanent International Association of Navigation Congresses)
RHA . . . . . Rivers and Harbors Act of 1899
ROD . . . . . Record of Decision
SHPO . . . . State Historic Preservation Officer
SMART . . . Simple Multiattribute Rating Technique
SOF . . . . . Statement of Findings
SRF . . . . . State Revolving Fund
USACE . . . . United States Army Corps of Engineers
USFWS . . . United States Fish and Wildlife Service
WRDA . . . . Water Resources Development Act

Preface

Every year in this country, the dredging of shipping channels, harbors, waterways, canals, lakes, and reservoirs produces large quantities of valuable sediment material. Most of this dredged material is clean and suitable for beneficial uses such as beach restoration, shore protection, agricultural uses, habitat enhancement, and many other applications. However, dredged material has not been exploited for its full economic, social, and environmental potential because of costs and the prevailing view that dredged material is waste.

In recent years, there has been a growing awareness of the vast potential for dredged material as a manageable, beneficial resource. This increased awareness has coincided with the growing difficulty in locating new dredged material disposal areas and escalating disposal costs. The increase in beneficial use projects is due also to forward-looking federal, state, and local governmental policies and private initiatives to take full advantage of the natural resources produced by dredging activities regionally and around the country.

This "Beneficial Use Planning Manual" presents a framework for identifying, planning, and financing beneficial use projects. This manual:

- describes the range of beneficial use opportunities;
- identifies potential beneficial use project partners or others who can contribute to project success;
- outlines how advanced planning augments options for using dredged material for beneficial purposes;
- explains alternative means of financing beneficial use projects; and
- presents strategies to solicit public input in project planning.

This manual is written for a wide audience, including dredging organizations, permitting authorities, environmental resource agencies, commercial concerns including port authorities, and other organizations or groups that can use or encourage the use of dredged material for beneficial purposes.

While prepared by the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE), this manual is a key element of the National Dredging Team's (NDT)[1] *Dredged Material Management: Action Agenda for the Next Decade* (NDT 2003), which recommended the development of a national guidance document that presents a framework for identifying, planning, and financing beneficial use projects.

Important Note:

The discussion in this document is intended solely as guidance. The statutory provisions and regulations described in this document contain legally binding requirements. This document is not a regulation itself, nor does it change or substitute for those provisions and regulations. Thus, it does not impose legally binding requirements on USACE, EPA, or any other entity, including the regulated community. This guidance does not confer legal rights or impose legal obligations upon any member of the public.

Although USACE and EPA have made every effort to ensure the accuracy of the discussion in this guidance, the obligations of the regulated community are determined by statutes, regulations, or other legally binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling.

The general description provided here might not apply to a particular situation based upon the circumstances. Interested parties are free to raise questions and objections with regard to the substance of this guidance and the appropriateness of the application of this guidance to a particular situation. USACE, EPA, and other decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from those described in this guidance where appropriate.

This is a living document and may be revised periodically. USACE and EPA welcome public input on this document at any time.

This guidance manual includes descriptions of potential sources of funds to help finance beneficial use projects. Inclusion of the potential sources of funds does not constitute endorsement by EPA or USACE; the sources are provided solely to aid users of this guidance manual in exploring options for financing.

[1] The National Dredging Team is a federal, interagency group established to facilitate communication, coordination, and resolution of dredging issues among participating federal agencies. It also serves as a forum to promote implementation of the National Dredging Policy. The National Dredging Policy recognizes dredged material as a resource and promotes environmentally sound beneficial use of dredged material.

1

Introduction

Several hundred million cubic yards of sediment must be dredged from U.S. ports, harbors, and waterways each year to maintain and improve the nation's navigation system for commercial, national defense, and recreational purposes. The disposal of this dredged material is managed and conducted by federal, state, and local governments; private entities; and semi-private entities, such as port authorities. The U.S. Army Corps of Engineers (USACE), which is responsible for constructing and, in most U.S. ports, maintaining federal navigation channels, issues permits for dredged material disposal, after review or concurrence by the U.S. Environmental Protection Agency (EPA). In some cases, disposal is subject to additional regulation by state governments through state water quality certification and coastal zone consistency under the Federal Coastal Zone Management Act. EPA and USACE strive for coordination and consistency in selecting dredged material management alternatives on the basis of cost and environmental impacts.

USACE and EPA have long had general policies offering broad support for the use of dredged material for beneficial purposes. Throughout the years, these policies allowed USACE to incorporate to some extent beneficial use projects into its Civil Works dredging programs. In the past 20 years, Congress has provided new legislative authorities and funding that enable and encourage USACE to pursue beneficial use opportunities, particularly habitat restoration projects, on a much wider scale. Section 306 of the Water Resources Development Act (WRDA) of 1990, for example, requires USACE to include environmental protection as one of its principal missions. Section 1135 of WRDA 1986 authorizes USACE to modify the structures and operations of its existing water resources projects to redress environmental damage caused by those projects. Section 204 of WRDA 1992 and Section 207 of WRDA 1996 encourage USACE to incorporate beneficial uses of dredged material into constructing, operating, and maintaining its Civil Works navigation projects. (These and other authorities that promote beneficial uses of dredged material are discussed in detail in Chapter 5.)

This document is intended to provide practical guidance for project sponsors and their potential partners for identifying, planning, financing, and implementing projects that use dredged material for beneficial purposes.

Forster's terns inhabiting a marsh created by dredged material on Poplar Island, Maryland (*Photo by USACE*).

In 2004, EPA and USACE published a guidance document titled *Evaluating Environmental Effects of Dredged Material Management Alternatives—A Technical Framework* (the "Technical Framework," EPA/USACE 2004). The Technical Framework provides EPA and USACE personnel with a consistent technical framework for evaluating potential environmental impacts of dredged material management alternatives, including beneficial use options, and for meeting the substantive and procedural requirements of the governing regulations.

This document, the "Beneficial Use Planning Manual," is a companion guide to both the Technical Framework (EPA/USACE 2004) and the joint EPA/USACE "Beneficial Uses of Dredged Material" website (***http://el.erdc.usace.army.mil/dots/budm/budm.cfm***). The Beneficial Uses website demonstrates potential beneficial uses of dredged material by presenting existing case studies as examples. Category descriptions, procedural outlines, and reference resources are also provided at the site. The "Beneficial Use Planning Manual" builds upon the website's foundation by providing practical guidance for project sponsors (e.g., government agencies, port authorities, marinas, industries, and private persons) and their potential partners for identifying, planning, financing, and implementing projects that use dredged material for beneficial purposes. In particular, this manual:

- describes the various **categories of beneficial uses**;
- discusses **actions and partnerships to improve the feasibility** of beneficial use projects;
- describes **federal policy** on beneficial uses of dredged material;

- presents methods to **determine goals** and **evaluate alternative beneficial uses** against goals for a particular site;
- provides information on available **financing opportunities and mechanisms** for beneficial use projects; and
- describes avenues for **public involvement** in beneficial use decision making.

The guidance in this manual assumes that beneficial use project sponsors are active decision makers in the activities discussed in the Technical Framework. In particular, it assumes that beneficial use project sponsors are or might soon be:

- developing management alternatives for dredged material;
- evaluating management alternatives;
- identifying a preferred alternative; and
- performing increasingly detailed planning for the preferred alternative.[2]

The remaining chapters in this Beneficial Use Manual cover the following information:

- **Chapter 2:** Overview of beneficial use opportunities and the federal dredged material management program, with emphasis on types of beneficial use projects and suitability of various types of dredged material.
- **Chapter 3:** Descriptions of potential project sponsors and other decision makers who can influence the success of beneficial use projects.
- **Chapter 4:** Framework to identify and plan beneficial use projects in a broad planning context at the watershed (including coastal) and sediment system levels in a process that is led by local planning groups and involves all stakeholders.
- **Chapter 5:** Funding sources available through USACE funding mechanisms and other federal authorities, and through state agencies, environmental groups, and private sector sources.
- **Chapter 6:** Strategies for maximizing public participation at important decision-making points in planning beneficial use projects.
- **Chapter 7:** References and additional resources.

[2] In many cases, beneficial use proponents will in fact be conducting a National Environmental Policy Act assessment of alternatives.

2

Overview of Beneficial Use Opportunities

Increasing the number of beneficial use projects in the United States requires greater understanding of the federal dredged material management program and the wide range of potential beneficial use projects by all involved parties. Likewise, potential project sponsors will benefit from learning about types of dredged material that are suitable for the specific beneficial uses under consideration. This chapter briefly summarizes these topics and describes some potential challenges for beneficial use projects.

An important goal of managing dredged material is to ensure that the material is used or disposed of in an environmentally sound manner. Each year, 200 to 300 million cubic yards of material are dredged from U.S. ports, harbors, and waterways. Of this volume, approximately 20 percent is disposed of in ocean waters. Eighty percent of the material is disposed of or placed through other means in estuarine, fresh waters, upland or other areas. Approximately 30 percent of material placed is used for beneficial purposes.

2.1 Federal Dredged Material Management Program

USACE is the nation's largest dredger through its Civil Works dredging projects. USACE is also responsible for issuing permits for dredged material disposal, after review or concurrence by the EPA. Other federal, state, and local agency reviews are required depending on the jurisdictions in which the dredging occurs and the location of dredged material disposal or placement sites.

The central role of USACE and EPA in dredging provides them the opportunity to broadly and strongly support beneficial use projects. Although USACE has incorporated beneficial uses into its Civil Works projects for many years, Congress has provided new legislative authorities and funding that encourage USACE to pursue beneficial use opportunities, particularly habitat restoration projects, on a much wider scale. Some of these USACE legislative authorities, including Sections 204, 306, and 1135 of WRDA, are described in Chapter 5. Wetland protection at Barataria Bay Waterway in Louisiana, oyster bed restoration at Lower James River in Virginia, and beach nourishment at Jones Inlet in New York are just a few examples of the many successful beneficial use projects among hundreds that USACE, EPA, and other partners have implemented to date.

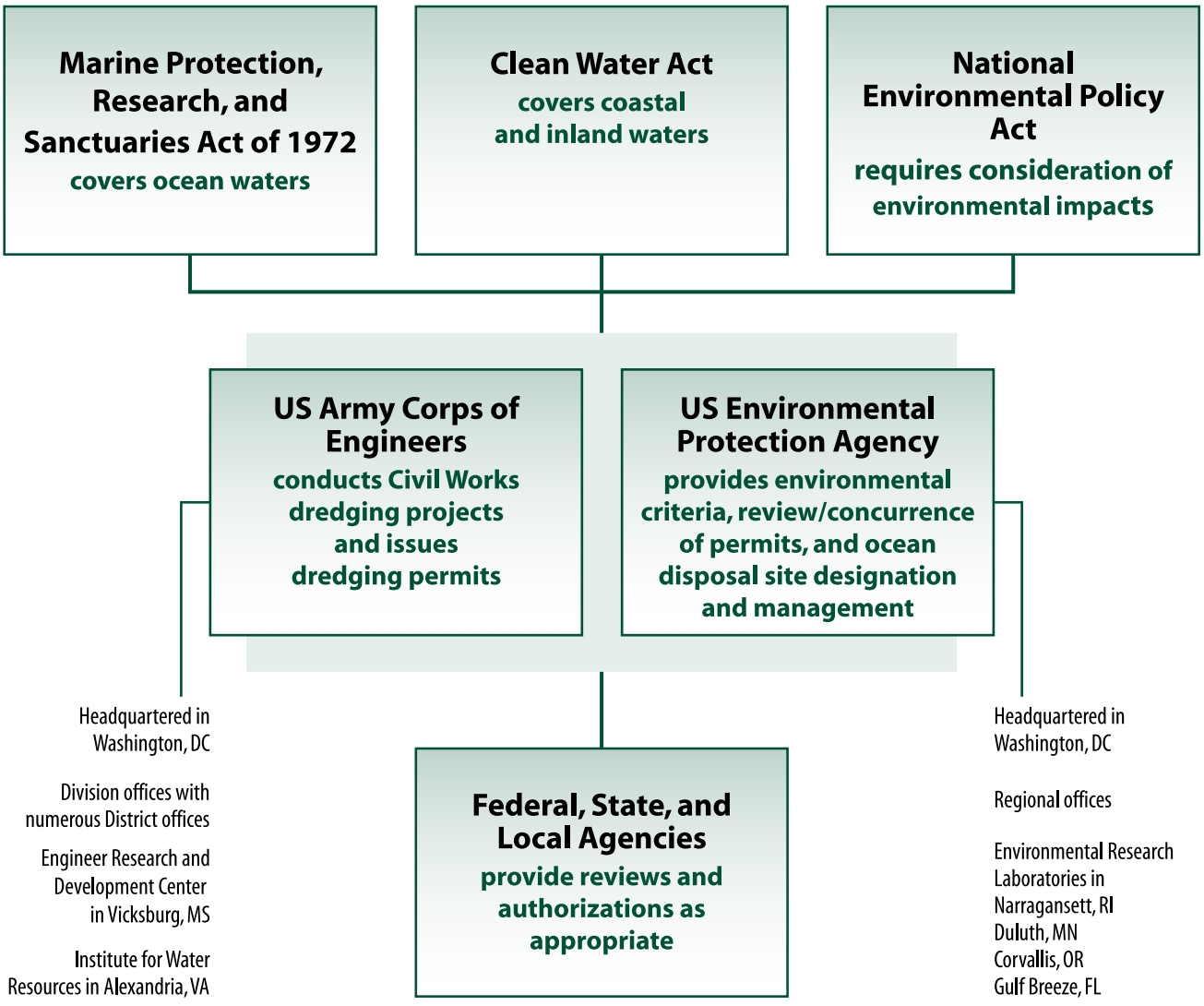
To make limited federal budgets go further, USACE, EPA, and other federal agencies should take advantage of still other opportunities to collaborate on beneficial use projects. USACE, EPA, and other federal agencies have responsibilities and programs involving protection, preservation, and restoration of coastal and freshwater resources in areas where dredging and disposal are also required to meet navigation and economic needs. These responsibilities and programs provide opportunities for creative partnerships to meet both environmental and economic objectives, including the beneficial use of dredged material.

The Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA), the Clean Water Act (CWA), the Rivers and Harbors Act of 1899 (RHA), the National Environmental Policy Act (NEPA), and the Coastal Zone Management Act (CZMA) are the five major federal statutes affecting dredged material disposal. The MPRSA, CWA, and RHA cover different geographic areas associated[3] with dredged material management. The MPRSA (Section 103) governs the transportation of dredged material for

[3] Other authorities may play a role in dredging and dredged material placement. Chapters 3 and 5 discuss some of these authorities, including the numerous Water Resources Development Acts, The National Historic Preservation Act, and the Magnuson-Stevens Act.

the purpose of dumping it into ocean waters, while the RHA (Sections 9 and 10) requires a USACE permit for structures or work in or affecting navigable waters of the U.S. By contrast, the CWA (Section 404) covers the discharge of dredged or fill material into waters of the U.S. USACE and EPA each have specific responsibility under the MPRSA and the CWA for dredged material disposal projects. USACE conducts Civil Works dredging projects, as well as issues permits for all activities in navigable waters (RHA), for discharges of dredged or fill material in waters of the U.S. (CWA),[4] and for transportation of dredged material for the purpose of dumping it into ocean waters (MPRSA). EPA develops environmental criteria in conjunction with USACE, reviews and provides concurrence on dredging permits, and, in the case of the MPRSA, designates and manages ocean disposal sites (Figure 2.1).

Figure 2.1 Elements of the Federal Dredged Material Management Programs. USACE and EPA work with other government agencies to implement the MPRSA, CWA, and NEPA.



[4] Note that Michigan and New Jersey are authorized to administer a CWA Section 404 permit program under Section 404(g).

A common misperception among the public is that dredged material is usually contaminated; in fact, a significant portion of material dredged from U.S. waters is not contaminated.

NEPA and the Council on Environmental Quality implementing regulations provide that federal agencies assure that environmental impacts and public input are considered in their decision making by preparing an environmental assessment (EA) or environmental impact statement (EIS), as appropriate, for all federal actions that may significantly affect the environment. NEPA requires USACE to evaluate alternatives for discharging dredged material from its Civil Works projects and from those projects for which it issues permits.

USACE and EPA offices dealing with dredged or fill material placement are organized as follows:

- EPA and USACE headquarters offices in Washington, DC, have the general responsibility for promulgating guidelines and criteria for the evaluation of dredged or fill material to be disposed or discharged under CWA and MPRSA, and for developing national policy and technical guidance.
- EPA Regional offices and USACE Division offices are responsible for implementing policy and guidance in each region of the country.
- USACE has 38 District offices within its eight Divisions that are the action offices for USACE activities. USACE Districts manage the planning, design, construction, operation, and maintenance of Congressionally authorized Civil Works projects for navigational dredging, flood control, and ecosystem restoration; the District offices also issue the permits previously discussed for dredging projects proposed by all entities other than USACE (including private and U.S. Navy).
- The U.S. Army Engineer Research and Development Center consists of seven laboratories, three of which—the Coastal Hydraulics, Geotechnical and Structures, and Environmental Laboratories located in Vicksburg, Mississippi—conduct research on dredging and placement.
- EPA's environmental research laboratories in Narragansett (RI), Duluth (MN), Corvallis (OR), and Gulf Breeze (FL), study the impacts of dredging and placement activities conducted around the United States, and are divisions of the National Health and Environmental Effects Research Laboratory (NHEERL). EPA's other Office of Research and Development Laboratories (National Risk Management Research Laboratory (NRML), National Exposure Research Laboratory (NERL), and National Center for Environmental Assessment (NCEA)) also have efforts underway studying impacts of dredging and placement activities.
- USACE's Institute for Water Resources in Alexandria, Virginia, develops planning procedures, manuals, and policy studies on a variety of issues, including the placement of dredged material.

2.2 Types of Beneficial Uses

The beneficial use of dredged material embraces the idea that this material can be used in a manner that will benefit society and the natural environment. A common misperception among the public is that dredged material is usually contaminated; in fact, a significant portion of material

dredged from U.S. waters is not contaminated. However, even material that is contaminated may be suitable for certain types of beneficial use. The quality of the dredged material varies, however, depending on the particular location dredged and the nature of the material itself (sands, silts, and/or clays). Material dredged in some of our major harbors is more likely to be contaminated because this material is generally silt and clay particles to which contaminants can easily bind. In any case, the promotion of beneficial uses continues to require a shift from the common perspective of dredged material as a waste product to one in which this material is viewed as a valuable resource that can provide multiple benefits to society.

To maximize the public benefits from dredging and placement, it is important to fully and equally consider all practicable placement alternatives. Dredging projects can provide the greatest public benefit by addressing multiple economic and environmental objectives simultaneously (e.g., harbor widening, wetlands creation, brownfields redevelopment, and recreational opportunities).

Dredged material can be used beneficially for engineered, agricultural and product, and environmental enhancement purposes, as described on the beneficial uses website (***http://el.erdc.usace.army.mil/dots/budm/budm.cfm***) and in the seven categories described below (USACE 2006):

1. ***Habitat Restoration and Development:*** using dredged material to build and restore wildlife habitat, especially wetlands or other water-based habitat (e.g., nesting islands and offshore reefs).
2. ***Beach Nourishment:*** using dredged material (primarily sandy material) to restore beaches subject to erosion.[5]
3. ***Parks and Recreation:*** using dredged material as the foundation for parks and recreational facilities; for example, waterside parks providing such amenities as swimming, picnicking, camping, or boating.
4. ***Agriculture, Forestry, Horticulture, and Aquaculture:*** using dredged material to replace eroded topsoil, elevate the soil surface, or improve the physical and chemical characteristics of soils.
5. ***Strip-Mine Reclamation and Solid Waste Management:*** using dredged material to reclaim strip mines, to cap solid waste landfills, or to protect landfills.
6. ***Construction/Industrial Development:*** using dredged material to support commercial or industrial activities (including brownfields redevelopment), primarily near waterways; for example, expanding or raising the height of the land base, or providing bank stabilization. In addition, dredged material may be used in construction material.
7. ***Multiple-Purpose Activities:*** using dredged material to meet a series of needs simultaneously, such as habitat development, recreation,

[5] Funding under Section 1135 of WRDA 1986, Section 204 of WRDA 1992, and Section 207 of WRDA 1996 may not be available for all types of beach nourishment projects, particularly those that are principally for recreational beaches.

and beach nourishment, which might all be supported by a single beneficial use project.

During evaluation and selection of beneficial use options, issues such as potential bioaccumulation of contaminants and introduction of invasive species should be considered. Each of these seven beneficial use categories is described in more detail in Appendix A.

2.3 Suitability of Dredged Material for Various Uses

When identifying potential beneficial use opportunities for dredged material, it is important to evaluate the suitability of the dredged material in question for a given use (see box below and Table 2.1 following). Prior to consideration of any dredged material placement option subject to CWA Section 404, the material should be tested and evaluated under the procedures described in the CWA Section 404(b)(1) guidelines for compliance. Basic data on physical and chemical characteristics of the sediments to be dredged, such as grain size and levels of contamination, can provide an initial screen of possible beneficial use options. In

Industrial Development (Brownfields): *The Jersey Gardens Mall*

Located on Newark Bay, south of the Port Newark/Port Elizabeth complex, this 185-acre project site served as a municipal waste landfill from 1960 to 1972. The OENJ Cherokee Corporation purchased the property in 1992, with a plan to close the landfill, remediate the site, and construct a large retail mall on the site. The approved landfill closure plan allowed the import of recycled material, including processed dredged material, for use as a cap and structural fill on the site.

Several dredging projects in the New York/New Jersey Harbor removed 2.2 million cubic yards (mcy) of sediment, of which 850,000 cubic yards was used beneficially at the project site. The dredged material was tested for grain size, percent moisture, total organic carbon, and bulk sediment chemistry, then blended with a stabilizing agent (cement kiln dust and/or Portland cement) and tested for bulk sediment chemistry again, followed by a modified multiple extraction leachate test. In addition, the processed dredged material was tested for permeability (it was required to have a low permeability). The testing results were then checked by the New Jersey Department of Environmental Protection against the placement criteria established for the site. Once the dredged material and other recycled materials were placed, the fill was covered with 2 feet of clean soil, asphalt, and buildings, effectively eliminating exposure to air, precipitation, and human contact.

The Jersey Gardens Mall, a 1.5-million-square-foot discount shopping center, had its Grand Opening in October 1999. The Jersey Gardens Mall currently provides jobs and generates $6 million in tax revenues for the State of New Jersey.

Project Title .....Jersey Gardens Mall
Sponsor.....OENJ Corporation
Volume Placed .....0.85 mcy
Placement Cost .....$40-56/cubic yard
Project Completion 1998

(*Photo by USACE*)

Table 2.1 Beneficial Uses Most Compatible With Dredged Material of a Given Composition

Material Type	Potential Beneficial Use*
Rock	***Habitat Restoration and Development*** ***Beach Nourishment (offshore berms only)*** Parks and Recreation Agriculture, Forestry, Horticulture, and Aquaculture Strip-Mine Reclamation/Solid Waste Management ***Construction/Industrial Development***
Sand and Gravel	***Habitat Restoration and Development*** ***Beach Nourishment*** ***Parks and Recreation*** Agriculture, Forestry, Horticulture, and Aquaculture Strip-Mine Reclamation/Solid Waste Management ***Construction/Industrial Development***
Consolidated Clay	***Habitat Restoration and Development*** Parks and Recreation ***Agriculture, Forestry, Horticulture, and Aquaculture*** Construction/Industrial Development
Silt/Soft Clay	***Habitat Restoration and Development*** Parks and Recreation ***Agriculture, Forestry, Horticulture, and Aquaculture*** Construction/Industrial Development
Mixture (rock/sand/gravel/silt/soft clay)	Habitat Restoration and Development Beach Nourishment (offshore berms only) Parks and Recreation Agriculture, Forestry, Horticulture, and Aquaculture Strip-Mine Reclamation/Solid Waste Management Construction/Industrial Development

* *Uses in bold italics text are the most suitable uses for the corresponding material type.*

general, clean, coarse-grained sediments (sands) are suitable for a wide range of beneficial uses. Fine-grained sediments can be suitable for more limited uses such as wetlands habitat development. In addition to grain size and levels of contamination, other characteristics to consider are salinity of the sediments, water content, organic content, acidity, levels of nutrients, and engineering properties such as shear strength and compressibility.

The following subsections review the major types of sediment (PIANC 1992). In addition, the special case of contaminated material is reviewed.

Rock. Dredged rock can vary in both size and composition (e.g., soft rocks such as sandstone or coral, or hard rocks such as granite). Rock is a potentially valuable construction material if appropriately sited that can be used, for example, in building offshore berms (to protect and improve beach stability), for foundation material in road construction

or other building activities, or as aggregate in concrete. Sorting may be required if the dredged rock varies widely in size. In general, dredged rock is not contaminated.

Sand and Gravel. Sand and gravel are usually considered the most valuable dredged material. They can be used in a number of applications, including beach nourishment, recreational land development, habitat development, and concrete, and as fill in shoreline construction. Like rock, dredged sand and gravel may require washing and sorting and usually are not contaminated. If they are contaminated, however, dewatering and washing treatments may clean the material sufficiently (Averett et al. 1990).

Consolidated Clay. Consolidated clay can range from hard to soft. Depending on the process, consolidated clay may be dredged as lumps of clay or in a homogeneous mixture of water and clay, which might require dewatering before use. Possible uses for consolidated clay include wetlands or uplands habitat restoration and development, shoreline construction, offshore berm construction, or manufacture of construction material such as bricks and ceramics. Consolidated clay often is not contaminated because it usually is found in undisturbed sediments.

Silt/Soft Clay. Silt and soft clay, the most common material excavated in maintenance dredging of rivers and ports, are valuable as material for agricultural purposes (e.g., topsoil) and for all forms of habitat restoration and development. Other applications include construction and recreational land development. Depending on the application, the material may require dewatering and desalination. Silt and soft clay are more likely to be contaminated if they come from river or port areas subject to heavy industrial activity or agricultural runoff.

Mixture. Often an area to be dredged contains a mixture of material. If the dredging area contains previously undisturbed sediments, these sediments may lie in discrete layers that can be dredged and managed separately. By contrast, areas along rivers or ports that are dredged often may contain mixed sediments that cannot be excavated separately. Depending on its composition, mixed material can still be used for a range of beneficial uses, including habitat restoration and development, recreational land development, shoreline construction, agriculture and forestry, or construction. Material mixtures may or may not be contaminated, depending on the source of the material and its location in relation to contaminated sources.

Contaminated Material. Assessing the level of contamination in dredged material is a key step in determining its suitability for beneficial uses (see Table 2.2). In general, the more contaminated the material, the greater the constraints on reuse. Highly contaminated material is not usually suitable for reuse unless its potential risk for biomagnification is low (e.g., The Jersey Gardens Mall project discussed on p. 10). The important issue is not so much whether the material is contaminated

Table 2.2 Potential Beneficial Uses Based on Sediment Contamination Status

Contamination Status	Potential Beneficial Use
Uncontaminated (Broad Use)	Habitat Restoration and Development Beach Nourishment Parks and Recreation Agriculture, Forestry, Horticulture and Aquaculture Strip-Mine Reclamation/Solid Waste Management Construction/Industrial Development Multipurpose Uses (Involving more than one of the above)
Contaminated (Limited Use – Sediment to be capped and/or contained)	Parks and Recreation Agriculture, Forestry, Horticulture and Aquaculture Strip-Mine Reclamation/Solid Waste Management Construction/Industrial Development Multipurpose Uses (Involving more than one of the above)

but whether the level and type of contamination are consistent with the intended use. For example, material being considered for aquaculture needs to be free from pathogens and contaminants that might bioaccumulate to harmful levels in products cultivated for human consumption (e.g., shrimp). By contrast, material being used for shoreline construction in an otherwise heavily industrialized area may not need to be entirely clean, although the material likely would need to be contained and not allowed to leach or otherwise move through the environment. In some cases, projects might be able to mitigate the use of contaminated material with cleaner material. As an example, an island creation project might use somewhat contaminated material for the bottom layers of construction, followed by upper layers of clean material to cap the contaminated sediment.

Assessing whether levels and types of contamination are consistent with intended use requires consideration of not only technical issues (e.g., potential for human contact and potential for bioaccumulation), but also regulatory and policy issues (e.g., CWA Section 404(b)(1) guidelines). Regulations vary by state, so it is important to assess state requirements as well as federal policy regarding standards for contamination and reuse.

2.4 Potential Challenges to Beneficial Use Projects

Although beneficial use projects provide opportunities for broad public benefit as well as more efficient resource use, there are nevertheless potential challenges to their application. Project cost and logistical issues are often the biggest challenges. Perceptions and biases create other challenges. In particular, because the concept of beneficial use projects may not be familiar to all parties in a decision-making process (e.g., regulators, dredging sponsors, and the public), these projects can

suffer from being seen as "novel" with unclear standards and practices. This latter drawback has diminished, however, as beneficial uses have become more prevalent and a common business practice.

Some key potential challenges are the following:

- ***Numbers of Participants:*** Planning and decision-making processes for beneficial use projects can become complicated and unwieldy given that federal and state natural resource and wildlife agencies, local agencies, private parties, and public interest groups are often involved. Also, because some of these participants may be responsible for protecting different resources, the parties may have conflicting goals for the resources under consideration. For example, one participant interested in water quality may be charged with minimizing filling to maintain water course flushing, while another party may favor filling to improve a particular wildlife habitat. These potentially conflicting interests require project partners to exercise considerable organizational skills—as well as patience—to work out the details of a beneficial use activity.

  Project sponsors can meet this challenge by determining as early as possible in project planning which government and private organizations and individuals will have an interest and want to be involved in the project. Chapter 3 describes the types of organizations and the variety of interests project sponsors will encounter. It also indicates the positive project planning and implementation roles that many of these organizations can take. As Chapter 6 indicates, using technical advisory groups can be one effective means of reducing the complications inherent in addressing differing interests. As that chapter recommends, project sponsors should try to involve all interested parties in project planning as early as possible. By approaching these organizations' involvement with an open attitude of cooperation and collaboration, project managers can alleviate multi-organization complexities to a great extent.

- ***Lack of Familiarity with Beneficial Uses:*** Although some types of beneficial use projects have been implemented for several decades, many federal and state agency staff, as well as private and public participants, still may be unfamiliar with such a concept or specific proposal. As with any innovative or emerging public policy issue, time and effort must therefore be spent in clarifying appropriate policy and procedures to be followed. This problem can be significant in that participants are likely to emphasize approaches they are familiar with and resist approaches new to them—particularly in public decision making.

  The information provided about beneficial use opportunities in this chapter and in Appendix A is meant to provide at least an overview of information about the great variety of ways in which dredged material has successfully been used for beneficial purposes. Likewise, the information about federal agencies' responsibilities, federal policies

encouraging beneficial uses, and sources of federal funding presented throughout this manual should help clarify current relevant policies and procedures. The beneficial use planning groups described in Chapter 3 are another source of useful information about what approaches to using dredged material have proven most effective.

- ***Confusion About Compatibility of Beneficial Use with Various Compositions of Dredged Material:*** Participants who are generally not involved in dredging activities might be confused about the various grain size characteristics and qualities of dredged material and the associated potential of these characteristics and qualities for beneficial uses. As discussed previously, some participants may be inclined to assume that either all dredged material is contaminated and that disposal is the only appropriate option, or all dredged material is suitable for beneficial use. This chapter's descriptions of the major dredged material types and the beneficial uses most compatible with each material should help to reduce this confusion.
- ***Logistics:*** Independent of issues of acceptability, beneficial use projects also may suffer logistical problems. Because beneficial use projects entail connecting a dredging project to a use project, it will be important to coordinate the timing and physical location of activities. For example, if the dredging project proceeds throughout a 3-year timeline, but the intended beneficial use (e.g., island creation) cannot be initiated for several years, it may be difficult for the projects to be successfully coupled. The proximity of the dredged material source to its ultimate use also has logistical and cost implications. In addition, it is important to address issues of scale. Is the amount and type of dredged material compatible with the use project? For example, if a dredger has millions of cubic yards of material, a small wetlands restoration project may not be an adequate alternative for use (although it might be possible to link various smaller use projects to match the scale of the dredging project). Alternatively, projects such as beach nourishment may require continuing sources of material.

  As discussed in Chapter 6, participation in a local beneficial uses planning group or its equivalent enhances coordination of the timing, location, and scale of dredging and material use. Private parties who are interested in funding or promoting a beneficial use project should contact their nearest USACE District office to learn if a beneficial use planning group is operating in their region.

  Tracking a project's regulatory requirements to the agencies responsible for them is a good way to identify and begin to coordinate with all the project's participants. Contacts for three case studies of successful beneficial use projects from around the country are listed in fact sheets accompanying this guidance document (EPA/USACE 2007a, EPA/USACE 2007b, and EPA/USACE 2007c). These contacts are good sources of information about meeting the logistical challenges presented by beneficial use projects.

Because beneficial use projects entail connecting a dredging project to a use project, it will be important to coordinate the timing and physical location of activities.

- ***Coordination of Financial Components:*** Lining up the necessary financial components of the project can present challenges. Independent of whether timing and location will work, and whether there is general support for the project, project sponsors will have to arrange specific financing and cost-sharing, work out issues of land ownership or other legal questions, obtain necessary permits, and seek support.

  Chapter 5 of this document discusses the funding of beneficial use projects. Chapter 6 outlines ways to work with the public to foster understanding and support for beneficial use projects. Project proponents may very well discover that public sentiment strongly favors the use of dredged material for beneficial purposes.

  Project proponents enhance the likelihood that a beneficial use project will go forward if they clearly communicate to each regulatory agency involved how the project itself will benefit the resource for which that agency is responsible. For example, in the case of the Jetty Island, Washington, beneficial use project sponsored by the Port of Everett, the U.S. Fish and Wildlife Service, National Marine Fisheries Service (NOAA Fisheries), and the Washington Department of Fisheries supported the project because of its potential to enhance salmon spawning habitat.

- ***Other Potential Barriers:*** Other potential barriers to beneficial use projects can be identified during the early stages of project planning. For example, a state Coastal Zone Management agency may request beneficial use of dredged material for a dredging project conducted or sponsored by a federal agency to be consistent to the maximum extent practicable with the state's coastal management policies. This could hinder the federal agency's project if the state agency's request is made after initial project appropriation, especially if this appropriation is based on a disposal option that is less costly than the possible beneficial use alternatives. These types of potential barriers can be overcome by early coordination among all stakeholders and careful planning of the project.

More than anything, beneficial use projects depend on foresight, good planning, and steady effort. Given that, there is every reason to believe that, in most cases, the various challenges can be overcome.

3

Identifying Project Partners and Other Decision Makers

Many types of organizations typically contribute to the success of beneficial use projects. EPA, USACE, and state resource agency staff, for example, can play a very important initial role by identifying interested parties, regulatory agencies, beneficial use alternatives, limitations on the use of the material, and logistical requirements. Several other entities can help increase project feasibility and success by providing essential design, implementation, and monitoring services. This chapter describes the many organizations that can be involved in beneficial use projects.

Although beneficial use projects have many purposes and take many forms, all such projects are likely to have at least one sponsor that needs to create or, more likely, maintain a navigable waterway or harbor. Section 3.1 describes the types of organizations that conduct dredging projects in the United States. These include government agencies, port authorities, marinas, industries, and private persons. USACE's dredging and permitting responsibilities are described in detail because of this agency's prominent role in U.S. dredging activities.

Involving other public and private entities as partners to design, build, maintain, or fund a beneficial use project can contribute to a successful project. Such organizations seek to be partners because of their interest in using dredged material to accomplish a beneficial purpose such as performing environmental restoration or providing recreational or commercial opportunities. Sometimes such partners may be willing to help fund the project. Most are able to contribute by advising on technical issues and helping to design and implement the placement of the dredged material. Still others help dredgers by assisting with permitting and by providing an economical means of using the dredged material. Section 3.2 briefly describes the types of organizations that typically support using dredged material for beneficial purposes. Although they do not necessarily play a direct sponsorship or partnering role, many federal, state, and local government agencies can facilitate beneficial use projects by participating in project planning, implementation, and monitoring. Some of these agencies also enforce environmental, land-use, and other regulations applicable to beneficial use projects. Other agencies and organizations that can influence project success are discussed in Section 3.3. Furthermore, it is important to note that the public can also influence a project's decision-making process and success. Chapter 6 provides information on outreach and public involvement.

3.1 Dredging Organizations

U.S. Army Corps of Engineers

USACE will be a principal federal sponsor of almost any large dredging project in the United States. In that role, USACE is the largest supplier of dredged material for beneficial uses.

USACE has long been the most active dredging organization in the United States, as well as the primary regulator of dredging and dredged material disposal. In fulfilling its mission of developing and maintaining the nation's navigational channels and harbors, USACE dredges and disposes of about 200 million cubic yards of sediment annually in constructing, operating, or maintaining Civil Works projects. USACE will be a principal federal sponsor of almost any large dredging project in the United States. In that role, this agency is the largest supplier of dredged material for beneficial uses.

USACE's principal organizational levels are its Headquarters in Washington, D.C., regional Divisions, and local District offices. There are eight regional USACE Divisions that are divided into 38 local Districts. Divisions and Districts have jurisdiction over specific

geographic areas usually defined by state or river basin boundaries. Districts are the foundation of the USACE Civil Works program. While USACE's higher echelons provide program and policy oversight, direction, and management, the Districts manage all day-to-day operations and work with other project sponsors, federal and state agencies, and all interested members of the public. USACE Districts have the authority to, among other things, construct, operate, and maintain major Civil Works water resource projects, including dredging projects. Under authority granted to USACE by the MPRSA, RHA, and the CWA, the Districts also issue, modify, or deny permits for dredging and disposal projects proposed by other entities. Local USACE District office staff are an important source of information and guidance for any organization intending to participate in a beneficial use project, either as dredger or as user of dredged material. USACE's responsibilities and processes in its Civil Works program and for permitting dredging projects planned by other entities are briefly described here.

Construction, Operation, and Maintenance of Civil Works Projects. USACE's Civil Works program includes projects to further the interests of commercial navigation, flood control, and ecosystem restoration. The key federal objective of these water resource projects is to contribute to national economic development consistent with protecting the nation's environment pursuant to national environmental statutes, applicable executive orders, and other applicable federal and state regulatory requirements. USACE projects may be individually authorized by Congress or, in the case of some smaller projects, conducted under a Continuing Authorities Program. Most opportunities for beneficially using dredged material are provided by USACE's navigation projects.

USACE's Civil Works activities are divided into two broad categories: (1) construction of new projects and (2) operation, maintenance, or modification of existing projects. USACE's process for developing new Civil Works projects consists of a multiyear, five-phase series of analyses that become progressively more detailed as the process moves forward. The five phases are the Reconnaissance Phase, the Feasibility Phase, the Preconstruction Engineering and Design Phase, the Real Estate Acquisition Phase, and the Construction Phase. USACE must receive Congressional funding and authorization to continue at various points in this process. Applicable law also requires cost-sharing agreements with non-federal partners. According to these agreements, non-federal partners pay part of projects' Feasibility, Preconstruction Engineering and Design, and Construction Phase costs. Once planning is completed for major Civil Works projects, USACE assigns a life-cycle project manager responsible for the project's implementation

Placement of dredged material for habitat restoration (*Photo by USACE*).

USACE policy places an important emphasis on the environment, providing increasing opportunities for beneficial use projects.

and ultimate construction. An increasingly important aspect of the life-cycle manager's responsibilities is to seek prospective dredged material beneficial use opportunities and develop information on the availability, scheduling, and volumes of dredged material from particular Civil Works projects, and to coordinate beneficial use disposal alternatives.

Many new Civil Works navigation projects are multipurpose projects designed to accomplish both a navigational and an ecological restoration purpose because environmental restoration is a primary mission of the USACE Civil Works program. During the Feasibility Phase of these projects, USACE formulates alternative plans that would contribute to the federal National Economic Development (NED) objective, while addressing the water resource problem in question. The NED plan reasonably maximizes net economic benefits consistent with protecting the nation's environment. Each plan shows that particular alternative's effects on the national and regional economy, the environment, and other social indicators. USACE is required to select the NED plan (or the plan that reasonably maximizes net economic benefit consistent with protecting the nation's environment) for addressing the particular water resource problem unless there is some important overriding reason for choosing an alternative plan that would not maximize net economic benefit.

Since the passage of the landmark Water Resources Development Act (WRDA) of 1986, environmental restoration is a primary mission of USACE, along with some of the more traditional mission areas of flood damage reduction and inland and coastal navigation. New laws have established specific authority for USACE to use dredged material for environmentally beneficial purposes, and programs are in place to implement these laws to the extent that funds are available.

USACE policy places an important emphasis on the environment, which provides increasing opportunities for beneficial use projects. Now that ecosystem restoration is recognized as one of the primary missions of USACE under its planning guidance (USACE 2000), the placement option that is selected for a project should maximize the sum of net economic development and national environmental restoration benefits.

Selecting the recommended plan for new Civil Works projects allows for offsetting project costs with the project's navigational and ecosystem restoration benefits. USACE can now incorporate one or more options for beneficial use of dredged material into new Civil Works projects as a cost-effective means of accomplishing projects' dual purposes. By doing so, the beneficial use's potential economic, environmental, or social benefits and attendant costs are included in the overall mix of project costs and benefits that are analyzed in the project plan submitted to Congress for construction authorization.

Section 204 of WRDA 1992, as amended by Section 207 of WRDA 1996, seeks to maximize beneficial uses of dredged material with Civil Works navigation projects. Section 204 provides authority for projects that

create, restore, and protect ecologically important habitats, including wetlands, in connection with dredging associated with new and existing projects. USACE can use this permanent authority to sponsor beneficial uses of dredged material without having to seek specific authority for individual projects. Section 5.1 discusses in more detail Section 204 funding opportunities and required arrangements with local project co-sponsors.

Dredged material produced by project construction can be used in beneficial use projects not associated with USACE's navigation or ecological restoration missions; for example, airport construction. In this case, the local sponsor of the airport project has to pay the increment of cost above USACE's least-cost disposal alternative associated with disposal at the airport site.

After Civil Works projects are constructed, USACE's operations and maintenance (O&M) program may conduct the day-to-day management, repair, and rehabilitation of these Congressionally authorized projects. Completed USACE projects are operated and maintained by either USACE or local sponsors, depending on the projects' authorization and purposes, and the terms of the cooperative agreements between the local sponsors and USACE.

Just as for construction of new Civil Works projects, it is USACE policy to dispose of dredged material associated with the O&M of existing projects in the least costly manner that is consistent with sound engineering practice and that meets applicable federal environmental standards. In the context of O&M activities, this manner of dredged material disposal is referred to as the "base plan" (also known as the "Federal Standard") for accomplishing the project's navigation purpose. If a beneficial use project contributes to a project's navigation or ecosystem restoration purpose and is part of a base plan, it is funded as a navigation O&M cost from USACE Operations and Maintenance General Funds.

Where the beneficial use project is not part of the base plan, but still contributes to a project's navigation or ecosystem restoration purpose, the base plan serves as a reference point for measuring the incremental costs of that beneficial use. For costs exceeding the base plan, one or more non-federal entities must enter into a cooperative agreement with USACE to participate in the project (Section 204, WRDA 1992). The non-federal partner must agree to pay 25 percent of the incremental costs above the base plan (or 35 percent in the case of placement on beaches) associated with the construction of the project, including provision of all lands, easements, rights-of-way, and necessary relocations. The non-federal partner is also responsible for the entire cost of operation, maintenance, replacement, repair, and rehabilitation associated with the project. In cases in which the beneficial use of the dredged material does not contribute to USACE's navigation or ecosystem restoration missions, the project partner using the material pays the full costs of that beneficial use project.

Three statutes provide USACE with flexibility to alter existing projects and to use dredged material for beneficial purposes. As noted previously, USACE can use its permanent authority under Section 204 of WRDA 1992 to incorporate beneficial use projects into O&M activities of navigation projects. Section 216 of the Rivers and Harbors Act and Flood Control Act of 1970 authorizes USACE to review the operation of any completed Civil Works project when changed physical or economic conditions warrant it, or for improving the quality of the environment in the overall public interest. This section requires USACE to report to Congress in such cases with recommendations on modifying the project's structures or operation. To make such modifications for either purpose, USACE first has to obtain Congressional authorization after submitting a Feasibility Study for such action. The third statutory authority, Section 1135 of WRDA 1986, provides USACE with rather limited authority regarding beneficial use projects. This section enables USACE to modify the structures and operations of Civil Works projects to redress environmental damage being caused by those projects. This authority has been used to implement ecosystem restoration projects. Section 5.1 of this report discusses in more detail the funding opportunities created by these authorities and describes beneficial use projects that have used these authorities.

One of the most important considerations for dredged material managers is knowing sufficiently far in advance when suitable material will be available. It normally takes project proponents 2 or 3 years to plan and design a beneficial use project, arrange project financing, and meet all applicable regulatory requirements. The fact that much of USACE's dredging is conducted under its waterway maintenance program means that much of USACE dredging is done as part of a routine, predictable process on an annual basis. USACE staff can provide information on characteristics, volumes, and availability of material from these programs. Local permittees also may dredge on schedules consistent with federal projects to be able to contract with area USACE dredgers, thereby reducing project costs. USACE District staff handling these permits should be able to help characterize this non-USACE dredged material and help coordinate with the permittees. (See the next section, "USACE Permitting of Dredging and Placement for Beneficial Uses," for details.)

Beneficial use project sponsors can take advantage of this predictability by working with the local USACE District early in project planning. It is particularly important that interested parties expecting to use USACE dredged material be ready to take and use this material at a time consistent with the USACE dredging schedule. Because of the complexity of setting up beneficial use projects and USACE's need to spend funds allocated for particular dredging projects in the particular year for which they were allocated, project sponsors should start planning and regulatory compliance activities as early as possible to be ready for the material when dredging begins.

USACE Permitting of Dredging and Placement for Beneficial Uses. Activities involving dredging, disposing of dredged material, or otherwise modifying navigable waters, produce approximately 300 million cubic yards of dredged material annually. USACE dredges and disposes of about 200 million cubic yards annually, and authorizes approximately another 100 million cubic yards for disposal each year. Port authorities, state or local governments, and private entities engaging in such activities are subject to permitting requirements under a number of federal statutes, as briefly described below. In addition, other federal agencies (e.g., the U.S. Navy) are required to apply for such permits, even if USACE is the organization that would do the dredging. Although USACE does not issue permits to itself for Civil Works projects, it applies the same regulatory criteria and guidelines, as appropriate, to its own Civil Works projects.

Project sponsors should start planning and regulatory compliance activities as early as possible to be ready for the material when dredging begins.

Under Section 10 of the Rivers and Harbors Act of 1899, USACE issues permits for, among other things, dredging operations and/or disposal of dredged material, in "navigable waters of the United States." The "navigable waters of the United States" subject to Section 10 are all waters historically used, currently used, or susceptible to use to transport interstate or foreign commerce, including the three-mile territorial sea as well as all waters subject to the ebb and flow of the tide (33 C.F.R. 329.4).[6] Responsibility for implementation of Section 10 is vested in USACE, and permit decisions are based upon a public interest review in accordance with USACE criteria (33 C.F.R. 320.4).

The discharge of dredged or fill material into "Waters of the United States" is subject to permitting under Section 404 of the CWA. "Waters of the United States" include the traditional navigable waters identified in the previous paragraph, and also extend to additional non-navigable tributaries and many types of wetlands.[7] Section 404 of the CWA is jointly implemented by EPA and USACE, with USACE being responsible for issuing permits, using its public interest review criteria and also the environmental criteria contained in EPA regulations (40 C.F.R. 230), commonly referred to as the "404(b)(1) Guidelines." Issuance of Section 404 permits is also subject to an EPA review role. A fundamental requirement of the 404(b)(1) Guidelines is that "…no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 C.F.R. 230.10(a)).

Transportation of dredged material from the United States for the purpose of dumping into "ocean waters" is subject to permitting under Section 103 of the Marine Protection, Research and Sanctuaries Act (commonly referred to as "the Ocean Dumping Act" or "MPRSA"). The

[6] In some instances Section 10 permitting applies even beyond the seaward edge of the three mile territorial sea. Under Section 4(f) of the Outer Continental Shelf Lands Act, a Section 10 permit is required for the construction of artificial islands, installations, and other devices located on the seabed to the seaward limit of the outer continental shelf. See 33 C.F.R. 320.2(b).

[7] Readers should contact USACE or EPA for the most recent information related to the extent of CWA jurisdiction.

"ocean waters" subject to Section 103 are the three-mile territorial sea and all ocean waters seaward of the territorial sea.[8] Section 103 of the MPRSA is jointly implemented by EPA and USACE, with USACE being responsible for issuing permits, using its public interest review criteria and also the ocean dumping criteria contained in EPA regulations (40 C.F.R. Part 227). Under the MPRSA, issuance of Section 103 permits is subject to an EPA concurrence role, and USACE also is directed to use, to the maximum extent feasible, ocean dumping sites that have been designated by EPA. Under the applicable regulations, in addition to the potential impacts of the dumping, consideration must also be given to the need for ocean dumping and the availability of practicable alternatives to the dumping (40 C.F.R. (230)(c)).

Although the scope of waters covered by CWA Section 404 and MPRSA Section 103 overlap within the three-mile territorial sea, the regulations provide that where the placement of the dredged material is for the primary purpose of fill (e.g., beach nourishment, island creation, construction of underwater berms), the activity will be regulated under CWA Section 404 (40 C.F.R. 230.2(b); 33 C.F.R. 336.0(b)). As a result, the discharge of dredged material into the territorial sea for the types of beneficial uses addressed in this document (see activities discussed in Section 2.2) will be subject to permitting under CWA Section 404 rather than MPRSA Section 103.

Compliance with other laws, including NEPA, CZMA, the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA), and Section 401 of the CWA, are considered as part of USACE's processing of permit applications. A list of some of these other relevant authorities and a summary of their content may be found at 33 C.F.R. 320.3.

When a party applies to conduct any new or maintenance activity or project that may require a permit, the USACE District office assigns a project manager. This person coordinates all the necessary paperwork, meetings, hearings, and other actions to comply with USACE and EPA regulatory requirements, and with NEPA. The potential applicant can request a Pre-application Meeting to determine what information and studies may be required in the permit process. Appropriate federal agencies, including EPA and National Marine Fisheries Service (NOAA Fisheries), and state and local agencies are strongly encouraged to join this Pre-application Meeting so the applicant gains the greatest insight into the potential data needs, problems, and alternatives as early as possible. At this time, the parties can discuss dredged material evaluation and disposal alternatives, including potential beneficial uses. The applicant is also informed of the information USACE will need to prepare either an EA or an EIS in compliance with USACE's responsibilities under NEPA. During this stage of the process, permit applicants also prepare

[8] One exception to this is Long Island Sound. Even though Long Island Sound is considered inland waters and is subject to CWA Section 404, Section 106(f) of the MPRSA requires that any dumping of dredged material into Long Island Sound from a federal project, or from a non-federal project exceeding 25,000 cubic yards of dredged material, shall comply with the requirements of the MPRSA.

An osprey perches atop its nest in a coastal habitat created with dredged material (*Photo by USACE*).

sediment sampling and evaluation/testing plans for USACE District and EPA Regional staff review. Specifically, testing and evaluation procedures described in relevant dredged material testing guidance (EPA/USACE 1991, EPA/USACE 1998) should be consulted at this stage.

A permit application, which must be filed with USACE where the dredging is proposed, describes the proposed activity's location, purpose, need, and schedule, as well as the proposed means of disposing of the dredged material. Because most beneficial uses of dredged material occur in inland waters or the territorial sea, the permitting authorities most likely to be relevant will be Section 10 of the RHA and Section 404 of the CWA. Permits under those authorities are issued using various forms of authorization. General permits authorize a category or categories of activities in specific geographic regions or nationwide when they cause only minimal individual or cumulative environmental impacts. In some instances, maintenance dredging or restoration of damaged structures/fill may qualify for a general permit. Standard permits are issued following an evaluation process including NEPA analysis, compliance with the CWA Section 404(b)(1) Guidelines and ESA, and several other analyses. If USACE deems the application complete, it publishes a Public Notice to inform other agencies and the public of the proposed activity, and to solicit comments and information necessary to evaluate its probable impact. This comment period generally lasts 30 days, but may, under certain circumstances, be reduced to 15 days. After the comment period has closed, USACE determines whether to prepare an EA or EIS and whether to hold a public hearing, if one has been requested by an interested party. If USACE determines that an EIS is required, it publishes a Notice of Intent to write an EIS and a Scoping Notice to begin the formal NEPA process; more commonly, however, a less detailed EA is prepared for beneficial use projects.

During and after the public comment period, EPA reviews the application and supplementary information to determine whether the placement activity complies with applicable regulatory criteria, including the Section 404(b)(1) Guidelines. Regional EPA staff may also participate in the NEPA process as a cooperating agency or comment on the proposed placement during the NEPA process. If there is concern that the proposed activity does not meet regulatory criteria, EPA can work with USACE to construct "special conditions" that will bring the proposal into compliance.

After obtaining all relevant data, USACE conducts a public interest review to weigh potential beneficial and detrimental impacts of the proposed activity. USACE considers all public and agency comments and applicant responses when determining whether to permit the activities. USACE bases this analysis on various environmental, economic, and social benefit criteria. Depending on the impacts of this project, this can include the impacts to threatened or endangered species (e.g., sea turtles) and require a formal or informal consultation with USFWS and/or NOAA Fisheries. For projects subject to Section 404 of the CWA, USACE also applies the 404(b)(1) Guidelines developed by EPA in conjunction with USACE. After reviewing the permit application, permit evaluations, and supporting documentation, and making a decision on permit issuance, USACE issues a Statement of Findings (SOF) and either a Finding of No Significant Impact (FONSI), if a NEPA EA was prepared supporting such a finding, or a Record of Decision (ROD), if an EIS was prepared. These documents, which are sometimes consolidated into a single document, explain the permit decision and any conditions. Requests for modifications and/or extensions of the permit can be submitted to USACE.

Local and State Port Authorities

Local or state port authorities or port associations may sponsor projects both as dredgers and as managers of dredged material. Port authorities have a direct interest in maintaining the navigability of harbors and ship channels. While USACE maintains federal channels in U.S. ports and harbors, port authorities generally are responsible for dredging side channels and berthing areas. Some port authorities also have responsibility for airports, bridges, and tunnels. In this capacity, port authorities have used dredged material for building or expanding airports at several locations around the country, including Kennedy International Airport in New York City, Boston's Logan International Airport, and the Washington Reagan National Airport. The following box provides an example of other ways a port authority may be involved in a beneficial use project.

U.S. Navy

The U.S. Navy dredging operations are also potential sources of dredged material for beneficial uses. The U.S. Navy maintains areas immediately adjacent to its piers and wharves worldwide. The U.S. Navy's dredging program is conducted similarly to, and often in coordination with, local

Port Authorities Working with USACE

The Poplar Island project in Chesapeake Bay is a notable example of a beneficial use project undertaken by a port authority in partnership with USACE. The Maryland Port Administration has ongoing placement needs for materials dredged at the Port of Baltimore. The Port, along with USACE under its WRDA 1992 Section 204 authority to jointly fund beneficial use projects, is sponsoring a multiyear project that is rebuilding an island in the middle of Chesapeake Bay using material taken from bay channels serving the Port of Baltimore. This island provides the Port with a location to place its materials, and restores critically degraded marsh wetlands, upland bird habitat, and shellfish habitat. The initial phase of rebuilding Poplar Island took place in March 1998. Completion of dredged material placement is scheduled for 2015. Upon completion, 40 million cubic yards of material will have been used to create 1,140 acres of wildlife habitat.

Aerial view of Poplar Island (*Photo by USACE*).

USACE Districts' planning and implementation of Civil Works projects. U.S. Navy projects for larger new construction dredging must be Congressionally authorized. Both new construction and maintenance dredging projects must receive permits issued by USACE.

Marinas and Other Private Dredgers

Local marinas, or consortia of marinas, may be considered as potential project partners. Marinas require periodic dredging to keep their channels and pier areas navigable, thereby providing a potential source of dredged material for beneficial uses. They also can use dredged material for projects such as protective dikes. Likewise, many private companies around the country face the continuing need to dredge privately owned waterways adjacent to their commercial and industrial facilities. As providers of dredged material, such companies also should be considered potential beneficial use project partners. Compared to other potential project sponsors, marinas and industrial companies dredge and use relatively small volumes of material. These dredging activities require dredging permits issued by USACE. They should, nonetheless, be considered as project partners, depending on the needs of particular beneficial use projects. While each project is small, the cumulative effect of part-

nering with marinas and private dredgers may be large when projects are integrated into a regional plan or project. Because of the relatively small size of their operations, marinas and industrial organizations often can more easily, flexibly, and quickly make decisions and commitments with regard to supporting beneficial use projects than some larger prospective project sponsors.

3.2 Users of Dredged Material for Beneficial Purposes

Although USACE is currently the largest sponsor for beneficial uses, other organizations are also able to take advantage of available dredged material regionally and around the country. These organizations are discussed below.

Private Commercial and Environmental Organizations

Private commercial and environmental organizations have for many years used or supported the use of dredged material for a vast number of beneficial purposes. For example, some island habitats created from dredged material are owned by private conservation organizations or private citizens. Homes and businesses in many cities such as Galveston, Texas, and Portland, Oregon, have been constructed on dredged material foundations. These and many other commercial and ecological uses indicate that private organizations are viable project partners, at least in dredging projects of small to medium size.

The agriculture and horticulture industries also are using dredged material beneficially. Dredged material at some placement sites, especially in river systems, has been used for truck farming and livestock pasturage. Farmers have successfully incorporated dredged material into marginal soils to increase productivity. Dredged material also has been applied to soils at orchards and nurseries to enhance production of fruit, nuts, and ornamental plants. Project sponsors should contact the local field office of the U.S. Department of Agriculture's Natural Resources Conservation Service (formerly the Soil Conservation Service) or their state department of agriculture to explore these potential uses.

Private Entities Working with Port Authorities and USACE

The Montezuma Wetlands Project (Montezuma) is occuring through a collaboration of private and government organizations. The private entity that owns the site, Montezuma Wetlands LLC, is financing the design, permitting, construction, and operations. Beginning in 2003, Montezuma started receiving sediment dredged from channel deepening in the Port of Oakland. In collaboration with the Port and USACE (under its WRDA 1992 Section 204 authority to fund beneficial use projects), Montezuma has successfully recovered 2.5 million cubic yards of material. Depending on the rate of dredging needs in the San Francisco Bay-Delta area over the next 10 to 20 years, Montezuma expects to restore over 1,800 acres of historical tidal wetlands on a 3,500-acre site in San Francisco Bay-Delta with about 17 million cubic yards of sediment dredged from Bay-Delta harbors and channels.

Environmental organizations around the country can facilitate beneficial use projects in various ways. They can, for example, help identify organizations located near upcoming dredging projects that may be willing to cosponsor beneficial use projects. They also may help identify potential sources of project funding and, in some cases, provide volunteers to perform such tasks as planting grasses at marsh restoration sites. The Chesapeake Bay Foundation and the National Audubon Society are examples of such environmental organizations. Audubon, for example, has used the fact that more than 70 percent of the colonial nesting birds on the Atlantic Seaboard use dredged material islands for nesting in developing its sponsored refuges. Project sponsors may want to consider enlisting the support of such organizations in project planning and construction.

The creation or maintenance of recreational sites is one of the most prevalent beneficial uses of dredged material.

Local and State Parks Departments

The creation or maintenance of recreational sites is one of the most prevalent beneficial uses of dredged material. In beach nourishment projects, for example, dredged material is used to supply sediment to beaches subject to erosion. Many other recreational sites, such as riverside picnic areas, water parks, and marinas, have been built, both by USACE and private sponsors, using dredged material, particularly along the upper Mississippi River and its tributaries. In the Great Lakes region, parks, marinas, fishing piers, and other recreation facilities have been built using dredged material. Dredging projects in coastal and riverine areas have high potential for use in shoreline recreation development such as swimming beaches, boat-launching ramps, and fishing piers. When areas are large enough, campgrounds, marinas, outdoor sport facilities, and hiking and nature trail systems may be constructed.

Many factors influence the use of dredged material placement sites for recreation. Potential project sponsors must consider the local or regional demand and need for recreational facilities, the interest and capability of local sponsors to participate in development and operation, and available access. Recreational uses of dredged material tend to be heavily dependent on acquiring local funding. The innovative funding opportunities discussed in Section 5.3 may be particularly useful for recreational projects.

In pursuing recreation-related uses of dredged material, project sponsors should contact local and regional planning agencies for information about public needs for recreational facilities. The local office of the National Park Service also may be a good source of information.

State Highway Departments

Dredgers seeking project partners for beneficial use of their material should consider state highway departments as potential participants. Dredged material has been used for sanding roads in some areas of the country. For example, USACE dredging operations in the upper Missis-

sippi River region have supplied material for this purpose. Many types of dredged material are also suitable for use in road construction and maintenance.

Solid Waste Management Departments

State and local government solid waste management departments are experiencing increasing difficulty in siting and operating environmentally sound solid waste disposal operations. Most of this country's solid waste is ultimately placed on land in sanitary landfills. The location of a sanitary landfill is often constrained by cover material requirements and availability, and the site characteristics related to potential adverse environmental impact. In many instances, dredged material can be used as a daily, interim, or permanent cover material, allowing location of sanitary landfills at sites previously considered unsuitable due to the lack or high cost of native cover soil (USACE 1987). USACE operations in the St. Paul (Minnesota) and Mobile (Alabama) Districts have both supplied suitable dredged material as capping for urban landfills, as has the Port of Oakland (California).

State Nonregulatory Agencies

Some state governments include nonregulatory agencies whose mission is natural resource conservation and enhancement. The California Coastal Conservancy is one example of such an agency. As the primary local sponsor, along with USACE, the Coastal Conservancy has played a key role in tying together USACE's dredging activities at the Port of Oakland with the Sonoma Baylands tidal land restoration project in the northern part of San Francisco Bay. Through the Coastal Conservancy's organizational efforts and 25 percent share of project financing, the Sonoma Baylands project put dredged material to beneficial use.

3.3 Beneficial Use Project Facilitators

Several other federal, state, and local government agencies and private organizations play a role in designing, reviewing, implementing, and regulating beneficial use project activities. Experience gained from many beneficial use projects indicates the prudence of assembling all project participants—be they other sponsors, regulatory agencies, funding sources, or public representatives—into a cohesive, participatory team as early as possible. These projects invariably require solving technical issues, accommodating environmental interests, and revising public perceptions. These tasks can be accomplished only by involving all interested parties in project design from the earliest stages. This section identifies specific agencies and organizations that can significantly contribute to project success.

Local Beneficial Use Planning Groups

Dredging project sponsors seeking potential partners, or parties needing dredged material, should first determine whether there is a "local beneficial use planning group" in the area. In some areas where large-scale dredging projects are underway or proposed, various federal, state, and local agencies have developed these formal or informal groups, which can act as planning groups and clearinghouses of information about applicable dredging policies, upcoming dredging projects, and timing and volumes of dredged material expected to become available. USACE and EPA, as well as federal and state resource management agencies and port authorities, are typically represented in these groups. The National Dredging Team, a federal interagency team, prepared a planning guidance document on formation of local planning groups to assist in the development of dredged material management plans. The guidance is called "Local Planning Groups and Development of Dredged Material Management Plans" (NDT 1998), and can be found at ***http://www.epa.gov/owow/oceans/ndt***.

Local beneficial use planning groups act as clearinghouses of information about applicable dredging policies, upcoming projects, and timing and volumes of dredged material expected to become available.

Although beneficial use planning groups do not sponsor beneficial use projects, they can provide a central source of much useful information. USACE District offices, EPA Regional offices, state agencies (such as departments of environmental protection, environmental conservation, or natural resources), coastal zone management offices, local dredged material planning groups, Regional Dredging Teams, and the NDT can provide information about the existence of such groups in any particular area of the country.

There are several examples of local planning groups. For example, a Beneficial Uses Workgroup in the Puget Sound region of Washington has researched the area's applicable federal and state dredging policies (including information on potentially available dredged material) and has provided a forum for encouraging and coordinating beneficial use projects. In the Galveston Bay region of Texas, a beneficial use planning group consisting of five federal, two state, and one local agency assisted in obtaining USACE approval for using material dredged from the Houston-Galveston navigation channels for a variety of beneficial purposes during the project's 50-year life span.

Similar groups in the San Francisco Bay and Chesapeake Bay regions provide useful information about beneficial use activities and opportunities in those areas. In the San Francisco Bay area, federal and state agencies have developed a long-term management strategy (LTMS) for dredged material. The LTMS plan established a beneficial use goal of 40 percent of the average 4-6 million cubic yards of material dredged in the area annually. Several regional-scale use projects to restore or enhance tidal wetlands and other aquatic habitats have already begun, including projects to use over 40 million cubic yards of dredged material to restore over 4,000 acres of tidal wetlands during the next 10 years. In the Chesapeake Bay region, a number of agencies and organizations,

Dredging operations in Port of Oakland, California (*Photo by Port of Oakland*).

including the Maryland Port Administration, USFWS, and the Chesapeake Bay Foundation, have formed a consortium to restore Poplar Island, a rapidly eroding island in Chesapeake Bay, using material dredged from Bay channels serving the Port of Baltimore (see the box on page 27 for a project description). Although this consortium is not designated as a beneficial uses group per se, it is seeking to use dredged material for other beneficial use projects.

Environmental Protection Agency

EPA has a number of roles in beneficial use projects. Federal statutes give EPA an oversight responsibility to ensure that dredged material excavated from the nation's waters is disposed of in compliance with the CWA Section 404(b)(1) guidelines (where applicable) or with ocean dumping criteria (where applicable). To achieve that goal, EPA provides technical advice, as well as environmental review. CWA Section 404(c) authorizes EPA to "veto" or prevent USACE permits under certain circumstances. Proposed permits and USACE dredging projects for ocean dumping of dredged material are subject to EPA review and concurrence under the MPRSA. On a case-by-case basis, EPA can exercise its formal authority to review and comment on NEPA analyses and other documentation prepared by USACE.

EPA staff normally participate in beneficial use projects by collaborating with USACE, project sponsors, and other interested parties as part of the planning team that designs and implements the projects. Regional office staff contribute valuable guidance on the technical aspects of dredging

alternatives analysis and monitoring. EPA participates in the process by identifying, for example, project design modifications, permit conditions, or management restrictions to meet the compliance obligations of the CWA. EPA also has contributed funding to some beneficial use projects through programs such as the National Estuary Program (NEP). For example, EPA Region 9 provided a grant to California to pay for monitoring of the Sonoma Baylands project in San Francisco Bay. Along with USACE District personnel, EPA staff in the closest regional office can provide information regarding other regulatory or advisory agencies that should be involved in beneficial use projects. Project sponsors should always contact and involve EPA regional office staff as early as possible in project planning.

EPA regional office staff also have increasingly important opportunities to pursue new beneficial use options. For example, EPA staff working on water sediment and dredged material disposal issues can help bring prospective beneficial use project partners together with USACE and other dredgers that have available material. By interacting with other local EPA staff, they also may be able to identify other beneficial use opportunities, for example, the use of dredged material for capping in Superfund projects. In collaboration with USACE District office staff and other regional participants, EPA staff can help facilitate beneficial use projects by maintaining a current inventory of mitigation projects that periodically require dredged material. This inventory will enable prospective project sponsors to determine the volume, quality, and timing of dredged material that will become available. EPA staff also can advise project partners on the most expeditious way to comply with applicable regulatory requirements.

Federal Natural Resource Agencies

USFWS and NOAA Fisheries are often involved in beneficial use projects. USFWS's mission is to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. NOAA Fisheries' charge is similar, but with an emphasis on marine resources. These agencies ensure that dredging projects do not unduly harm the resources under their jurisdiction and comply with laws under their jurisdiction, such as the Endangered Species Act, Magnuson Stevens Act, and the Fish and Wildlife Coordination Act. In doing so, these agencies often play an important role in choosing a beneficial use site and identifying appropriate uses on a programmatic and case-by-case basis. They may also participate in a sponsorship role when the dredging project creates new environmental resources. For instance, USFWS might seek to protect fish and shellfish habitat or to participate in the design of new habitat. Likewise, NOAA Fisheries may pursue protecting wetlands as part of project planning while striving to create new wetlands and marsh areas by using dredged material.

Federal natural resource agency personnel normally have extensive knowledge of and contacts with dredgers and those who may use the dredged material beneficially around their regions.

Like USACE and EPA regional office staff, these federal resource agency personnel normally have extensive knowledge of and contacts with dredgers and those who may be able to use dredged material beneficially in their regions. By using these contacts to bring dredgers together with those who could use the material beneficially, USFWS and NOAA Fisheries staff can foster beneficial use projects in their regions that could result in projects that provide added benefits to threatened, endangered, and harvested species such as improved or additional nesting, roosting, resting or feeding habitat for birds, fish, and marine mammals.

State Environmental and Natural Resource Agencies

Many states have a central agency charged with environmental protection. Although these organizations' responsibilities differ by state, they generally involve an expansive, multimedia environmental protection mission analogous to that of EPA on the federal level. Most, if not all, states also have separate agencies to protect and manage natural resources, including state-owned land, wildlife, and habitat. These state agencies, like their federal counterparts, normally exercise considerable influence on the shape and ultimate success of beneficial use projects. Moreover, under the Fish and Wildlife Coordination Act federal agencies are required to consult and consider the views of state fish and wildlife agencies in federal agency decisions. The state agencies may also participate both as regulators and as indirect sponsors of beneficial use projects. They have an important role in project planning, often contributing technical guidance, to ensure that the environmental requirements under their jurisdictions are fully met. In some instances, parties interested in using dredged material beneficially must gain these agencies' concurrence on project design. Depending on the nature of the project and available funds, state agencies in some cases have paid for certain phases of projects, such as monitoring of project performance.

In general, states, by constitutional or other legal authority, own the land underlying the lakes, rivers, and other navigable waterways within the state. Together with their natural resource responsibilities, the states exercise an important responsibility to ensure that beneficial use projects are in the overall public interest of the state.

State environmental and natural resource agencies also can play the valuable role of beneficial use project conveners. Like the similar federal agency staff, certain state agency staff have wide knowledge of dredging activities and potential beneficial uses in their states. State agency staff can use this knowledge to encourage and facilitate beneficial use projects.

Coastal Zone Review Agencies

The Coastal Zone Management Act authorizes states to establish coastal zone management plans. The CZMA requires that each federal agency

activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner that is consistent to the maximum extent practicable with the enforceable policies of approved state management programs. Furthermore, private parties seeking a federal permit for activities affecting land or water uses in a state's coastal zone are required to obtain certification that the proposed activity will be consistent with the state's plan. Sponsors of beneficial use projects in the coastal zone will, therefore, need to coordinate with the pertinent state-level coastal zone review agencies. The regulatory authority of the CZMA is much like the authority provided to states under Section 401 of the CWA in that the state exercises an approval authority for activities undertaken in jurisdictional coastal zones based on specified statutory considerations. State coastal zone plans often include special management areas where certain types of activities are either encouraged or discouraged. Advantage can be gained by engaging the coastal zone management agency early in the beneficial use project planning process to ensure that the project will be consistent with the state's coastal zone management plan.

Native American Tribes

Native American tribes are frequent participants in beneficial use project planning and implementation. Native American interests can vary from economic development/commercial interests associated with ports to the preservation or development of fish or bird habitat and the preservation of historic properties and cultural resources. Like the agencies mentioned previously, tribal representatives can contribute useful technical guidance to project planning. Within reservation boundaries, tribes also own dredged material from river-bed lands and can become involved with CWA Section 404 permitting and natural resource damage assessments on their usual and accustomed fishing grounds. Natural resource damage assessments may be a source of some beneficial use projects for tribes.

The Federal Government has a unique trust responsibility to federally recognized tribes. This responsibility is legally based on treaties, statutes, executive orders, Supreme Court decisions, and the historical relations between the United States and the tribes. Existing U.S. Indian law obligates the Federal Government to recognize the tribes' special status as sovereign, dependent nations. Government-to-government consultation with tribes is expected to occur during the earliest phases of federal projects that may impact tribe economies, cultures, health, or environment.

Pre-decisional consultation is an important aspect of Section 106 of the National Historic Preservation Act (NHPA). 36 C.F.R. Part 800 clearly specifies tribal roles in the Section 106 decision-making process. The State Historic Preservation Officer (SHPO) may also play a role in Section 106 consultation, as may the Advisory Council on Historic Preserva-

tion. Although the SHPO may be involved in the Section 106 process, the NHPA regulations specifically identify circumstances in which federal consultation with tribes must occur to meet the unique responsibilities of the trust relationship. Note that the trust relationship exists solely between federally recognized tribes and the Federal Government. It does not apply to state or local governments, nor does it apply to applicants. Trust responsibility cannot be delegated.

4

Beneficial Uses in the Context of Watershed Planning and Regional Sediment Management

Linking dredged material placement needs with beneficial uses can be most practical, cost-effective, and environmentally advantageous when beneficial use planning is integrated with watershed planning processes and regional strategies for managing sediment resources. In such efforts, beneficial use of dredged material is a management tool that supports watershed and other regional goals. This chapter provides an overview of identifying and selecting beneficial use projects within this broader context.

Dredged material management and beneficial use can be integrated into watershed planning by applying the principles of pollution prevention, strategic resource management, and industrial ecology. Understanding the links between these principles and beneficial use within the context of watershed-wide processes can lead to more effective sediment management. Applying a watershed or regional sediment management approach places dredged material (and beneficial use planning) within larger system goals, such as looking upstream to reduce the amount of sediment to be dredged downstream or understanding the implications of removing sediment from a system, and can make use of watershed planning tools such as mitigation banking.

4.1 From Pollution Control to Industrial Ecology

Over the past few decades, environmental policy at federal and state levels has begun to replace the historic focus on end-of-pipe pollution control with an emphasis on pollution prevention, strategic resource management, and industrial ecology. These evolving concepts of pollution control can have implications for resource management and can be applicable to dredged material management.

Pollution Prevention

Historically, regulators sought to control industrial pollution at the point of discharge by imposing "end-of-pipe" effluent limits or requiring particular treatment or disposal technologies. Today, environmental leaders in both government and industry recognize the importance of pollution prevention to avoid depending solely on an after-the-fact pollution control approach. They are increasingly focused on avoiding initial pollution generation from both point and nonpoint sources. Pollution prevention is often a more efficient, more effective, and safer means of protecting the environment than relying solely on pollution control.

Pollution prevention has developed primarily in an industrial context, where it involves several related activities, including:

- substituting or conserving material (changing the inputs used);
- redesigning or substituting equipment (changing the process used); and
- improving operation, maintenance, training, and controls (changing operational practices).

These activities enable industry to produce a given level of output with less pollution, often at lower cost. For dredged material management, reduction of sediment volumes entering the navigational channels can decrease the need to dredge. Efforts could focus on reducing losses of sediment from the landscape, stream banks, and other sources that

result in sediment transport and accumulation in harbors and waterways. Beneficial use of dredged material also results in less dredged material being disposed in the marine environment and can play an integral role in pollution prevention.

Strategic Resource Management

Though initially conceived with reference to chemicals, energy, water, and process inputs used by industry, pollution prevention is becoming more widely applied in other contexts as well. Sometimes referred to as strategic resource management, this approach emphasizes greater efficiency in resource use to reduce needs for raw materials. Examples include recycling paper, glass, metal, plastics, and other material; searching for improved energy efficiency in both production and consumption; and applying low-pesticide farming techniques. By recognizing dredged material as a resource, beneficial use results in a more efficient use of sediment. Integrating dredged material management and beneficial use into watershed and sediment system planning can help keep sediment in the system when needed, or reduce the loss or accessibility of the material when it is placed in remote disposal facilities.

Industrial Ecology

The concept of industrial ecology is a particularly promising offshoot of the strategic resource management perspective. Industrial ecology suggests that industry can be usefully viewed as analogous to an ecosystem—as an interwoven web of production and consumption in which the by-product of every organism (and industrial process) is a potential source of material and energy for other organisms (and industrial processes). By including plants and firms within a geographic region, industry, or other system, industrial ecology broadens the search for pollution prevention and strategic resource management opportunities beyond the individual industrial plant or firm. Industrial ecology seeks to find markets for the productive use of by-products, such as dredged material, rather than viewing them as waste requiring treatment or disposal. Matching available dredged material with sediment needs can foster productive use of the dredged sediments. Discussion of dredged material availability and suitability across a range of regional projects supports a strategic, lifecycle approach to dredged material management. This strategic approach can include economic development and environmental management factors. Such strategies may help develop markets for dredged material use, and promote efficient use of sediment resources that may be scarce in some regions.

Industrial ecology seeks to find markets for the productive use of by-products, such as dredged material, rather than viewing them as waste requiring treatment or disposal.

Implications for Dredged Material Management

The principles of pollution prevention, strategic resource management, and industrial ecology are relevant to managing dredged material. Pollution prevention emphasizes reducing the volume of material that must be dredged. USACE and EPA are coordinating with other federal

agencies, particularly the U.S. Coast Guard and the Maritime Administration, and the private sector, to reduce the need for dredging. Measures include using shallower lanes for inbound traffic at export-oriented ports, improving vessel traffic control to more efficiently allocate use of deep channels, using ship simulators to assist in the design of more efficient channels, real-time reporting of water level depths to optimize the use of existing channel depths, and controlling nonpoint source sediment loadings that contribute to siltation.

Strategic resource management and industrial ecology also support beneficial uses. From the viewpoint of the generator (dredging entity), dredged material is not necessarily waste to be disposed of at increasingly high cost. Instead, it is a product that can be sold or potentially given away. From the standpoint of someone who needs sediment, dredged material is a potentially attractive alternative to mining new, more costly material. From a watershed perspective, keeping soils where they benefit ecosystems and economic development results in more efficient resource use, lower costs, and reduced environmental impacts.

The application of these principles to dredged material management primarily seeks to reduce the volume of material to be dredged, but also emphasizes beneficially using the products of dredging as resources. Managers and regulators should also keep in mind the implications of removing sediment from a system. Removing sediment from a system can cause a shift in the sediment system balance and exacerbate streambed erosion, coastal shore erosion, and other processes dependent upon sediment resource availability in a system.

4.2 Watershed and Sediment System Approaches to Planning and Management

Federal and state regulatory and natural resource management agencies recently have recognized the advantages of more integrated, comprehensive approaches to protecting and restoring environmental resources.

Historically, the regulated community has faced multiple federal, state, and local regulations that separately, and sometimes inconsistently, impose environmental requirements on a given activity, such as siting a facility, developing property, or managing industrial emissions. This piecemeal system is a product of laws that were crafted to protect a particular environmental medium (e.g., water, air, soil) or resource (e.g., fish, wildlife, wetlands), address a particular environmental concern, or apply to a particular geographic area, often without reference to possible effects on other interrelated media, resources, concerns, or regions. The differing orientations of these laws often have led the associated federal and state environmental protection and natural resource management agencies to develop distinctive cultures, priorities, constituencies, and ways of operating. The result is fragmentation—overlaps, gaps, and inconsistencies in regulatory coverage and approach that may greatly complicate public and private decision making as the various government agencies and members of the regulated community struggle to resolve cross-cutting issues.

Federal and state regulatory and natural resource management agencies recently have recognized the advantages of more integrated, comprehensive approaches to protecting, restoring, and managing environmental resources. These integrated approaches involve greater emphasis on agency coordination across all levels and more attention to interrelationships of watershed or other system-wide processes and issues. For example, EPA and state water resource management agencies are emphasizing broader-based and coordinated management of all sources of water pollution, including diffuse nonpoint sources, rather than focusing only on specific industrial or municipal sources in isolation. They are placing priority on better sharing of information and on developing strategies that cut across agencies. Examples of the trend toward more watershed-wide planning that are relevant to beneficial use proponents include the watershed approach, the regional sediment management approach, and mitigation banking.

The Watershed Approach

Since passage of the Federal Water Pollution Control Act (Clean Water Act) in 1972, our nation has made great strides in protecting and restoring the water quality in our aquatic ecosystems. Since the mid-1990s, EPA has joined with other stakeholders to nationally promote the use of a watershed approach. A watershed approach is a broad coordinating process focusing on priority water resource problems to achieve watershed-specific environmental goals. Developing appropriate watershed approaches that focus on environmental priorities is a process that allows stakeholders to accomplish more through collaboration than each can do with its own limited resources.

A watershed is a geographic area of land in which water, sediments, and other suspended and dissolved material drain to a common body of water, such as a lake, river, wetland, bay, estuary, or ultimately an ocean. A watershed approach is hydrologically focused, involves all stakeholders, and strategically addresses priority environmental goals. These goals should ultimately protect and restore the health of the nation's aquatic resources, which includes but goes beyond meeting water quality standards.

A watershed approach may include the following key elements:

- Focus on hydrologically-defined areas.
- Use of an integrated set of tools and programs to address problems.
- Involvement of all stakeholders.
- Use of an iterative planning or adaptive management process to address priority water goals.
- Breaking down barriers between plan development and implementation.

A watershed approach is hydrologically focused, involves all stakeholders, and strategically addresses priority environmental goals.

A watershed approach is a process that can be applied to any environmental goal in any watershed, including beneficial use of dredged material.

Integrating the beneficial use of dredged material into watershed approaches can support priority environmental goals such as habitat restoration and pollutant management. Applying a watershed approach may improve the health of wetlands, coastal ecosystems, and marine waters, and may also address pollutants such as clean sediments. A watershed approach can consider discharges and receiving waters, but it can also integrate land-based activities that affect water quality and quantity. It may also address issues such as navigation, flood control, and recreation. Because of the variety of possible issues, stakeholder participation may include both land management and water resource agencies, as well as other diverse groups such as industry and business, community groups, and academia. The National Estuary Program (NEP) is a good example of successful application of a watershed approach because it involves a wide range of stakeholders. Established under Clean Water Act Section 320, it is an EPA flagship community-based watershed program. One NEP, the Puget Sound Action Team, has built partnerships with stakeholders such as the Washington State Department of Natural Resources for the purpose of characterizing clean sediment dredged from navigational channels for use in potential beneficial use projects such as wetland restoration.

Regional Sediment Management

Similar to applying a watershed approach, sediment system-based planning and management provides a regional strategy for managing sediment resources. Often called regional sediment management, this approach addresses sediment-related issues within a regional context. Regional sediment management uses the sediment system as a context for recommending projects and activities involving sediments; it also links sediment sources with regional sediment needs. This can help balance needs for keeping sediment in the system with concerns about excess sediment, while also promoting the beneficial use of dredged material (Martin 2002).

Regional sediment management attempts to "design with nature" by using knowledge of both sediment movement in a region, and the interrelationships of projects and management actions. The concept of regional sediment management originated in the notion of coordinating USACE dredging activities in coastal systems (e.g., navigation maintenance, beach nourishment, and habitat restoration) to foster balanced, natural system processes, and to reduce project costs. The concept is applicable to any sediment system; regional sediment management approaches are being applied in riverine, estuarine and coastal systems. The regions are defined by sediment systems, which are used for planning purposes. Consideration is given to sources, sinks, timing, direction, quantity, and quality of sediment, as well as identification of factors influencing each of these characteristics.

Application of this approach encourages consideration of the range of activities affecting transport, erosion, removal, and deposition of sediment in a region, such as:

- Dredging and placement to maintain navigation depth or reservoir capacity.
- Building structures that divert, trap, or interrupt sediment flows.
- Erosion protection structures for riverbanks, shorelines, seabeds, and channel bottoms.
- Habitat restoration and protection.
- Sand and gravel mining for construction or other purposes.

Regional sediment management uses the sediment system as a context for recommending projects and activities involving sediments; it also links sediment sources with regional sediment needs.

Development of regional sediment management strategies uses knowledge about the sediment system and the range of activities affecting it to inform local project decisions and future planning. Partnerships and collaborations across agencies, levels of government, and the private sector are key to implementing projects that balance the many sediment objectives resulting from the wide range of sediment interests and competing demands for sediment resources. Regional sediment management strategies match the variety of needs for sediment with anticipated sediment resources available from dredging waterways and harbors.

Regional sediment management strategies often seek to keep sediment in the system. Strategies consider lifecycle and system implications of beneficial uses that remove sediment from the system (e.g., construction materials, capping, top soil, or upland habitat restoration). In some cases beneficial uses that result in sediment being removed from the system may produce short term benefits, but may also produce undesirable consequences or lost opportunities in the long term. In other cases system dynamics are such that there are no anticipated adverse affects. In each instance the balance of the sediment system is considered relative to multiple sediment management objectives.

Mitigation Banking

Another application of the watershed approach is the identification, development, and "banking" of environmental resources within the watershed or ecosystem for subsequent use in offsetting impacts of development at another site within the same watershed or ecosystem. The practice of "mitigation banking" has been increasingly applied in the area of wetlands protection. Chapter 7 and the footnotes in this section provide additional references on mitigation banking for wetlands.

Under the CWA Section 404 permit program, USACE and EPA have established a three-step overarching sequence for mitigating the environmental effects of discharging dredged or fill material to wetlands and other surface waters:

1. ***Avoidance.*** Applicants must first demonstrate that there are no practicable alternatives to the proposed discharge that would have less

adverse effect on the aquatic ecosystem (when the alternative does not have other significant environmental consequences).

2. ***Minimization.*** All appropriate and practicable steps to minimize adverse impacts must be taken, for example, through project reconfiguration.
3. ***Compensatory Mitigation.*** For unavoidable adverse impacts that remain after minimization, appropriate and practicable compensatory mitigation (e.g., wetlands restoration or creation) is required.

As a result of applying this sequence, compensatory mitigation has become a common requirement of nearshore development that affects wetlands. EPA, USACE, and other federal agencies have provided specific guidance for how mitigation banking can be used to satisfy CWA Section 404 and other mitigation requirements.[9]

In cases where on-site mitigation (at the same site as the development) is not feasible (perhaps because the development project is small or the project site is in a location not amenable to mitigation), mitigation banking has become a vehicle for facilitating off-site mitigation. It involves restoring, creating, or enhancing wetlands within a watershed, generally in advance of a specific development proposal, and using the resulting bank as a source when compensatory mitigation is required for approval of a Section 404 permit elsewhere in the watershed.

Mitigation banks are established when a public or private entity restores or creates wetlands for the purpose of providing mitigation to offset unavoidable wetland losses in advance of development actions. Mitigation banks typically involve the consolidation of small, fragmented wetland mitigation projects into larger contiguous sites that can be designed to be more beneficial to the environment. Units of restored or created wetlands are expressed as "credits" that may subsequently be withdrawn to offset wetland losses incurred at the project development site. Mitigation banking incorporates a watershed-wide perspective by recognizing that mitigation can often be more effectively provided at the watershed level than on a site-by-site basis.

In addition to mitigation banking, regulatory and natural resource management agencies are also experimenting with other less formal trading of environmental resources. For example, there is increased emphasis on trading public and private lands to create larger contiguous parcels where resource protection has greater overall value than on more numerous small and isolated parcels. In one case, federal land management agencies are seeking to exchange other federal lands for private holdings in ecologically sensitive locations. There is also increased emphasis on encouraging development projects to engage in

[9] The "Federal Guidance for the Establishment, Use and Operation of Mitigation Banks" (60 FR 58605, November 28, 1995) is available at ***http://www.epa.gov/owow/wetlands/guidance/mitbankn.html***. This interagency guidance clarifies the use of mitigation banks to offset impacts to wetlands and other aquatic resources authorized under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Additional references on compensatory mitigation banking are available at ***http://www.epa.gov/wetlandsmitigation/***.

compensatory environmental projects, such as including wildlife or recreational amenities, even where not explicitly required by regulation.

Implications for Beneficial Use Projects

Increasing the use of the watershed approach, regional sediment management, mitigation banking, and other similar integrated planning approaches creates a climate conducive to beneficial use projects. Such efforts will make dredged material generators more aware of beneficial use opportunities, those needing sediment for restoration or other purposes more aware of dredged material as a resource, and regulators and resource managers more likely to support and foster the necessary linkage. Individual dredging or development projects or activities that could beneficially use dredged material may be best evaluated and implemented in a watershed and regional sediment context, rather than in isolation.

Another positive effect of the trend towards watershed and sediment system-wide planning and management is that, once identified in these broader plans, beneficial use projects are more easily implemented. As federal, state, and local resource agencies develop more experience working together, it should be easier for beneficial use project sponsors to work with these agencies on issues that cut across jurisdictions.

Additionally, certain types of mitigation banking and other resource trading practices may create increased opportunities for beneficial uses of dredged material in wetlands creation, restoration, and enhancement, and in the creation of other environmental amenities.

As federal, state, and local resource agencies develop more experience working together, it should be easier for beneficial use project sponsors to work with these agencies on issues that cut across jurisdictions.

4.3 Decision-making Process

As discussed in Chapter 3, beneficial use project participants include organizations and persons performing at least four roles:

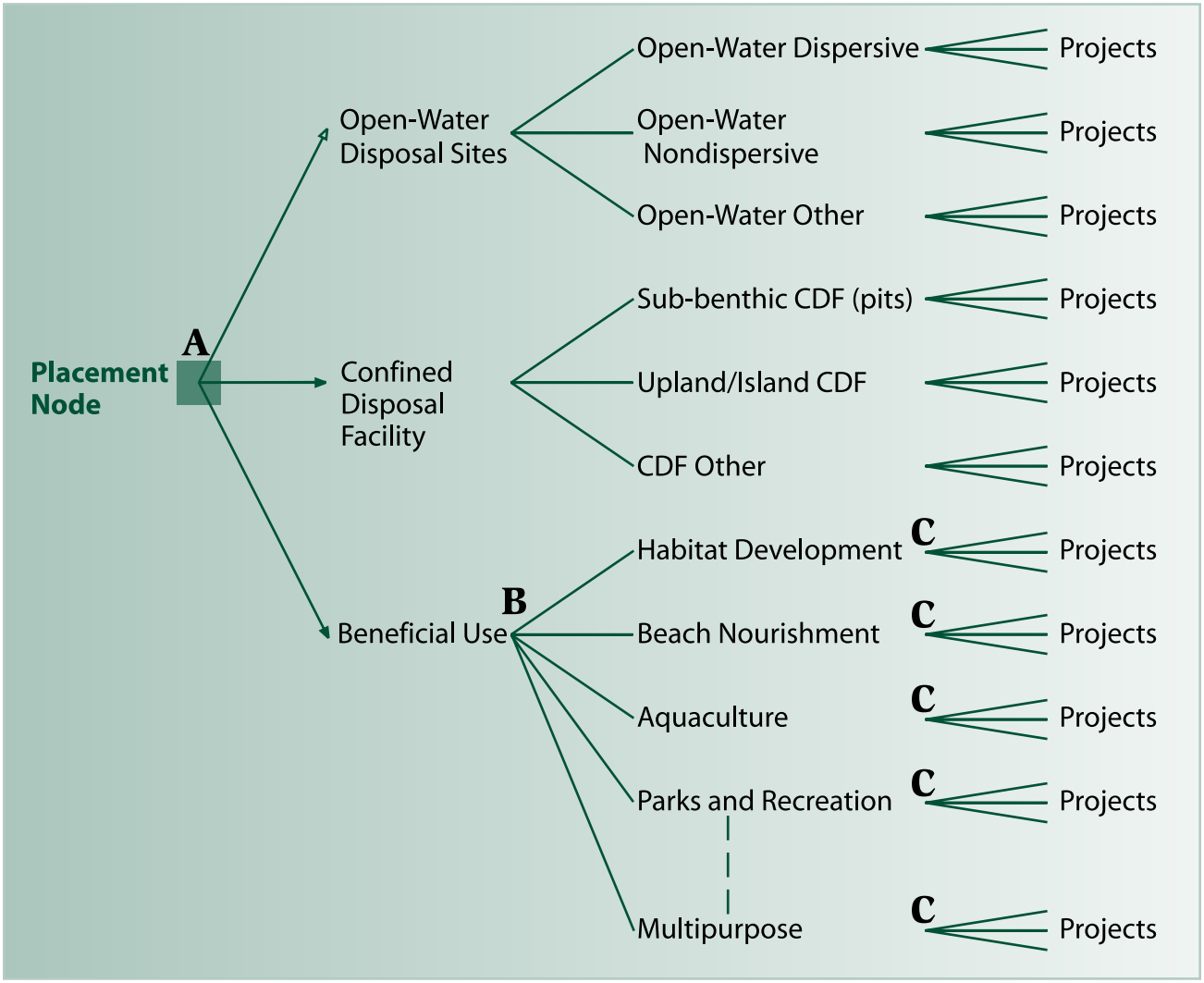
- ***The Dredged Material Generator:*** often USACE, in connection with construction or maintenance of Civil Works projects, or a federal, state, local, or private organization.
- ***The Regulators of Dredged Material Placement:*** primarily USACE, as well as EPA and state regulatory agencies. Local authorities may also have a role.
- ***The Beneficial Use Project Sponsor:*** often USACE; another federal, state, local, or private organization; or a combination.
- ***Interested Parties:*** federal, state, and local environmental protection and natural resource management agencies, public interest groups, local residents, and others.

This section is intended to assist all participants in identifying and evaluating beneficial use options for managing dredged material resulting from a given dredging project. Keep in mind that processes already in place (e.g., National Estuary Programs, Local Planning Groups) may

assist, and be used, in decision making and involving interested parties. As illustrated in Figure 4.1, choosing dredged material management options involves several fundamental decisions:

- whether to manage the dredged material by open-water disposal, confined disposal, or a beneficial use (Decision Node A);
- which type of beneficial use to choose if this management option is chosen (Decision Node B); and
- which specific project to choose if the material is to be managed by a particular type of beneficial use (Decision Nodes C).

Figure 4.1 Decisions to Make in Choosing Dredged Material Management Options[10]



[10] This process can be iterative. For example, project participants may decide to manage dredged material through placement for a beneficial use (Decision Node A). However, after determining the type of beneficial use and the specific project for this type of beneficial use (Decision Nodes B and C) project participants may decide to investigate other options, including other projects (Decision Node C), other types of beneficial uses (Decision Node B), or even other placement alternatives (Decision Node A).

The remainder of this chapter is intended to help participants determine which categories of beneficial uses may be applicable, to identify or devise specific projects within the applicable categories, and to compare alternatives across beneficial use types (Decision Node B) and projects (Decision Nodes C). This guidance is not intended to directly assist in comparing beneficial use options with open-water or confined-disposal options (Decision Node A). Applying the guidance in this manual should provide information that is necessary to make comparisons among beneficial use types (Decision Node B) and potential beneficial use projects (Decision Nodes C).

Beneficial use opportunities are identified in a process that involves all relevant stakeholders. Within the authorities established by the statutory framework, active stakeholder participation in the decision-making process is strongly encouraged. All stakeholders should be involved in developing a preferred alternative.

4.4 Evaluation Criteria

Chapter 2 and the previous sections of this chapter present pertinent information and general guidance to help project partners narrow the field of potential beneficial uses to relatively few site-specific project alternatives. Once project partners have identified feasible beneficial use alternatives to disposal, the first step in choosing a beneficial use option is to specify criteria for evaluating each alternative. Criteria are sometimes referred to as goals, objectives, or attributes. Whatever the label, they are simply the considerations that will be taken into account in evaluating the alternatives. This chapter provides two approaches to identifying evaluation criteria. Under the first approach, participants use generic criteria, which are discussed here. The second approach is a five-step process that involves all the project partners and other stakeholders in collectively developing customized criteria.

Once project partners have identified feasible beneficial use alternatives to disposal, the first step in choosing a beneficial use option is to specify criteria for evaluating each alternative.

Approach No. 1: Generic Criteria

A wide range of criteria could be applied to evaluate beneficial use alternatives. Table 4.1 provides a starting point for evaluating beneficial use alternatives using generic criteria. Following are brief descriptions of each of these criteria.

- **Human and ecological benefits** could include creation, restoration, or enhancement of habitat (either directly for fisheries or wildlife, or indirectly for food web support), creation or enhancement of recreational opportunities (either active recreation or passive aesthetic enjoyment), enhancement of water quality (via sediment trapping or nutrient retention and removal), or improvement of hydrologic functions (groundwater recharge, groundwater discharge, flood storage and desynchronization flow control, and shoreline anchoring).

Table 4.1 Criteria to Apply in Evaluating Beneficial Use Alternatives

Criterion	Examples
Human Benefits	Recreation Flood protection Economic development
Ecological Benefits	Improved hydrologic functions Habitat enhancement Improved water quality
Compatibility with Estuary- or Watershed-Wide Plans/Goals	Habitat restoration Enhanced public access to water resources
Feasibility	Technical Logistical Institutional (decision process/infrastructure)
Cost	Dredging Transportation and placement Maintenance Monitoring
Availability of Funding Mechanisms (see Chapter 5)	USACE EPA Other federal agencies State agencies Local governments Public/private partnerships Private lenders/partners
Environmental Impacts	Of construction Of project, after construction
Legal Authority	Authority to take action Regulatory requirements/compliance
Public Support	Decision leaders (e.g., elected officials) Regulators Neighbors Advocacy groups Other interested parties General public
Risk	Ecological Human health Financial Schedule of project

- **Compatibility with estuary- or watershed-wide plans and goals** refers to the connections between the public or environmental benefits of the use and any specific goals established by planning authorities for the estuary or watershed where the project is sited. This criterion helps ensure integration between a specific beneficial use project and broader watershed-wide planning goals.
- **Feasibility** refers to whether the project will function as intended, whether its construction and operation are practical and implementable, and whether a decision process/infrastructure is in place to make decisions and take actions to implement the project.
- **Cost** is the money required to construct, operate, maintain, and monitor the project, net of any income from the project.
- **Availability of funding mechanisms** is the ability of participants to finance the beneficial use project. Funding mechanisms, and the need to demonstrate the cost effectiveness of beneficial uses, are discussed separately in Chapter 5.
- **Environmental impacts** are adverse effects on the environment caused by constructing and operating the beneficial use project. These potential impacts would also be identified through the NEPA process for the project and the evaluations required under other relevant statutes (e.g., Section 404 of the Clean Water Act).
- **Legal authority** is the participants' authority to take the actions necessary to successfully complete the project, including authorities to permit or otherwise authorize the project, and to fund, construct, and operate the project.
- **Public acceptance** refers to support for the project by affected stakeholders, including decision leaders, regulators, neighbors in the vicinity of the project, interested parties (such as environmental or business groups), and the general public.
- **Risk** is the uncertainty surrounding other criteria, especially public/ecological benefits, feasibility, and cost.

It may be useful to distinguish between threshold criteria, which any project must meet to be acceptable, and balancing criteria, which can be traded off against each other in evaluating alternatives if there is more than one potential project. Suggested threshold criteria are identifiable human or ecological benefits, compatibility with estuary- or watershed-wide plans and goals, legal authority, and public acceptance.

Approach No. 2: Customized Criteria

In lieu of simply using generic criteria, project participants could develop customized threshold and balancing criteria. Although more time-consuming, this approach helps integrate the identification and evaluation of beneficial use projects with whatever watershed-wide planning process has been established for the watershed. In addition, involving stakeholders (including regulatory authorities) in developing criteria is

Involving stakeholders in developing criteria is likely to improve the prospects that the alternative ultimately chosen will be implementable.

likely to improve the prospects that the alternative ultimately chosen will be implementable. The following suggested five-step process was developed by Keeney(1988).

Step 1: Seek the early involvement of pertinent stakeholders in identifying and structuring criteria. A good way to accomplish this task is to meet with all stakeholders in a common orientation session. In the session, outline the decision problem, explain the purpose of involving stakeholders and the processes by which these participants were selected, describe how the results will be used, and discuss the principles to be used for eliciting criteria and combining the results.

Step 2: Elicit criteria from stakeholder representatives. This process requires from 1 to 8 hours per stakeholder representative. First ask the representative to write down the criteria he or she believes to be important to the decision problem. Then discuss the suggestions to develop and refine the criteria.

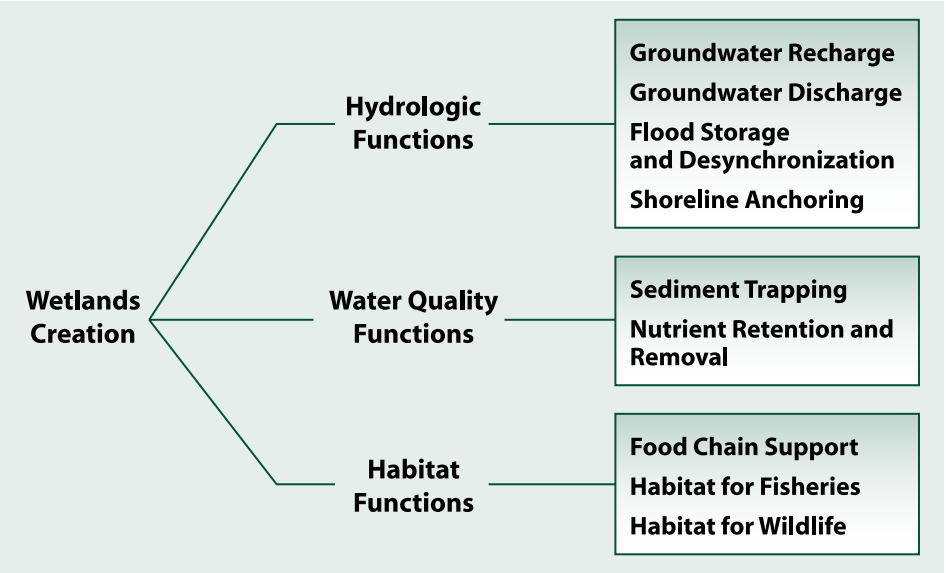
Step 3: Combine each individual stakeholder's criteria into stakeholder's own objectives hierarchy. The objectives hierarchy, which is akin to an organization chart, groups criteria into categories and subcategories at several levels of generality to facilitate understanding and refinement of criteria. Objectives hierarchies can be constructed from the top down (general to specific) or the bottom up (specific to general). In practice, one often iterates several times from bottom to top and back.

An example of part of a hypothetical objectives hierarchy for an individual stakeholder about wetlands functions is provided in Figure 4.2. In this example, at the highest level is the most general criterion: wetlands creation. This category is divided into somewhat less general objectives, in this case related to wetland functions: hydrologic, water quality, and habitat. On the right are more specific subdivisions of objectives; for example, water quality functions may include sediment trapping, and nutrient retention and removal. Similar hierarchies should be created for the other criteria of the stakeholder, which in turn should be combined into an overall hierarchy for the particular stakeholder.

Step 4. Combine the various stakeholder hierarchies into a single comprehensive hierarchy. Depending on the situation, this combination may be developed after the session using professional judgment, or negotiated through further discussion with the stakeholders. The overall goal is to capture the diversity of objectives from the individual hierarchies without allowing the integrated hierarchy to become too unwieldy. The selection of a preferred alternative as a single comprehensive hierarchy based on the consensus of all stakeholders is strongly encouraged.

Step 5. Hold a review meeting with the stakeholders. At this meeting, project partners and stakeholders should review the combined hierarchy to minimize potential misinterpretations and to refine the final product.

Figure 4.2 Hypothetical Objectives Hierarchy for Ecological Benefits of Wetlands Creation



4.5 Qualitative Evaluation

Having identified the applicable criteria by either a generic or customized approach, interested parties can evaluate and compare the beneficial use options available. If the number of alternatives under consideration is relatively small, this evaluation can probably be done qualitatively. (In more complex cases, a quantitative evaluation may be necessary.[11]) The following steps are recommended for a qualitative evaluation:

- Construct a matrix that arrays the criteria as row headings and the alternatives as column headings.
- In each cell, enter the objective data available regarding the performance of the alternative with respect to the criterion (for example, acres of wetland habitat to be created).
- If objective data are not available, attempt to assign a subjective evaluation (for example, the expected feasibility of Alternatives A and B is high, while the expected feasibility of Alternative C is medium).
- After the matrix is completed, eliminate any alternatives that do not meet threshold criteria.

[11] For additional information on quantitative evaluation, see *Social Utilities* (Edwards 1971); *How to Use Multiattribute Utility Measurement for Social Decision Making* (Edwards 1977); *Multiattribute Evaluation* (Edwards and Newman 1982); and *Decision Analysis and Behavioral Research* (von Winterfeldt and Edwards 1986).

- Of the remaining alternatives, look for any that are dominated by another alternative. For example, Alternative B will dominate Alternative A if Alternative B rates as good as or better than Alternative A on each criterion. Eliminate weaker alternatives.
- Retain the remaining alternatives for comparison with each other (and non-beneficial use alternatives) on a qualitative/judgmental basis.

4.6 Summary

Matching a dredged material disposal need with a beneficial use solution is likely to be more practical, cost-effective, and environmentally advantageous when made as part of a broad, watershed-level planning effort. This approach requires innovative collaboration at the local level to achieve implementable solutions.

Choosing a dredged material management option involves several fundamental decisions: whether to manage the dredged material by open-water disposal, confined disposal, or a beneficial use; which type of beneficial use to choose if the material is to be so managed; and which specific project to choose if the material is to be managed by a particular type of beneficial use. All these decisions can benefit from an approach that specifies evaluation criteria and systematically evaluates alternatives against the criteria. Such a process should help enrich the range of beneficial use alternatives considered, improve compatibility with watershed-wide planning goals, and enhance stakeholder acceptance of the results.

Beneficial use projects enhance economic, recreational, and ecological resources (*Photo by USACE*).

5

Funding Beneficial Use Projects

Financing beneficial use projects demands efficient—and creative—use of financial resources. This chapter describes ways beneficial use project partners can raise funds necessary for project planning, design, implementation, and monitoring. Both governmental and private funding sources and mechanisms are described in detail. Each funding mechanism is discussed in light of advantages, limitations, and potential barriers. Real-life examples of how the funding mechanisms have been applied also are included. This chapter does not discuss the basic components of public finance or provide a comprehensive inventory of financing mechanisms (e.g., taxes, fees, debt financing).[12]

[12] For reviews of standard financing mechanisms, see *Financing Marine and Estuarine Programs: A Guide to Resources* (EPA 1988); *Protecting Coastal and Wetlands Resources: A Guide for Local Governments* (Chapter 5) (EPA 1992) available at ***http://nepis.epa.gov/***; and *A Guidebook of Financial Tools: Paying for Sustainable Environmental Systems* (EPA's Environmental Financial Advisory Board and Environmental Finance Center Network 1999) available at ***http://www.epa.gov/efinpage/guidebook/guidebooktp.htm***.

Probably the most significant impediments to beneficial use projects are lack of sufficient funding and constraints imposed on the use of those funds that are available. Limited financing forces decision makers to make trade-offs among alternative environmental project investments. To avoid shortchanging a proposed beneficial use project, participants should try to maximize use of the funding authorities and alternative financial resources described in this chapter. For further detail on existing funding authorities and their application, readers can contact their local USACE District office.

Important Note:

This guidance manual includes descriptions of potential sources of funds to help finance beneficial use projects. Inclusion of the potential sources of funds does not constitute endorsement by EPA or USACE; the sources are identified here solely to aid users of this guidance manual in exploring options for financing. There may be restrictions on the use of some of the options discussed in this chapter; some options may not be available in some places or for some purposes.

5.1 USACE Funding Options Under Existing Authorities

There has been a major evolution of law and policy concerning the beneficial use of dredged material since the passage of WRDA 1986. Environmental restoration joins flood damage reduction and inland/coastal navigation as primary missions of USACE. Laws have established the authority of USACE to use dredged material for environmentally beneficial purposes, and programs have been initiated to implement these laws.

As described in Chapter 3, many new Civil Works navigation projects are designed to be multipurpose projects addressing navigation and other purposes such as ecological restoration. USACE is required to select the National Economic Development (NED) plan (or plan that reasonably maximizes net economic benefit consistent with protecting the nation's environment) for addressing the particular water resource problem unless there is some important overriding reason for choosing an alternative plan that would not maximize net economic benefit. Part of the overall NED plan addressing a particular water resource problem is the Federal Standard, or base plan, for disposal or placement. The Federal Standard is defined as the least costly dredged material disposal or placement alternative (or alternatives) consistent with sound engineering practices and meeting applicable federal environmental requirements, including those established by Section 404 of the CWA and Section 103 of the MPRSA. The Federal Standard defines the disposal or placement costs that are assigned to the "navigational purpose" of the project.

Establishing the Federal Standard for a particular dredging project is not the same as selecting a disposal or placement option for that project, nor

does it limit potential federal participation in the project. As ecosystem restoration is recognized as one of the primary missions of USACE under its planning guidance (USACE 2000), factors beyond cost contribute to decisions on placement or disposal options for dredging projects. The selected placement or disposal option should maximize the sum of economic development and national environmental restoration benefits. Therefore, a beneficial use option may be selected for a project even if it is not the Federal Standard for that project. Additionally, a project may have more than one purpose, such as navigation and flood control. The placement or disposal option preferred when two project purposes are considered jointly may be different from those resulting from separate considerations of navigation and flood control options.

If the beneficial use (e.g., environmental restoration) project is (or is part of) the Federal Standard, its costs are considered to be navigation (harbor or inland system) construction or maintenance costs and will be funded accordingly. Where the beneficial use project is not (or is not part of) the Federal Standard to accomplish the project's navigation purpose, the plan serves as a reference point for measuring the incremental costs of the beneficial use project that are attributable to the "environmental purpose."

Cost-Sharing Arrangements

If a beneficial use is selected for a project and that beneficial use happens to be (or be part of) the Federal Standard, or base plan option, for the project (because it is the least costly alternative that is consistent with sound engineering practices and meets all relevant federal environmental requirements), the costs of that beneficial use are assigned to the navigational purpose of the project and shared with the non-federal sponsor in the same manner as are other navigation construction, operations, and maintenance costs. If a beneficial use is selected for a project, and that beneficial use is not the Federal Standard option, the plan serves as a reference point for measuring the incremental costs of the beneficial use project that are attributable to the "environmental purposes." The costs for the beneficial use option are divided into two categories for the purpose of determining the federal and non-federal sharing ratios. First, the costs assigned to the navigational purpose of the project (i.e., the amount it would have cost to implement the Federal Standard option) are shared with the non-federal sponsor. Second, the costs beyond the navigational purpose costs (termed "incremental costs") are shared on a different basis, depending on the type of beneficial use. The non-federal sponsor is responsible for the entire cost of operation, maintenance, replacement, repair, and rehabilitation associated with the completed beneficial use project. For further information on who bears the costs assigned to the "navigational purpose" of a dredging project, as well as the incremental costs of a beneficial use project, refer to both Appendix B of this manual and the manual's companion document on the role of the Federal Standard (EPA/USACE 2007f).

Justifying Excessive Costs

Although the cost-sharing policy for beneficial use projects (e.g., environmental restoration) allows for reimbursement in cases where the value of land, easements, and rights-of-way exceed the 25 percent non-federal share, land values for most restoration projects should be less than 25 percent of total project costs. Environmental restoration projects that have land costs exceeding 50 percent of total cost are not recommended for implementation under USACE policy (USACE 1995b). Project sponsors should remember that the objective of USACE's program is to use dredged material to produce high-value environmental results in a cost-effective manner. High costs for project land, easements, and rights-of-way are indicators that the location of the habitat project is not efficient.

Specifics on Using Funding Authorities

The following information provides guidance on using the special authorities discussed in this chapter (USACE 1995b). These authorities are the primary authorities for financing incremental costs for beneficial use projects but other authorities that are not discussed in this chapter could be used for specific projects. Interested parties should contact their local USACE District office for more information about opportunities to use these authorities.

Section 1135, WRDA 1986 (PL 99-662), as amended by Section 202 of WRDA 1992 and Section 204 of WRDA 1996: Project Modifications for Improvement of Environment. Under this provision, USACE is authorized to modify the structures and operations of existing USACE Civil Works projects to improve the quality of the environment in the public interest. These modifications must be feasible and consistent with authorized project purposes. A non-federal cost share of 25 percent for incremental costs is required for project implementation, and the non-federal sponsor must operate, maintain, repair, rehabilitate, and replace the completed project. If the estimated federal cost of such a modification exceeds $5 million, specific Congressional authorization is required.

USACE annually requests programmatic funding for implementing Section 1135 projects. The authority has been used for ecosystem restoration projects that use material dredged from federal navigation projects. With the passage of Section 204 of WRDA 1992 (discussed in the next paragraphs) and appropriation of programmatic funds, however, USACE currently encourages use of Section 204 over Section 1135 as the primary authority for implementing projects that employ dredged material for ecosystem restoration. The federal share per project under Section 1135 is usually $5 million or less, with an annual appropriation limit of $25 million. (See the box following for an example of implementing a project under Section 1135.)

WRDA Section 1135: Calcasieu River and Pass—Marsh Creation at Sabine National Wildlife Refuge

A project in Cameron Parish, Louisiana, provides an example of the use of Section 1135 for a beneficial use project. The total cost of the project was $259,852, which included a feasibility study, plans, specifications, and construction. In this case, incremental costs were shared 75:25 between USACE and the Louisiana Department of Natural Resources. The project modification, initiated and completed in 1993, provided for pumping about 1,840,000 cubic yards of dredged material into a 240-acre site in the Sabine National Wildlife Refuge west of mile 10 of the Calcasieu River and Pass navigation project to an elevation conducive to marsh creation. Without this modification, the material would have been placed in a confined disposal area located along either side of the Calcasieu River and Pass navigation project.

Section 204, WRDA 1992 (PL 102-580) as amended by Section 207 of WRDA 1996 and Section 209 of WRDA 1999: Beneficial Uses of Dredged Material. In connection with dredging for constructing, operating, or maintaining USACE navigation projects, Section 204 authorizes USACE to carry out projects for creating, protecting, and restoring aquatic and ecologically related habitats, including wetlands. USACE may conduct projects to accomplish these types of beneficial uses if it finds that the environmental, economic, and social benefits—both monetary and non-monetary—justify the cost and that the projects would not result in environmental degradation. Section 207 of WRDA 1996, which modified Section 204 of WRDA 1992, allows selection of a disposal or placement method other than the least-cost Federal Standard option in order to achieve environmental benefits. It is primarily used for new navigation projects or for maintenance projects with large incremental costs. This section requires a specific Congressional appropriation for each project and is more applicable for larger projects.

Section 204 requires that local, non-federal entities participate in these projects along with USACE. Project implementation is contingent upon various conditions. The non-federal sponsor must enter into a cooperative agreement according to the requirements of Section 221 of the Flood Control Act of 1970 and must provide 25 percent of the construction costs of the project (in excess of dredging and dredged material placement costs), including provision of all land, easements, rights-of-way, and necessary relocations. The non-federal sponsor also must agree to pay 100 percent of the operation, maintenance, replacement, and rehabilitation costs associated with the project. For purposes of determining the 25 percent non-federal share of construction costs, those costs are limited to incremental construction costs exceeding the least-cost alternative means of placement consistent with economic, engineering, and federal environmental criteria (i.e., the Federal Standard). Section 204 establishes an annual appropriation limit of $15 million. (See the following box for examples of Section 204 projects.)

WRDA Section 204 Projects

Barataria Bay Waterway, Grand Terre, Louisiana. This project was completed in 1996 and provided for the placement of approximately 850,000 cubic yards of dredged material on the gulf side of West Grand Terre Island to protect approximately 125 acres of existing wetlands and to restore approximately 90 acres of wetlands and dune habitat. The total project costs charged to Section 204 were $1,133,000. The non-federal sponsor was the Louisiana Department of Natural Resources.

Lower James River Oyster Reef Restoration, Virginia. Ten to fifteen oyster bars ranging in size from 5 to 10 acres have been created using Geotextile tubes filled with dredged material from the James River Navigation Channel and topped with disease-free shell material. The project was completed in 2002. The total Section 204 project costs were $915,000. The non-federal sponsor was the Virginia Marine Resources Commission.

Calcasieu River and Pass, Louisiana – Sabine National Wildlife Refuge. This project was completed in 1996 and consisted of pumping 1.3 million cubic yards of dredged material into the refuge to create/restore 244.3 acres of marsh. The total project costs charged to Section 204 were $537,312. The non-federal sponsor was the Louisiana Department of Natural Resources.

Texas Point National Wildlife Refuge, Texas. This project consisted of placing about 800,000 cubic yards of dredged material into the refuge to aid in the restoration of approximately 200 acres of saltmarsh. This work was performed in November, 2000. The total project costs charged to Section 204 were $260,000. The non-federal sponsor was the Texas General Land Office.

Section 216, Rivers and Harbors Act and Flood Control Act of 1970 (PL 91-611): Authority to Study Project Modifications. This provision authorizes review of the operation of completed projects in two situations: (1) when significantly changed physical or economic conditions make a review of such projects advisable, and (2) for improving the environmental benefits that such projects provide to society. This study authority can be used to seek specific Congressional authorization of a navigation project modification to use dredged material from the project for environmental restoration. A feasibility study under Section 216 authority would be appropriate for large-scale restoration projects whose costs are too large for the Section 204 program in light of its annual appropriation limits. The decision to seek specific authorization versus using the permanent Section 204 authority is made case by case based on coordination between USACE Major Subordinate Commands and Headquarters.

Section 145 of WRDA 1976 (PL 94-587), as amended by Section 933 of WRDA 1986, Section 207 of WRDA 1992, and Section 217 of WRDA 1999: Beach Nourishment. At the request of a state or local government, USACE is authorized to place suitable dredged material from construction and maintenance of navigation channels and inlets onto local beaches. The non-federal partner, such as the state or local government, must pay 35 percent of the incremental costs of beach nourishment. Section 217 of WRDA 1999 amended the cost share from 50:50 between non-federal and federal partners to 35 percent non-federal/65 percent federal. (See the box following for an example of a Section 145 project.)

WRDA Section 145: Jones Inlet

The Jones Inlet maintenance dredging and beach nourishment project in Nassau County, NY, is an example of a project done under Section 145 of WRDA 1976 as amended by Section 933 of WRDA 1986 and Section 217 of WRDA 1999. In 1996, approximately 458,920 cubic yards of material was dredged from Jones Inlet and placed onto the Town of Hempstead beach at Point Lookout, New York. This work was part of a periodic USACE maintenance dredging operation to alleviate buildup of shoals that create shallow depths and hazardous navigation conditions for local mariners. The placement of sand on the beach was an attempt to help counter long-term beach erosion and storm damage. The added cost of placing sand on the Town of Hempstead beach (over the least-costly suitable alternative-offshore placement) was estimated at $700,000. The costs were apportioned 50:50 between the federal and non-federal (State of New York) sponsors, as per Section 933 of WRDA 1986. A berm approximately 3,000 feet long and 100 feet wide was created on the beach.

Maintenance dredging of approximately 500,000 cubic yards from the federal channel and deposition basin with placement of the material on the beach at Point Lookout has been proposed for 2007. The maintenance dredging is estimated to cost $6 million. The beach placement is expected to cover approximately 5,100 linear feet, at a width of approximately 150 feet. Section 217 of WRDA 1999 amended from Section 207 of WRDA 1992, Section 933 of WRDA 1986, and Section 145 of WRDA 1976, contains a change in the beach nourishment cost-share percentages from 50/50 to 35 percent non-federal/65 percent federal. The incremental cost of placing sand on the beach in lieu of placing it offshore is estimated to be $650,000 for 2007. This amount would be cost-shared 35/65.

5.2 Other Provisions of Law Potentially Applicable to Beneficial Use Projects

This section identifies non-USACE government funding sources available for financing beneficial use projects. In most cases, government grants and loans represent a transfer of funds generated through fees or taxes to some other entity. Typically, these funds are provided as grants for specific types of projects; they are not to be used as general support as the recipient sees fit. Several examples of federally maintained databases containing information on federal financial assistance sources are available online. *The Catalog of Federal Domestic Assistance*, published by the U.S. Office of Management and Budget (OMB 2005) provides information on all federal assistance programs (not just financial aid) available to various entities. The website *Grants.gov* provides organizations with the ability to search for competitive grants from all grant-making federal agencies, register to receive grant notices via e-mail, and download grant applications. *The Catalog of Federal Funding for Watershed Protection* is a searchable database of federal financial assistance sources (grants, loans, cost-sharing) available to fund a variety of watershed protection projects. These funding databases and other databases are available at ***http://www.epa.gov/owow/funding/databases.html***.

Most states also have grant and loan programs that apply to beneficial use projects. For other potential funding sources, project sponsors should contact their local university and request information about programs such as Sea Grant or Extension Programs. The state government, or its department of natural resources or department of environmental

quality, can provide information about coastal zone management programs. Examples of non-USACE funding authorities are described below.

Section 307(a) of Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA or "Breaux-Johnson Act"; [PL 101-646]). This provision authorizes a federal/state task force to carry out projects for protecting, restoring, or enhancing aquatic and associated ecosystems, including projects for creating, protecting, or restoring wetlands and coastal ecosystems. Under this provision, the federal/state task force must give wetlands protection, restoration, and creation projects equal consideration with navigation, irrigation, and flood-control projects. This act establishes a program for Louisiana coastal wetlands projects, as well as a matching grant program for coastal wetlands-conservation projects by coastal states.

CWPPRA Section 307(a): Bayou La Branche Wetlands Creation Project

This project, just west of New Orleans, created approximately 254 acres of intermediate marsh and nourished an additional 87 acres with material dredged from Lake Pontchartrain. The project was completed in 1994. Over the last 12 years, the project has continued to provide an ecologically productive habitat. The CWPPRA program in Louisiana, which is overseen by an interagency task force, is extremely successful. Dedicated, stable funding is provided through an excise tax on fishing equipment and fuel taxes on motorboats and small engines. Up to 20 years of monitoring data are available for each project.

These programs and projects are funded through the Aquatic Resources Trust Fund by a U.S. Department of the Interior small-engine gasoline tax. Annually, 70 percent of the appropriations from the fund are made available to Louisiana projects, and the balance to other states. The non-Louisiana share is disbursed through National Coastal Wetlands Conservation Grants (15 percent) and the North America Wetlands Conservation Act (15 percent). USACE oversees project funding with 85 percent federal/15 percent state cost sharing for states with approved Coastal Wetlands Conservation Plans. For states without approved plans, the cost-share ratio is 75:25. Whatever the cost share, state contributions must consist of no less than 5 percent in cash. The remainder may consist of land, easements, rights-of-way, or other in-kind contributions. Federal funding for FYs 1992 through 2006 was an average of $48 million per year, for a total of $718 million over the 15-year period, plus the states' cost-share amount. USACE FY 2006 allocation was $63.1 million. (See the box above for an example of a Section 307(a) project.)

Department of the Interior, Environment, and Related Agencies Appropriations Act, 2006 (PL 109-54). Subject to the availability of annual appropriations, EPA funds, through the Targeted Watersheds Grant Program, viable watershed restoration, protection, and preservation projects. This competitive grant program supports collaborative efforts and environmental results-oriented strategies to address the country's water

resource needs. The goal of the Targeted Watersheds Grant Program is to support successful partnerships and coalitions that have completed the necessary watershed assessments and have a technically sound watershed plan ready to implement. The major focus of the program is to fund those projects that have the potential of producing quick, measurable environmental results. This program is open to any nonprofit, public or private organization. Federal funding is approved on an annual basis.

Surface Mining Control and Reclamation Act of 1977 (PL 95-87, as amended by PL 101-508). The Secretary of the Interior administers the Abandoned Mine Reclamation Fund for (1) reclaiming and restoring land and water resources adversely affected by past coal mining, and (2) acquiring land for reclamation. This fund is financed by payments from coal mine operators. Land and water eligible for reclamation expenditures from the fund are those that were mined for coal or affected by coal mining activities, and abandoned or left in an inadequate reclamation status before 1977. Reclamation priorities include restoration of land and water resources and the environment previously degraded by mining, including measures for conserving and developing soil, water, woodland, fish and wildlife, recreation resources, and agricultural productivity. Past research has demonstrated that surface mine reclamation using dredged material is feasible. However, the distance to the reclamation site and the need for soil amendments may make most dredged material reclamation projects cost prohibitive.

5.3 Other Financing Opportunities

Need for Alternative Financing Strategies

Financing beneficial use projects solely through the means just described—federal and state taxes, grants, low-interest loans, and cost-sharing programs—is becoming increasingly difficult. Increasing pressures on all government budgets and reduction or elimination of many funding sources make it imperative that alternative sources of financing be developed if beneficial use projects are to continue.

One of finance's basic premises is, "If you identify a steady, reliable source of revenues to repay the costs of building a project, then the capital to build a project will follow." Identifying the means of repayment before figuring out how to pay for construction may seem like a backwards approach, but identifying a steady stream of revenues is by far the more difficult task and should be given greatest attention.

Revenues are streams of funds collected periodically, but reliably, for services or benefits rendered. Revenues can be generated in many ways; for example, user fees, impact fees, special surcharges, and utility rates. They are ideally suited to support ongoing O&M requirements of a beneficial use project. When a revenue stream can be dedicated to pay for

O&M and debt repayment of a beneficial use project, then sources of capital can be identified and committed to the project.

Capital is usually a lump sum of funds used to build a facility or other "capital asset." Most capital (or a commitment to provide capital) arrives at the beginning of the beneficial use project and is used to construct the project. Sources of capital for a beneficial use project include the bond market or any other capital market; banks and other financial institutions such as insurance, finance, and leasing companies; and private investors such as corporations, foundations, and persons. Again, however, investors generally will not commit capital to a beneficial use project until a steady, reliable source of revenues can be dedicated to the project for debt repayment and maintenance.

Just as a diverse group of people will enjoy the opportunities provided by beneficial use projects, so too should diverse sources of funding be used to complete such projects. No single source of funds should be relied upon. The following alternative financing "menu" presents an assortment of ideas for funding beneficial use projects. The ideas are meant to be mixed, matched, and expanded, because alternative financing is an ongoing, creative process. For each financing idea, the beneficial uses that could most appropriately use such financing are listed.

Alternative Financing Ideas for Beneficial Use Applications

Idea 1: Use **State Revolving Funds** for financing public or private sector projects that enhance or protect water quality.

Description: The Clean Water State Revolving Fund (CW-SRF) was created by Congress in the 1987 amendments to the Clean Water Act. Congress intended the program to replace the long-running Construction Grants program which had provided significant funding for municipal wastewater treatment facilities. The new CW-SRF was, however, intended to do much more; Congress significantly expanded eligibilities to include a full range of nonpoint source projects, including those intended to address urban, agricultural, and other types of contaminated runoff, as well as projects included in the NEP management plans to improve these critical resources. Each state and Puerto Rico has an established and successful SRF program. SRF loans may be issued to public entities for wastewater treatment projects. Loans may be issued to public, nonprofit, or private entities for nonpoint source and estuary projects (subject to state restrictions).

All 51 SRF programs have the potential to fund a wide variety of water quality infrastructure projects. As of 2005, 37 states have funded over two billion dollars in nonpoint source and estuary projects with SRF loans. Each year, additional states begin funding nonpoint source projects.

SRF loans may be used for dredged material beneficial use projects that are specifically designed to improve water quality, as long as that activity is included in a state's approved nonpoint source management plan or an NEP's Comprehensive Conservation Management Plan. The following are examples of possible projects: using dredged material to create wetlands, including wetland mitigation banks, that are needed to improve water quality (to treat or create a barrier to nonpoint source runoff or to help treat stormwater or wastewater effluents); using dredged material to improve stream banks to prevent or reduce sedimentation and improve vegetative cover; and using dredged material to help restore natural flows to a channelized stream.

To qualify for an SRF loan, a project (other than a wastewater treatment project) must be consistent with a state's approved nonpoint source management plan or an NEP's Comprehensive Conservation Management Plan. The project must also be included on a state's CW-SRF Intended Use Plan and is subject to the state's procedures for prioritizing and choosing projects, including an evaluation of the source of repayment. Each state has its own set of procedures for evaluating the credit worthiness of a loan applicant. The source of repayment need not come directly from the project itself and there are many innovative ways to secure a source of repayment (see, e.g., *Funding Nonpoint Source Activities with Clean Water State Revolving Fund*, EPA 832-F-03-009, Nov. 2003, found at ***http://www.epa.gov/owm/cwfinance/cwsrf/final.pdf*** and other project and financing factsheets at ***http://www.epa.gov/owm/cwfinance/cwsrf/factsheets.htm***).

SRF loans are issued below market rate (0 percent to less than market rate) with repayment terms up to 20 years. The SRF requires no cash up front and does not require matching funds. In addition, significant loan repayments and interest earnings have been generated and can be used as loans to match Clean Water Act Section 319 (the Nonpoint Source Program) funded projects.

Section 319 provides funds to states to implement their nonpoint source pollution programs. These programs address a broad range of nonpoint sources, including agriculture, forestry, urban runoff, habitat modification, and physical impacts that require restoration. In recent years, the annual 319 appropriation has been about $200 million annually, and the funds have been allocated to the states in accordance with a fixed formula. States spend half of this money to implement "watershed-based plans" that they have developed to address impaired waters, and the remaining funds are used for a wide variety of activities including demonstration projects, technical assistance, and public education. States are authorized to use 319 grant money for beneficial use projects; however, these types of projects commonly have not been funded by states in the past. More information on the program is available at ***http://www.epa.gov/nps***, and State Nonpoint Source Coordinators' contact information may be obtained by clicking on "contact us" at the top of the site's home page.

For more information on SRFs, contact your state program or contact the Clean Water State Revolving Fund Branch, U.S. EPA, 1200 Pennsylvania Avenue, NW, Mail Code 4204M, Washington, D.C. 20460, (202) 564-0752, or see website at ***http://www.epa.gov/owm/cwfinance/cwsrf/index.htm***.

Idea 2: Establish a **special assessment district** (e.g., a small river watershed district, a natural resource management district, or a beach district).

Description: A special assessment district is an independent government entity formed to finance government services for a specific geographic area. These districts can range in size from a city block to a multijurisdictional arrangement. Special districts focus the costs of enhanced services on the beneficiaries of those services by separating benefited taxpayers from general taxpayers. Residents of special districts pay a surcharge (usually in the form of increased tax rates) to finance improvements. For example, if citizens in a certain geographic area are interested in reclaiming a wetland in their neighborhood using dredged material, or enhancing recreational opportunities by improving a waterway with dredged material, a special district can provide needed structure, management, and financing.

Special districts have the power to levy taxes and collect fees and special assessments in order to pay for developing and operating beneficial use projects. Special districts may issue revenue bonds to finance revenue-generating beneficial use projects, such as fee-based wetland hunting preserves, watercraft rental facilities on constructed waterways, fee-based improved parkland or beaches, or solid waste management facilities capped by dredged material. Special districts can issue debt independent of state or county government, thus reducing the burden on general debt capacity.

Capital/Revenue Source: A special district can be both a capital-financing and revenue-generating vehicle. The special district can be authorized to issue bonds and collect revenues to finance a beneficial use project.

Action to Establish: State laws define the powers and characteristics of special districts and how they may be established. Some states, such as California, Illinois, Texas, and Washington, have strongly supported special districts for a wide variety of purposes. Other states have restricted the establishment of special districts to only a few specific purposes.

Although enabling legislation varies widely not only among states but also among different types of allowable special districts within a state, the general protocol for forming a special district and the district's responsibilities can be outlined as follows.

In most cases, landowners petition a governmental body—such as the governor, the state legislature, or a county executive—to establish a district encompassing the landowners' properties. After review and approval of the district by the appropriate governmental body, the landowners elect the district's governing board, which often comprises landowners and business representatives from the district. Sometimes, district boards may be appointed by government officials. Board members often have staggered terms and may have restrictions on reelection.

The district's board is responsible for administering the beneficial use project. The board will require technical expertise for construction and operation, management skills to administer ongoing operations, and political skills to effectively work with local and state public officials.

The board has the power and responsibility to hire staff, contract with businesses, and manage and maintain the beneficial use project. In some states, this activity includes exercising the power of eminent domain and using management tools such as public easements and rights-of-way. The board also levies and collects taxes, fees, and assessments, and can accept grants and enter into loan agreements. The board also can issue bonds on behalf of the district.

There are many special districts in the United States. A good way to learn more is to contact a special district in your area. Citizens seeking new or enhanced services might find special districts easier to establish than convincing a local government to increase its budget for those services.

Idea 3: Implement **tax-increment financing** (similar to a special assessment district).

Description: This technique requires creating a special district when a government-financed enhancement benefits the residents of the special district. From that time on, two sets of tax records are maintained for the district: one that reflects the value of assets up to the time of the enhancement, and a second that reflects any growth in assessed property value in the district after the enhancement. Tax revenues collected on the increased values of the properties after the improvement can be diverted to pay for the cost of the government-financed beneficial use project in the special district. In some cases, governments issue tax-increment bonds for revitalization projects, with the bond being backed, in part, by the anticipated increase in property values resulting from the investment.

Tax-increment financing differs from a special assessment district in that property tax rates are increased in a special assessment district to cover improvements made in the district. In special districts using tax-increment financing, tax rates may not be increased, but additional

revenues are collected based on increased assessed property values enjoyed after the improvements are made.

Capital/Revenue Source: Tax-increment financing is both a capital-financing and revenue-generating vehicle. The special district using tax-increment financing can be authorized to issue bonds and collect revenues for financing the desired beneficial use project.

Action to Establish: While the actions required to implement tax-increment financing vary by jurisdiction, enabling legislation is often required in order to designate special districts. Timely and accurate property value assessments must be made and a local authority must be established to maintain the two sets of tax records.

Idea 4: Create **habitat or parks and recreation** stamps patterned after duck stamp programs.

Description: Currently, many states sell duck stamps issued as hunting licenses, with hunting licenses, or as collectors' items. In addition to starting a duck stamp collection, many people buy additional stamps to use as artwork. Habitat restoration projects or parks and recreation efforts that use dredged material can be the basis for developing a stamp program as an annual art competition—thereby increasing the visibility of the beneficial use project.

Capital/Revenue Source: Revenues generated from the stamp program can be placed in a fund dedicated to supplementing debt service requirements incurred in establishing a beneficial use project. Or, as the fund grows, grants or loans can be made to help establish future beneficial use projects. Finally, the fund can be leveraged, perhaps by providing the match funding necessary for a federal, state, or private grant or loan program.

Action to Establish: In many jurisdictions, legislation is necessary to establish a revenue-generating program such as a stamp program.

Idea 5: Pool communities' debt for credit enhancement/creation of a small **community bond bank**.

Description: Small-denomination bonds backed by local taxes, park entrance fees, license fees, and other dedicated revenues can be "pooled" in a bond bank and offered as a single bond issue to finance a beneficial use project. The single issue can be backed by the state or county, or by bond insurance, if necessary, and can take advantage of lower interest rates enjoyed by larger issues. In addition, issuance costs are spread out over more issuers resulting in costs lower than any single community's issue could command. The proceeds of the issue would be dedicated to specific projects that beneficially use dredged material.

Capital/Revenue Source: A bond bank provides the capital to construct a project that will generate revenues dedicated to the repayment of the bonds. Revenues might come from taxes, park entrance fees, and license fees.

Action to Establish: A bond bank must be authorized and established by the state, although not all bond banks require a state guarantee for credit-enhancement.

Idea 6: Issue **mini-bonds** for wetlands creation, park development, beach replenishment, tree planting, stream restoration, etc.

Description: Mini-bonds are issued in small denominations (e.g., $500) for purchase by the general public. Bonds can be dedicated to a specific beneficial use project such as creation of a park or recreational facility, or a project more general in nature such as beach replenishment or wetlands creation. These bonds, which heighten awareness about the beneficial use project, are designed to be collectable or used as gifts, as well as provide small investment opportunities.

Capital/Revenue Source: Proceeds (a capital source) from mini-bonds are dedicated to establishing a specific beneficial use project. Spent proceeds are repaid from revenues generated by the project. Revenues might come from taxes, park entrance fees, and license fees.

Action to Establish: State legislation is necessary either to increase the state's debt limit or ceiling to accommodate the mini-bonds, or to designate a portion of the state's existing debt capacity to the mini-bonds.

Idea 7: Issue a **credit card** benefiting an environmental fund dedicated to a particular beneficial use project.

Description: A private company or environmental organization can issue a major credit card on a state or regional basis to benefit a new or existing fund dedicated to beneficial use projects. For each "affinity card," a fixed amount per card and a small percentage (e.g., 0.5 percent) of the spending on the card is donated to the fund. The fund can then be drawn upon for specified beneficial use projects.

Capital/Revenue Source: Revenues generated from the affinity credit card can be placed in a fund to supplement debt service requirements incurred in establishing a beneficial use project. Or, as the fund grows, grants or loans can be made to help establish future beneficial use projects. Finally, the fund can be leveraged, perhaps by providing the match funding necessary for a federal, state, or private grant or loan program.

Action to Establish: A private company or environmental organization works with a bank to issue the credit card.

Idea 8: Create/expand a **commemorative license plate program** targeted at projects that use dredged material.

Description: A certain portion of collected license plate fees (e.g., half of a $20 fee) is placed in a trust dedicated to specified beneficial use projects. Limited-edition plates also can be sold for $100 to $500 and may include a unique design featuring a specific project.

Capital/Revenue Source: Revenues generated from the license plate fees can be placed in a fund dedicated to supplementing debt service requirements incurred in establishing a beneficial use project. Or, as the fund grows, grants or loans can be made to help establish future beneficial use projects. Finally, the fund could be leveraged, perhaps by providing the match funding necessary for a federal, state, or private grant or loan program.

Action to Establish: Each state has its own process for developing specialty license plate programs. Generally, it requires legislative approval and an upfront administrative fee to defray the cost of the license plate design, development, promotion, and distribution. The state administers the program for the nonprofit organization.

Idea 9: Establish an **Adopt-an-Animal program** (a wetland, forest, marine, or riverine animal).

Description: This idea is based on the "adopt-a-whale" program created by the National Wildlife Federation and similar programs. People are solicited to "adopt" a species that lives in an area to be improved with dredged material, such as cranes and herons in wetlands, fish and shellfish in oceans and rivers, or birds and mammals in forests. For a fee, participants receive educational materials about their "adopted" animal and about the beneficial use project. Fees are dedicated to support a beneficial use project in the animal's habitat.

Capital/Revenue Source: Revenues generated from the adoption program can be placed in a fund dedicated to supplementing debt service requirements incurred in establishing a beneficial use project. Or, as the fund grows, grants or loans could be made to help establish future beneficial use projects. Finally, the fund can be leveraged, perhaps by providing the match funding necessary for a federal, state, or private grant or loan program.

Action to Establish: A marketing campaign developed by the organization administering the program will be necessary to alert the population about the program.

Idea 10: Create an **endowment fund**.

Description: A privately run endowment fund can be established through contributions from the private sector (possibly organized through Chambers of Commerce). The marketing campaign for this endowment might be based on "successful public/private partnering." The fund is coordinated with state agencies or a mitigation bank to target high-priority areas where habitat restoration using dredged material would be particularly beneficial. An example of such a fund is the Corporate Wetlands Restoration Partnership facilitated by the Coastal America Partnership. Visit their website for more information: ***http://www.coastalamerica.gov/text/cwrp.html***.

Capital/Revenue Source: Interest from the endowment fund can be used to supplement debt service requirements incurred in establishing a beneficial use project. Or, as the fund grows, grants or loans could be made to help establish future beneficial use projects. Finally, the fund can be leveraged, perhaps by providing the match funding necessary for a federal, state, or private grant or loan program.

Action to Establish: There must be a private initiative to establish and run the endowment fund, and to coordinate with state and local agencies or a mitigation bank to identify desired and needed beneficial use projects.

Idea 11: Price at full cost the **public sector service fees** associated with dredging operations and beneficial use projects.

Description: Existing fee systems associated with public sector oversight programs can be modified to cover more or all of the costs of a beneficial use project. The fee system should ensure that staff, equipment, and overhead costs associated with plan reviews and inspections are fully covered by fees paid by those regulated (i.e., the modified fee system would provide a dedicated source of funding for beneficial use project planning). The fee system can be based on project complexity or on an hourly rate. Time not spent directly on a project must be covered by another funding source.

Capital/Revenue Source: This approach represents a cost savings because it reduces the use of general funds that might otherwise be used to cover beneficial use project costs. This cost savings can be translated into increased general funds available for debt service for other beneficial use projects, so it ultimately is a revenue source.

Action to Establish: State and local regulations must be changed in order to allow fee-based programs to become self-supporting. Fee-based programs require staff to become familiar with accounting practices in order to ensure proper management of the flow of fees and costs.

Idea 12: Require a **beneficial use "checkoff"** for certain products.

Description: A checkoff would require that every retailer who markets a certain product used at a site created or enhanced by dredged material (e.g., beach accessories, snacks, and beverages sold at a park or recreational site, and recreational equipment) pay a fee for each unit that he or she sells. The fee is usually passed on to the consumer who benefits from the beneficial use project. These retailers vote on establishing a checkoff and also vote on the checkoff's renewal. If a majority of the retailers vote favorably, a small surcharge is added to each product when it is sold. The funds generated are collected and managed by those overseeing the beneficial use project.

Capital/Revenue Source: Revenues generated by the checkoff can be placed in a fund dedicated to supplementing debt service requirements incurred in establishing or maintaining a beneficial use project. In addition, the fund could be leveraged, perhaps by providing the match funding necessary for a federal, state, or private grant or loan program.

Action to Establish: Enabling legislation is required to authorize the levying of a special surcharge. A board must be created to oversee the fund and develop specific rules to govern its activities. The checkoff is well-suited to a special assessment district.

Idea 13: Dedicate a **sales tax surcharge** on certain products, such as prepared foods and beverages, to a beneficial use project.

Description: A surcharge can be added to the existing prepared food and beverage sales tax. Revenues generated would be dedicated to specific beneficial use projects. The surcharge may be time-limited (e.g., 10 years), with optional renewal by the legislature.

Capital/Revenue Source: Sales tax revenues can be placed in a fund dedicated to supplementing debt service requirements incurred in establishing or maintaining a beneficial use project. In addition, the fund can be leveraged, perhaps by providing the match funding necessary for a federal, state, or private grant or loan program. Grants and loans could be made available through the fund for beneficial use projects.

Action to Establish: Legislation authorizing a new sales tax is necessary.

Idea 14: Establish a **public-private partnership** to finance the construction of dredged material containment areas, or water parks and other recreational facilities that use dredged material.

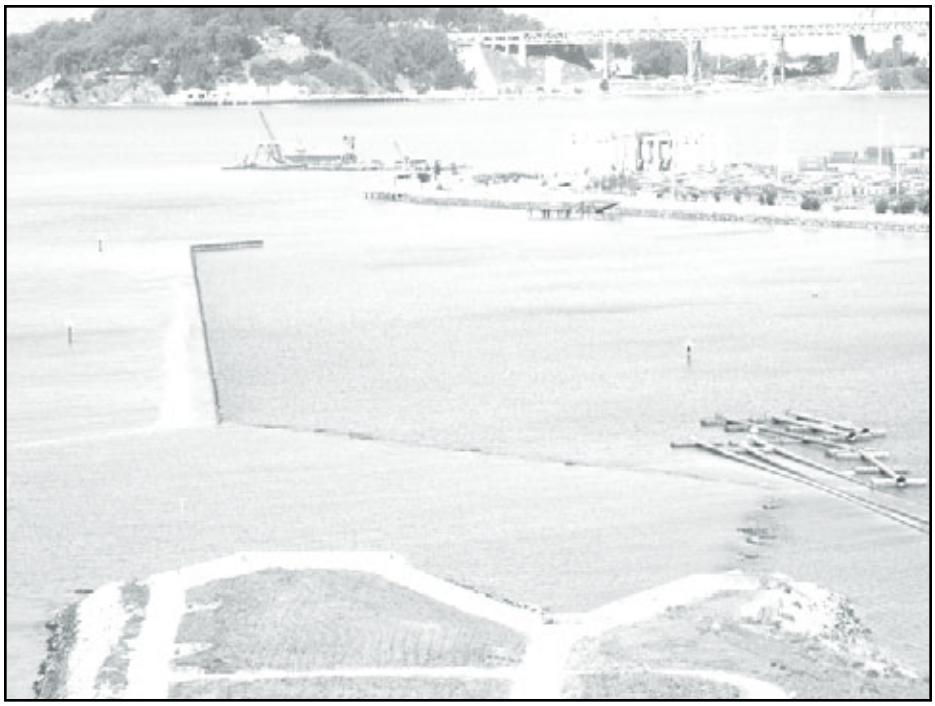
Description: Under a tax-exempt lease arrangement, a public partner can finance a beneficial use project by borrowing funds from an investor or financial institution. The private partner generally acquires title

to the beneficial use project assets, but transfers it to the public partner at either the beginning or end of the lease term. The portion of the lease payment used to pay interest on the project assets is tax-exempt under state and federal laws.

Capital/Revenue Source: Tax-exempt leases are a method of capital financing that could be applied to any beneficial use project requiring the building of capital assets, such as parks created with dredged material. Because the lease arrangements do not count against local debt limits, they may be a particularly useful tool for communities whose debt capacity is nearly exhausted.

Action to Establish: Regulations need to be in place to allow a public partner to enter into a tax-exempt lease arrangement with private parties.

Machinery used in the privately funded Montezuma Wetlands restoration project in California (*Photo by Levine-Fricke*).



Breakwaters such as this one in the Port of Oakland help protect wetlands created by beneficial use of dredged material (*Photo by Port of Oakland*).

6

Outreach and Public Involvement Strategies for Beneficial Use Projects

In most beneficial use projects, the public will significantly influence decision making at various points in the often multiyear process of project planning, implementation, and regulatory compliance. Effective public involvement will improve the quality of the decisions made about the use of dredged material. This chapter presents practical guidance for informing and involving the public in planning and carrying out beneficial use projects.

The success of a beneficial use project often depends on the public's perception of the project's purpose and its impacts on human health, property values, and the environment. Unfortunately, as noted previously in this manual, many people still regard dredged material as waste rather than as a valuable resource. Such misperceptions underscore the need for informing the public about proposed beneficial use projects and involving the community in pertinent discussions. Effective public involvement identifies and addresses issues of public concern that must be dealt with if projects are to be implemented.

6.1 Informing and Involving the Public

Different segments of the public will have different levels of interest and concern about beneficial use projects. Therefore, it is important to use a range of methods to inform and involve them. Public notice and comment periods are part of applicable permitting processes, as discussed in Chapter 3, but the use of additional outreach methods may increase public involvement. People participate when they believe that a project may significantly affect them. They may be motivated by the proximity of the project; by economic, social, or environmental concerns; or by personal values. The concerned public will be different for each beneficial use project, and may grow and change as a final decision approaches.

Levels of Public Interest

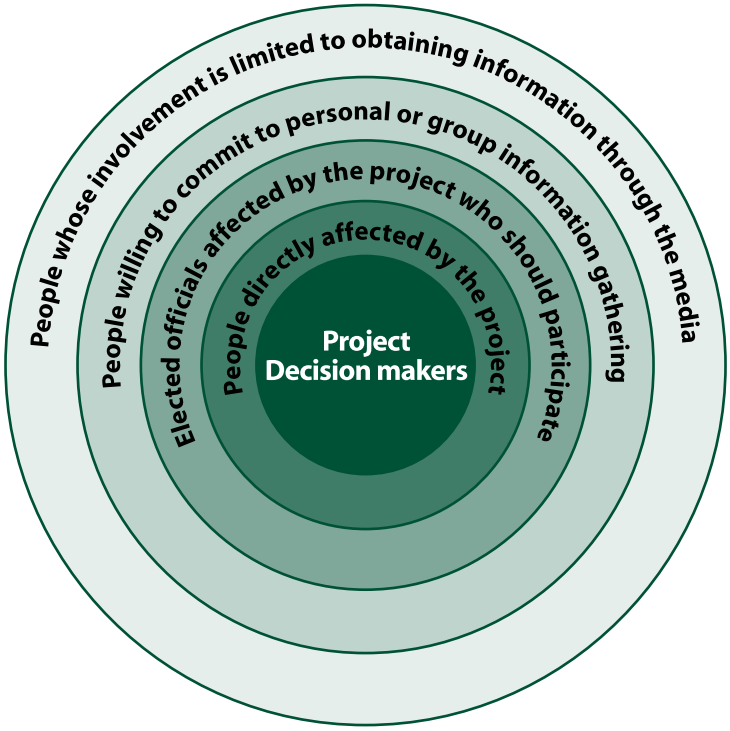
In planning public involvement, it may be helpful to think of the public as a circle with concentric rings (Figure 6.1). In the outer ring are people whose involvement will be limited to informing themselves about the project primarily through the media. As long as they are informed and know how they can make their views known, they will seek no further involvement.

The next circle comprises people who are willing to commit to limited involvement in the project. They may be members of civic, religious, or service groups, and can be reached through one-on-one discussion and presentations to their organizations. Informing these people is important because they, in turn, will inform other members of the community. In general, individual, personal discussion is very important to successful public involvement. An informed public can provide elected and agency decision makers with information and perspectives that enable them to make better decisions. Effective public involvement can aid in the early identification of potentially significant project problems. It can help resolve issues that, if not addressed, could end up in court. Not involving affected constituencies significantly increases the possibility of organized opposition.

An informed public can provide elected and agency decision makers with information and perspectives that enable them to make better decisions.

It is important to inform and work closely with elected officials, the next ring of the circle. Project proponents should determine early in project planning which federal, state, tribal, and local public officials will want

Figure 6.1 Levels of Public Involvement in a Beneficial Use Project



to be kept informed about project planning and implementation and may want to take a more active part in these activities. Project managers should then offer to brief these officials or otherwise provide information. It is important for project managers to communicate well with public officials to gain their useful insights in project planning, and also to preclude the possibility that public officials could be put in a difficult position due to lack of sufficient information about the project.

Closer yet to the center of the circle are those directly affected by a project. These people need extensive information and may seek to participate in decision making. People at this level of interest can be involved through participation on coordinating committees.

Project decision makers are at the center of the circle. Members of the public, particularly representatives of groups with a stake in the outcome of the project, can help government staff make decisions and guide project implementation. A local beneficial use planning group, as mentioned in Chapter 3, could be the core group in which other decision makers are included.

Developing a Public Involvement Plan

The best way to effectively involve the public is to develop a public involvement plan. Applying the techniques of "issue mapping" and

reconnaissance—conducting research and interviews that identify a community's concerns about a particular issue—is the first step in planning. These techniques are designed to identify key stakeholders, opinion leaders, representatives of important constituencies, elected officials, or others who need to be involved in decision making. Concerns related to a beneficial use project can be mapped by researching newspapers and pertinent public documents, and by interviewing agency staff, elected officials, and potential stakeholders.

The public's participation may result in a project design somewhat different than the original plan, but without public involvement, the project may never materialize.

Project managers should be centrally involved both in developing the public involvement plan and in the resulting public involvement program. The public's participation may result in a project design somewhat different than the original plan, but without public involvement, the project may never materialize. Project managers' philosophical and financial commitment to public involvement is essential from the outset.

It is important for project managers to make clear to the public how public comment and participation will be used, and how public involvement can make a difference in project planning and design. Public participation can add value on several levels, but it can only be successful if project managers are willing to consider the resulting input in their decision-making process. Making decisions and then attempting to "sell" them to the public is not public involvement; this approach often fails, makes the public increasingly cynical, and makes future public decision making more difficult.

Identifying the "access points"—decision points where public input can make a difference—is a key component of a public involvement plan. The NEPA EIS process provides useful examples of access points in the decision-making process. NEPA requires that the public has an opportunity to be involved in "scoping" for projects with significant environmental impact. The purpose of scoping is to identify the issues that the NEPA EIS will address. In addition, NEPA requires that the public has the opportunity to comment on the draft EIS and that federal agencies respond to those comments. An EIS is required only for those projects that may significantly impact the quality of the human environment, including the natural environment. Typically beneficial use projects are completed with an EA, which is less detailed than an EIS. The public is involved, to the extent practicable, in the preparation of an EA, and any finding of no significant impact (FONSI) may be available for public review 30 days prior to a final determination whether to prepare an EIS and before action may begin.

In developing a public involvement plan, project sponsors should understand the decision-making process and the scheduling needs of the other organizations involved in the project. Project managers should determine as early as possible what organizations and individuals will make key project decisions and when those decisions will be made. The public should be informed and provided an opportunity to be involved

sufficiently in advance of these decision points so that any public input is available to, and can be considered by, the decision makers.

The following sections describe techniques for informing and involving segments of the public having varying degrees of interest in beneficial use projects. For a more extensive discussion of public involvement planning, see *Framework for Implementing EPA's Public Involvement Policy* (EPA 2003a); *Getting in Step: A Guide for Conducting Watershed Outreach Campaigns* (EPA 2003b); *Community Culture and the Environment: A Guide to Understanding a Sense of Place* (EPA 2002); and *Public Involvement: Planning and Implementing Public Involvement Programs* (Praxis 1988).

It is helpful in communicating with the public to know to whom others in the community listen.

6.2 Public Involvement Strategies

Informing the Public: "I Heard It Through the Grapevine"

As elected officials know, every community has a network—a grapevine—through which information travels. It is helpful in communicating with the public to know to whom others in the community listen. Calling those people individually is an important way to get the word out about a proposed beneficial use project, to learn who else needs to be called, and to get a sense of public opinion about the project. Do not be surprised by unexpected opposition when no one has called community opinion leaders to find out about community issues and concerns. Personal interviews are an effective and important method of public involvement.

In addition, the project team can get its message on the community information network by making presentations to community organizations, such as service and church groups, and neighborhood associations. It is particularly important to get in touch with environmental interest groups. Identifying these community groups is part of the issue mapping and reconnaissance described in Section 6.1.

Direct Mail

One way to inform and involve citizens living in the vicinity of or otherwise directly affected by a beneficial use project is by mailing information about the proposal to them. Cities and counties maintain records of property ownership that project staff can use to determine the addresses of all the residents in the project area. Consider including short surveys and response forms for citizens' use, as well as a way to include those who may live in an area but who do not own property. This approach also can help identify key stakeholders with whom project staff may work in the future.

Mailings can identify the points in the project schedule—such as comment periods—during which citizens can access the decision-making process. Identify the agencies and organizations proposing the project as

well as the project's point of contact. Mailings should list the representatives in the decision-making process through whom the public can make its views known. Emphasize that the public's comments can make a difference in decisions about the project.

Neighborhood Forums

If your research reveals sufficient local interest, the next step may be to conduct neighborhood forums. Neighborhood forums are most effective if they are small and informal. Go to the community; do not wait for the community to come to you. Meet with citizens in residents' homes or in local schools and churches. Generally, neighborhood forums are set up and managed as information exchanges or to obtain the individual input of the citizens.[13]

Public Meetings

Opportunities to provide information and interact personally with interested community members occur frequently at organizational meetings, special workshops, and conferences. These opportunities can be excellent for public involvement. An open-house or other informal, interactive format is often preferable to a formal public meeting, which tends to be impersonal and can be acrimonious.

In the open-house or other interactive format, one good approach is to provide displays depicting aspects of the proposed project. Make a knowledgeable person available at each display to provide information and record comments. Within a several-hour period, community members should be free to circulate among the displays and register their comments. Entice participation with free admission, but request a toll to leave, such as completion of a questionnaire about the proposed project.

Working with a Local Dredged Material Planning Group

As mentioned in Chapter 3, agencies responsible for regulating dredging and dredged material disposal have convened dredged material planning groups in some regions of the country. These groups may be able to provide the basis for the shared decision making at the center of the public involvement circle. Beneficial use project sponsors should strongly consider monitoring the activities of these local dredged material planning groups. A nationwide guidance prepared by the National Dredging Team on dredged material management plan development for local planning groups is available on the internet: ***http://www.epa.gov/owow/oceans/ndt*** (NDT 1998).

[13] It is important to note that such meetings are generally not, but under some circumstances may be, subject to the Federal Advisory Committee Act (FACA). FACA applies to groups established or managed and controlled by the Federal Government in order to obtain collective group advice.

These local groups present distinct advantages in promoting the beneficial use of dredged material:

- Gathering all parties concerned about and responsible for beneficial uses "at one table" can facilitate meaningful public involvement. Representatives of the public will be able to participate in all phases of project planning and design. Through participation in these local groups, they can gain a thorough understanding of the project's opportunities, challenges, and trade-offs. Their input can be an integral part of project development, and they in turn are able to provide accurate, current information to their constituencies. Their constituencies will in turn know that their concerns are bearing directly on project decisions.
- Convening all interested parties in a local beneficial use planning group promotes early identification and evaluation of alternatives. The group can develop criteria for evaluating alternatives. These criteria/attributes of a successful project can be used to direct data gathering and allocation of limited financial resources.[14]
- Timing is very important in determining the success of beneficial use projects. It is important for agencies required to spend current-year project funds for dredging to identify available material use or placement locations that can be ready to receive the material in the relatively short term. Thus, coordination and planning of schedules by

Volunteers plant marsh grasses in a habitat restoration project on Poplar Island, Maryland (*Photo by USACE*).

[14] It is important to note that such meetings may be subject to the Federal Advisory Committee Act (FACA).

beneficial use groups can improve the chances that a provider and a user of dredged material connect in a timely way.

- A local beneficial use group provides knowledge and experience that is a resource for the public. Representatives of the public can inform and be informed by this gathering of people.

6.3 Summary

In conclusion, beneficial use project staff should:

- Involve the public from the outset. Go to the public; do not wait for the public to come to you.
- Identify and respond to issues of local concern.
- Understand the decision-making process and schedule to identify points of public access.
- Make clear how the public's input will be used.
- Use a variety of methods to inform and involve segments of the public with different levels of interest.
- Involve representatives of the public in project decision making.

7

References and Additional Resources

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A

Appendix A: Beneficial Use Categories

Each beneficial use category represents different types of environmental benefits and poses different potential impacts. These potential impacts can be described in terms of which specific project activities create the impacts (the "stress agents" of the beneficial use project) and what components of the environment are most affected by the impacts (the "receptors" of impact). Dredged material can be used beneficially for engineered, agricultural and product, and environmental enhancement purposes. In the following sections, seven beneficial use categories are described by general application, types of stress agents that are relevant, and types of receptors most likely to be affected.

1. Habitat Development

In habitat development, dredged material is used to build and maintain productive plant and animal habitat, especially wetlands. Use of dredged material as a substrate for habitat development is one of the most common and important beneficial uses. In considering habitat development, it is necessary to determine what type of habitat is needed (e.g., habitat to enhance fish or bird communities), whether the constructed habitat will be stable at the proposed location, and whether the new habitat will displace existing unique or valuable habitats.

Four general categories of habitats are suitable for establishment on dredged material: wetland, upland, island, and aquatic. These habitats may occur simultaneously within the same project area.

Wetland. Wetland habitat is a broad category of periodically inundated or saturated soils and plant communities, characterized by vegetation that survives in wet soils. Wetlands are most commonly freshwater and saltwater marshes, bottomland hardwoods, freshwater swamps, and freshwater riverine and lake habitats. To develop wetland habitat, dredged material is used to fill areas to precise elevations to promote colonization by wetland vegetation. Projects to restore wetlands are generally more likely to be successful than projects to create new wetlands. On the other hand, restoration/enhancement of wetlands can provide

both environmental and practical benefits (e.g., new habitat for commercially important fish species).

Upland. Upland habitat includes a broad category of terrestrial communities characterized by vegetation not normally subject to inundation, including grasses, shrubs, and trees. Upland habitat projects can be designed to support birds, waterfowl, mammals, and rare or endangered species.

Island. Dredged material can be used, where appropriate, to create new islands. Colonial-nesting seabirds are the primary wildlife species using new island habitats, but other wildlife, such as seals, also may benefit.

Aquatic. Aquatic habitats are permanently submerged habitats extending from near sea, river, or lake level down several feet. Dredged material is used to affect either the bottom elevation or the condition of the submerged area. Potential aquatic habitats that could be developed using dredged material include seagrass meadows, oyster beds, fishing reefs, and stands of freshwater aquatic plants.

Stress Agents and Receptors

The primary stress agent in any habitat-development project is the potential for net habitat loss in the trade-off of one habitat type for another. For example, will the project result in filling a subtidal area that has a soft-bottom community used by fish in order to develop an intertidal area for shorebirds? Because of the trade-off, detailed pre-project evaluation may be necessary to determine the need for a particular habitat type within the general region of the dredging project.

Other stress agents of habitat development are associated with construction. Increased turbidity from depositing and grading dredged material can affect the proximate water column. Initial deposition can also affect benthic organisms, with upland and island development that totally replaces benthic habitat being the most destructive. Consideration of tides and high flows is also necessary to achieve the specific goals of a habitat development project. If an upland project site is subject to unforeseen erosion, increased suspended sediment loads and benthic deposition in adjacent water bodies may become chronic problems.

The major receptors that may be adversely affected by habitat development are soft-bottom communities and aquatic communities. In addition, beaches and other shoreline features may be eliminated. If the dredged material contains contaminants that will be released when moved into the constructed habitat, the quality of the adjacent surface waters may also be degraded, and fish and shellfish may be contaminated. For example, sediment oxidation at upland project sites may release metal contaminants that previously were strongly bound to the sediment and biologically unavailable.

2. Beach Nourishment

In beach nourishment, dredged material is used to supply sediment to beaches that are subject to erosion. Shore erosion is a major problem along many ocean and estuary beaches, as well as the shoreline of the Great Lakes. Beach nourishment has been carried out successfully for many years with little discernible environmental impact (McGee 1988). In the past, beach nourishment has been accomplished by dredging sand from inshore or offshore locations and transporting it by truck, split-hull hopper dredge, or hydraulic pipeline to the beach needing supply. The construction of underwater berms both to decrease erosion by wave action and to supply sand to eroding beaches is a technique for beach nourishment (Richardson 1990). Underwater berms are mounds built on the ocean bottom, usually parallel to the shoreline and constructed to a specific height, length, and orientation. This approach is significantly less costly and less energy intensive (consequently, more often feasible) than direct beach nourishment. Caution, however, should be used in determining placement depth for underwater berms. Wave energy may not be able to reshape the berm material if material is placed in water that is too deep; this could result in sediment loss from the littoral system.

Stress Agents and Receptors

In beach nourishment, the main stress agents are evident during construction. Placing and operating pipeline and other equipment can damage sensitive aquatic and shoreline habitats. Construction can cause turbidity, sedimentation, and beach sediment compaction (Nelson and Pullen 1990). Post-construction turbidity and sedimentation can become a problem to sensitive habitats adjacent to the nourished beach if erosion continues to be high.

The receptors of most concern in beach nourishment include nesting birds, sea turtles, and oysters, and nearby sensitive habitats such as seagrass beds, mangrove stands, coral reefs, and dunes (McGee 1988; Nelson and Pullen 1990). Habitat loss and surf zone modification are major considerations in constructing underwater berms. Stress receptors for underwater berms include crustaceans, bivalves, and fishing operations.

In general, potential beach nourishment sites need to be screened for the presence of sensitive habitat such as coral reefs, mangrove stands, eelgrass beds, oyster beds, clam beds, and commercial fishing grounds. Because several species of sea turtles are threatened or endangered, the relationship of any beach nourishment to turtle nesting areas also should be evaluated.

3. Parks and Recreation

Of all types of beneficial uses, recreation on dredged material containment sites is one of the most prevalent land uses in terms of acreage.

It is not surprising to find many examples of such use since there is a demand for waterfront recreational sites in urban areas, where many dredging projects occur. In addition, legislation relating to wetlands, coastal zone management, and flood control promotes this use.

Using dredged material for developing park and recreational facilities is often associated with other beneficial uses, such as habitat development for fish and wildlife, or creation of beach and boating amenities (Murden 1987). For example, in the construction of the Tennessee-Tombigbee Waterway, a number of the dredged material disposal areas were designed for recreational uses (McClure 1988). Disposal areas were filled, contoured, and planted with vegetation to control erosion and to provide wildlife food and habitat. Activities supported in these areas include swimming and boating, walking and bicycle trails, wildlife viewing, and hunting.

Stress Agents and Receptors

Assuming that the dredged material used in the development of park and recreational facilities is clean or contains only low-level contaminants, there is little opportunity for human exposure to biological or chemical agents. However, during the initial phases of a project (i.e., immediately following dredged material placement), release of metals by oxidation and erosion into adjacent areas resulting in increases in the suspended sediment load may be of concern. Some contaminants may also be released into the atmosphere if volatile compounds are present in the material.

The receptors for any stressors such as low-level biological or chemical agents would be the surface waters and groundwaters. Plants and animals that colonize the disposal site could potentially take up and bioaccumulate chemical agents.

4. Agriculture, Forestry, Horticulture and Aquaculture

Over the past 100 years, innovative uses of dredged material placement have been made by the agriculture, forestry, horticulture, and aquaculture industries. Each year, considerable amounts of topsoil are lost by erosion to rivers, estuaries, and the oceans. By applying dredged material to farmland, topsoil can be conserved and reclaimed. Uncontaminated dredged material from freshwater sources has actively been incorporated into marginal soils for agriculture, forestry, and horticulture purposes (the salt content of marine and estuarine sediments usually precludes their use for these purposes but these sediments may be placed in containment areas that can be used for aquaculture). Dewatered dredged sediment can be applied to farmland to elevate the soil surface, thus improving drainage and reducing flooding; when incorporated into marginal soils, it can enhance the physical and chemical characteristics of the soils, and make water and nutrients available for

crop growth. Dredged material placement at sites in river systems has provided livestock pastures. Dredged material placed in containment areas to create dikes could serve as potential aquaculture areas. There are thousands of acres of land located on dredged material disposal sites that have been filled to capacity and are now used for agriculture.

Stress Agents and Receptors

Dredged material used for agriculture, forestry, horticulture, and aquaculture needs to be of acceptable sediment quality. The dredged material must not contain high concentrations of metals and organics that can be accumulated by fish, fodder, or crop plants to levels harmful to human beings or wildlife. The receptors for any stressors, such as low-level biological or chemical agents, would be surface waters and groundwater, as well as aquatic life, crop plants or grazing animals.

5. Strip-Mine Reclamation/Solid Waste Management

The productive use of dredged material in reclamation of strip mines, capping of solid waste landfills, and the use of material to protect landfills are placement options. Abandoned strip mines are unsightly, barren areas, and sources of acid leachate runoff and erosion. At a demonstration site in Ottawa, Illinois, for example, a former coal strip mine was recontoured and covered with a layer of dewatered dredged material. The dredged material used in this project contained low levels of heavy metals and organic compounds. Placement of the material buffered the acid runoff and limited the infiltration of water as it allowed the establishment of a dense growth of perennial grasses (Wilhelm et al. 1988). While past research has demonstrated that reclamation using dredged material is feasible, the distance to the reclamation site and the need for soil amendments may make most dredged material reclamation projects cost prohibitive.

Fine-grained dredged material can be used in solid waste management as daily and interim sanitary landfill cover. To implement this disposal alternative, the dredged material must meet chemical and physical criteria, and must meet landfill cover regulations. Thus, one of the constraints of using this disposal option is that open land must be available for a dewatering and drying area. Conceptually, dewatering sites used for dredged material are similar to confined, upland disposal sites. Section 316 of WRDA 1992 contains a provision to establish such a dredged material dewatering facility at a wetland restoration site at Port Sonoma in Marin County, California. Dewatering and construction operations at this site were completed in 1998 and the wetland could be fully developed by 2018. Beneficial reuse of dredged material at the site is expected to shorten the time needed to fully develop the wetland habitat.

Stress Agents and Receptors

Surface runoff and leachate of low-level biological or chemical agents during dewatering or following placement of the dredged material are potential concerns associated with the use of dredged material in mine reclamation or in solid waste management. These concerns can be alleviated at least at the dewatering sites by treating and monitoring effluent and runoff. Potential receptors would be the surface waters and groundwaters surrounding the sites, as well as plants and animals colonizing the area. Notwithstanding this issue, it is possible that moderately contaminated dredged material might be acceptable for this use, given the possibility of limited human access and the potential for remediating problems such as acidic runoff and erosion.

6. Construction/Industrial Development

Construction and industrial development offer a number of opportunities for the beneficial use of dredged material. Many of these applications are likely to occur near shorelines or rivers, thereby minimizing transportation distances between dredged material sources and uses. One such beneficial use is bank stabilization. In many lakes and rivers, particularly in the southern United States, placement of dredged material coupled with riprap is used to stabilize banks. Dredged material also can be used in levee and dike construction. In urban coastal areas, dredged material can be used to expand or enhance port-related facilities. For example, placing dredged material among abandoned piers can increase port-related lands. This option requires placing dredged material behind barriers such as sheet piling erected around and between abandoned piers. The procedure would be similar to construction of confined disposal facilities.

As a more general construction application, dewatered dredged material may also be used as loose material in construction; formed into construction aggregate and used for building material; or used in the ceramic industry for producing bricks, roof tiles, or ceramic tiles.

Project managers are now exploring the potential for dredged material beneficial use applications at brownfields sites. Brownfields are abandoned, idle, or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination. The Jersey Gardens Mall project is an example of a brownfields redevelopment success: an environmental remediation company acquired and developed a former municipal waste landfill, incorporating beneficial use applications of dredged material. (See case study in Section 2.3.)

Stress Agents and Receptors

Depending on the application, the dredged material used for construction or industrial applications may need to be clean or contain contami-

nants at very low levels to limit human or wildlife exposure to biological or chemical agents. As in other beneficial use applications, nuisance species, pathogens, and terrestrial chemical agents may be of concern during construction of the project. Some chemical agents may also be released into the atmosphere if volatile compounds are present in the material. The most likely receptors for any stressors such as low-level biological or chemical agents would be surface water and groundwater.

7. Multipurpose Activity

Often a series of applications can be devised for the beneficial use of dredged material in a given area. For example, a park and recreational area could be built over a closed solid waste landfill that used dredged material as cover. Alternatively, an island development project might provide both wildlife and recreation amenities. Recreational use and wildlife and fish habitat can often be developed simultaneously on a site. Of course, any multipurpose activity area for dredged material must be planned to accommodate the various uses and to minimize conflicts between different users.

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B

Appendix B: Cost-Sharing Examples

This appendix provides five examples on cost-sharing for beneficial use projects. Information on who bears the costs assigned to the navigational purposes, as well as who bears the incremental costs, is provided as background and context for these examples.

Who bears the costs assigned to the navigational purposes of a dredging project?

The costs assigned to the navigational purpose of a dredging project are shared with the non-federal sponsor of the project. The ratio of federal to non-federal costs depends on the nature and depth of the dredging project, as described in the box below.

New Navigation Projects

(deepening or widening of an existing federal navigation channel or creation of a new federal navigation channel)

For the portion of the project with a depth:	The non-federal share is:
Up to 20 ft	20% (10% during construction + 10% over 30 years)*
Over 20 ft and up to 45 ft	35% (25% during construction + 10% over 30 years)*
Over 45 ft	60% (50% during construction + 10% over 30 years)*

Operation and Maintenance of Existing Navigation Projects

1. Operation and Maintenance Dredging: Federal share is 100% (except for harbors greater than 45 feet, where the non-federal share is 50% of the costs beyond those which would be incurred for a project with a depth of 45 ft or less).

2. Constructing land-based and aquatic disposal facilities:

For the portion of the project with a depth:	The non-federal share is:
Up to 20 ft	20% (10% during construction + 10% over 30 years)*
Over 20 ft and up to 45 ft	35% (25% during construction + 10% over 30 years)*
Over 45 ft	60% (50% during construction + 10% over 30 years)*

3. Operating and maintaining land-based and aquatic disposal facilities: Federal share is 100%.†

** The non-federal share includes 10%, 25%, or 50% to be paid during construction. It may include an additional 10% share of the total project costs to be paid over 30 years. The value of lands, easements, rights-of-way, and relocations required for the project is credited to this 10%, which is to be paid over 30 years.*

† In some cases, the federal cost may be determined by legislation authorizing construction and maintenance of the confined disposal facility.

Who bears the incremental costs of a beneficial use project?

First, the costs assigned to the navigational purpose of the project (i.e., the amount it would have cost to implement the Federal Standard (base plan), or least costly dredged material disposal or placement alternative or alternatives identified by USACE that is consistent with sound engineering practices and meets all federal environmental requirements, including those established under CWA and MPRSA) are shared with the non-federal sponsor as described above. Second, the costs beyond the navigational purpose costs (the incremental costs) are shared on a different basis, depending on the type of beneficial use. The funding authorities used in the examples of this appendix are described below.

- **Protection, Restoration, or Creation of Aquatic and Related Habitats. Section 204 of WRDA 1992**, as amended by Section 207 of WRDA 1996 and Section 209 of WRDA 1999, authorizes USACE to carry out projects for creating, protecting, and restoring aquatic and ecologically related habitats, including wetlands, in connection with dredging for constructing, operating, or maintaining USACE navigation projects. The incremental costs of such projects are shared on a 75 percent federal and 25 percent non-federal basis. This is the most commonly used authority for funding beneficial uses of maintenance dredging both because of this specific focus and because it is appropriated programmatically. It has an annual appropriation limit of $15 million.
- **Placement of Dredged Materials on Beaches. Section 145 of WRDA 1976**, as amended by Section 933 of WRDA 1986, Section 207 of WRDA 1992, and Section 217 of WRDA 1999, authorizes USACE to place suitable dredged material on local beaches if a state or local government requests it. Although placement for restoration purposes may be authorized under it, this provision is primarily used for storm damage control purposes. The incremental costs of beach nourishment are shared on a 65 percent federal and 35 percent non-federal basis. Use of this section requires a specific Congressional appropriation for each project.

The information in this appendix was taken from USACE 1995, *Implementing Ecosystem Restoration Projects in Connection with Dredging*, Appendix C: Cost-Sharing Examples. Memo EC1105-2-209, US Army Corps of Engineers, Washington, DC. Example 1 uses Section 145 of WRDA 1976, as amended by Section 217 WRDA 1999. The other four examples use Section 204 of WRDA 1992, as amended by Section 207 of WRDA 1996 and Section 209 of WRDA 1999, as the funding authority.

Example 1: Section 145 - WRDA 1976

The base disposal plan (or Federal Standard) for maintaining a federal navigation project is ocean disposal at a cost of $100,000 for dredging and placement in an open water disposal site. The dredged material is clean sand. An opportunity is identified to place the dredged material on an adjacent beach to nourish the beach, reduce storm damages, and enhance recreational use. There is no lands, easements, rights-of-way, and relocations (LERR) requirement for this beach placement. The placement of the dredged material on the beach costs $100,000 more than ocean disposal. Therefore, the beneficial use placement is a total of $200,000. The first $100,000 of the beach nourishment would be shared as a navigation maintenance cost. Because it is Operation and Maintenance Dredging, the federal share is 100 percent. The incremental cost of $100,000 for material placement would be shared as beach nourishment on a 65 percent federal and 35 percent non-federal basis under the authority of Section 145 of the Water Resources Development Act of 1976, as amended. All operation, maintenance, replacement, repair, and rehabilitation (OMRR&R) costs for the completed beach nourishment would be non-federal. This example is illustrated below.

Example 1

	Federal	Non-Federal
Shared as Navigation Cost	$100,000	$0
(Material Placement)	(100,000)	(0)
(LERR)*	(0)	(0)
Shared as Beach Nourishment	$65,000	$35,000
(Material Placement)	(65,000)	(35,000)
(LERR)*	(0)	(0)
Total Beach Nourishment Cost	$165,000	$35,000
(Material Placement)	(165,000)	(35,000)
(LERR)*	(0)	(0)

** Lands, easements, rights-of-way, and relocations (LERR)*

Example 2: Section 204 - WRDA 1992

The base disposal plan for maintaining a federal navigation project is ocean disposal at a cost of $100,000 for dredging and placement in an open-water disposal site. A wetland creation project is identified using the maintenance dredged material at a cost of $200,000, including $25,000 for LERR. The first $100,000 of the wetland creation project would be shared as a navigation maintenance cost on a 100 percent federal cost basis. The incremental cost of $100,000 would be shared as an ecosystem restoration project on a 75 percent federal and 25 percent non-federal basis. All OMRR&R costs for the completed wetland project would be non-federal.

Example 2

	Federal	Non-Federal
Shared as Navigation Cost	$100,000	$0
(Material Placement)	(100,000)	(0)
(LERR)	(0)	(0)
Shared as Ecosystem Restoration	$75,000	$25,000
(Material Placement)	(75,000)	(0)
(LERR)	(0)	(25,000)
Total Wetland Creation Project	$175,000	$25,000
(Material Placement)	(175,000)	(0)
(LERR)	(0)	(25,000)

Example 3: Section 204 - WRDA 1992

The base disposal plan for maintaining a federal navigation project is disposal in an upland site at a cost of $100,000, which includes $80,000 for dredging and placement and $20,000 for LERR. A wetland creation project is identified using the maintenance dredged material at a cost of $200,000, including $25,000 for lands. The first $100,000 of this wetland creation project would be shared as a navigation maintenance cost, with the $80,000 dredging and placement costs being federal, and $20,000 LERR cost being non-federal. The incremental cost of $100,000 would be shared as an ecosystem restoration project on a 75 percent federal and 25 percent non-federal basis. The total LERR costs ($25,000 for lands) are shared between the non-federal navigation and ecosystem restoration costs. All OMRR&R costs for the completed wetland project would be non-federal. This example is illustrated below.

Example 3

	Federal	Non-Federal
Shared as Navigation Cost	$80,000	$20,000
(Material Placement)	(80,000)	(0)
(LERR)	(0)	(20,000)
Shared as Ecosystem Restoration	$75,000	$25,000
(Material Placement)	(75,000)	(20,000)
(LERR)	(0)	(5,000)
Total Wetland Creation Project	$155,000	$45,000
(Material Placement)	(155,000)	(20,000)
(LERR)	(0)	(25,000)

Example 4: Section 204 - WRDA 1992

The base disposal plan for a new-work harbor project is disposal in an upland site at a cost of $100,000, which includes $80,000 for dredging and placement, and $20,000 for LERR. The project deepens the harbor from 30 to 40 feet, so the $80,000 would have been cost-shared on a 75 percent federal and 25 percent non-federal basis as a general navigation feature, with an additional 10 percent cost share over 30 years that could be offset by credit for the value of LERR. The $20,000 LERR cost would have been non-federal and would offset the additional 10 percent requirement. The cost share for dredging and placement as a general navigation feature would have been $60,000 federal and $20,000 non-federal with an additional $20,000 for LERR. A wetland creation project is identified using the new-work dredged material at a cost of $200,000, including $25,000 for lands. The first $100,000 of this wetland creation project would be shared as a navigation cost on a $60,000 federal and $40,000 non-federal basis, $20,000 of which would cover lands. The incremental cost of $100,000 would be shared as an ecosystem restoration project, also on a 75 percent federal and 25 percent non-federal basis, $5,000 of which would cover the incremental cost of lands. The non-federal partners, however, may be different for the navigation and wetland creation projects. All OMRR&R costs for the completed wetland project would be non-federal. This example is illustrated below.

Example 4

	Federal	Non-Federal
Shared as Navigation Cost	$60,000	$40,000
(Material Placement)	(60,000)	(20,000)
(LERR)	(0)	(20,000)[15]
Shared as Ecosystem Restoration	$75,000	$25,000
(Material Placement)	(75,000)	(20,000)
(LERR)	(0)	(5,000)
Total Wetland Creation Project	$135,000	$65,000
(Material Placement)	(135,000)	(40,000)
(LERR)	(0)	(25,000)

Example 5: Section 204 - WRDA 1992

The base disposal plan for a new-work harbor project is ocean disposal at a cost of $100,000 for dredging and placement in an open-water disposal site. The project deepens the harbor from 30 to 40 feet, so this cost would have been shared on a 75 percent federal and 25 percent non-federal basis to be paid during construction, with an additional 10 percent

[15] In cases where the non-federal sponsor of the navigation project is different from the non-federal sponsor of the ecosystem restoration project, the former must pay an amount equal to the credited LERR costs that would have been incurred for the base plan, the latter will be responsible for actually acquiring all LERR required for the ecosystem restoration project (including those that also would have been required for the base disposal plan).

non-federal share (directed to the 75 percent federal share) to be paid over 30 years. This 10 percent non-federal share could be offset by credit for the value of LERR. In this example, assume that there are sufficient LERR costs for the new-work navigation project to offset the requirement to contribute an additional 10 percent of general navigation facility costs. The cost share for dredged material disposal would have been $75,000 federal and $25,000 non-federal. A wetland creation project is identified using the new-work dredged material at a cost of $200,000, including $25,000 for land in addition to land required for the base project. The first $100,000 of the wetland creation project would be shared as a navigation cost on a $75,000 federal and $25,000 non-federal basis. The incremental cost of $100,000 would be shared as an ecosystem restoration project also on a 75 percent federal and 25 percent non-federal basis. All OMRR&R costs for the completed wetland project would be non-federal. This example is illustrated below.

Example 5

	Federal	Non-Federal
Shared as Navigation Cost	$75,000	$25,000
(Material Placement)	(75,000)	(25,000)
(LERR)	(0)	(0)
Shared as Ecosystem Restoration	$75,000	$25,000
(Material Placement)	(75,000)	(0)
(LERR)	(0)	(25,000)
Total Wetland Creation Project	$150,000	$50,000
(Material Placement)	(150,000)	(25,000)
(LERR)	(0)	(25,000)

C

Appendix C: Implementing Environmentally Beneficial Use Projects in Connection with Maintenance Dredging

Projects Under Section 204 of The Water Resources Development Act of 1986 (WRDA 1986)

General. The authority of Section 204 of WRDA 1986 is most applicable for using dredged material from maintenance activities from a federally maintained channel to protect, restore or create aquatic and ecological related habitat (wetland, shallow water habitat, reefs, etc.). The authority provides that such projects will be shared on a 75 percent federal and 25 percent non-federal basis for the costs above the base plan costs (least cost disposal consistent with sound engineering practice and meeting all federal environmental standards). This is a permanent authority so the projects do not require specific Congressional authorization. Also, USACE seeks a programmatic appropriation for this authority every year so that Section 204 projects do not require a new construction start decision or specific project appropriations. Because the annual appropriation limit for Section 204 is $15 million, it is most appropriate for smaller beneficial use projects (e.g., federal share of $5 million or less), although there is nothing in the Section 204 authorization that limits the size of the project. Detailed guidance on the policy and process for implementing Section 204 projects is contained in Appendix F, Amendment 1 of ER 1105-2-100, dated 31 January 2006.

Process for Section 204 Project in Conjunction with Maintenance Dredging

1. Opportunities for beneficial use projects are identified through dredged material management planning efforts, interagency planning and management efforts (National Estuary Program, Coastal

America, etc.) state or local planning efforts, or general coordination activities with federal and state resource agencies.

2. A feasibility study prepared by the USACE District office is required to demonstrate that federal participation in the project is warranted and justified. It is initiated based upon receipt of a letter from a potential non-federal sponsor to the District Engineer stating its desire to participate in a solution and acknowledging its financial responsibilities, and upon the availability of funds. The feasibility study is initially federally funded up to $100,000. The remainder of the feasibility cost is shared 50 percent federal and 50 percent non-federal and a Feasibility Cost Sharing Agreement is required. The non-federal sponsor must be a legally constituted public body with full authority and capability to perform the terms of the agreement. Once a determination is made to initiate a feasibility study, funds are requested from the Headquarters Program Integration Office through the appropriate Major Subordinate Command (Division Office).

3. The feasibility report includes all the planning activities required to demonstrate that federal participation in a specific project is warranted. All plan formulation, including all technical analysis, policy compliance determinations, real estate, and federal and non-federal environmental and regulatory compliance activities required for approval of the decision document must be completed during the feasibility study. All policy-compliant feasibility reports can be approved by the Division Commander. Any non-policy compliant reports need to be approved at USACE Headquarters in coordination with the Assistant Secretary of the Army for Civil Works.

4. Upon completion of the feasibility phase and approval by the Major Subordinate Command Commander, requests for funds, not to exceed $50,000, may be submitted to the Headquarters Programs Integration Office through the appropriate Major Subordinate Command Programs Office to initiate the design and implementation phase. The first action of the design and implementation phase is negotiation and execution of a Project Cooperation Agreement (PCA). The design and implementation phase includes negotiation and execution of the PCA, final design, preparation of contract plans and specifications, construction, and any other activities required to construct or implement the approved project. The design and implementation phase is cost shared 75 percent federal and 25 percent non-federal. This phase does not include operation, maintenance, repair, rehabilitation or replacement activities which are a non-federal sponsor's responsibility in accordance with the terms of the PCA.

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