Table 4. Continued

Financing Tool	How Financing Tool Works
Expand use of Harbor Maintenance Trust Fund by changing federal law[a]	Section 210(a) of RDA 1986 could be broadened to allow the trust fund to pay the costs for the deepening of federal channels used for commercial navigation. This would be consistent with GATT rules.
Encourage use of multiuser upland disposal sites by changing federal law[a]	Allow federal cost sharing for tipping fees when use of upland or confined aquatic disposal sites by dredger is required to comply with federal environmental regulations.

[a] This approach would increase financing available to local sponsors for disposal of dredged sediments at upland or beneficial reuse sites and confined aquatic sites.

As previously indicated, fee revenues are an important source of funding for dredging projects. Dredging-related fees are levied by federal, state, and regional governments and may be levied by private operators of private disposal sites.

Harbor Maintenance Trust Fund

The most significant fee connected with dredging activities is the HMTF fee. The U.S. Customs Service collects a tax equal to 0.125% of the value of cargo entering the United States from foreign countries, or leaving the United States for foreign countries, through ports open to public navigation. The tax is levied on all port users except international ferries and ships traveling between ports on inland waterways.

The tax applies to:

- commercial cargoes entering the United States or leaving the United States aboard a commercial vessel at a port and
- passengers for hire entering or leaving the United States aboard a commercial vessel at a port.

Revenues collected for this tax are used to fund work authorized by WRDA 1986, Section 210(a), and work authorized in WRDAs of subsequent years. Section 210 of this act initially allowed the HMTF to fund up to 40% of the total cost of maintenance projects nationwide.

In 1990, the Omnibus Budget Reconciliation Act raised the harbor maintenance tax to its present level and authorized the federal government to pay 100% of the costs for the operation and maintenance of federal channels from the HMTF. This work is administered by the Corps. Specific maintenance dredging projects are not submitted to Congress for approval but are approved by the Corps.

U.S. law restricts the use of the HMTF to projects benefiting commercial navigation. Because these funds are collected from vessels engaged in international trade, existing GATT agreements would preclude their diversion to other uses. However, the list of uses that benefit commercial navigation could be broadened by administrative action and, where necessary, by legislation.

For example, upland disposal sites could be recognized as necessary in some areas to provide environmentally acceptable disposal of sediments from maintenance dredging. Thus, using the HMTF for the 75% federal share of developing and using upland sites would be consistent with the goal of financing maintenance dredging and consistent with existing GATT agreements.

The HMTF had a surplus of $453.7 million as of September 30, 1994, $150 million greater than the previous year's balance of $303.5 million.

Dredging Fees

Other dredging-related fees charged by federal, state, and regional agencies are designed primarily to fund the cost of regulatory activities. These fees are summarized briefly below:

- RWQCB fees:
  - Waste discharge requirement (WDR) fees. RWQCBs require application fees ($2,000-10,000) for WDRs. The funds go into the RWQCB's General Fund. The cap on the fee is mandated by the state, and legislation would be required to modify the fee or the usage.
  - Bay Protection and Toxic Cleanup (BPTC) program. RWQCBs charge polluter fees ($10,000-20,000) per discharger to all major NPDES dischargers. These fees may not necessarily apply to dredgers. Funds go toward the administration of the BPTC program.
  - Regional Monitoring Program. RWQCB, District 2, has developed a voluntary program by which dredgers would provide money for monitoring. RWQCB is calculating the estimated fees to be used. Fees would be used to support overall San Francisco Bay water and sediment quality monitoring.
- BCDC dredging and disposal fee. This recently authorized fee of 10 cents per cubic yard was established to fund BCDC's involvement in the LTMS. The total accumulated amount of fees is not to exceed $650,000. BCDC's authorization to levy this fee will end in 1998. BCDC uses the funds to support LTMS dredging planning and implementation activities. State legislation would be required to extend or change the fee or modify its use.
- State Lands Commission (SLC) dredging and disposal fee. The fee of 25 cents per cubic yard is charged only for upland disposal in areas that are not used as a public resource. SLC also charges royalties for sand dredging and other resource extractions. State legislation would be required to modify this fee.
- Corps permit application fee. A fee of $100 per permit applies only to commercial projects by non-government applicants. For individual applicants of commercial projects, there is a $10 fee, which is charged for all non-federal projects.

Private Disposal Fees

Private operators, such as the Montezuma Wetlands restoration project, would generally charge tipping fees for disposal of dredged sediments at their facility. Operators of the Montezuma project presently plan to charge an average tipping fee of $7-8 per cubic yard. Dredging experts interviewed expect that Montezuma will charge a premium tipping rate for "unsuitable" sediments to be placed in the lower levels of its facility and charge lesser fees for clean sediments that are placed above the "unsuitable" sediments and used to "cap" them.

CASE STUDIES OF DREDGING AND DISPOSAL PROJECTS

The following case study summaries illustrate different approaches being used for financing dredging and disposal activities in the San Francisco Bay Area. The case studies include:

- the deepening of the Port of Oakland to 42 feet and the related wetlands restoration at the Sonoma Baylands,
- the deepening of the Port of Richmond to 38 feet, and
- the privately financed Montezuma wetlands restoration.

More detailed descriptions of these three projects, and the funding mechanisms used to finance the projects, are contained in Appendix A, "Case Studies".

Port of Oakland Deepening Project (Including the Sonoma Baylands Project)

The federal share of construction costs for this project is 75%. The Port of Oakland will continue to use its operating revenue to finance its share of project costs. The port will pay 100% of the project costs for developing and using one upland site: the Galbraith Golf Course. Because the Corps is constructing the Sonoma Baylands project and providing 75% of the funds, the Port of Oakland, which will not incur added costs for using this upland disposal site, will benefit indirectly.

Sonoma Baylands Wetlands Restoration Disposal Site

For this demonstration project, state and federal financing was approved by legislators on special terms. Upland disposal is not normally covered but was specifically authorized by Congress for this project in Section 106 of WRDA 1992. The California Coastal Conservancy, which administers a state land trust, provided 100% of the financing to acquire the land used for the project.

The Conservancy also financed planning studies for the project. Because the Corps' normal cost-sharing process counts the value of the land, the Conservancy is financing the 25% non-federal share of the project's costs. In addition, the Conservancy is financing 25% (approximately $1 million) of the excess costs that resulted from disposing of Oakland's dredged material at the Sonoma Baylands disposal site instead of using the designated ocean disposal site material.

With specific congressional authorization in Section 106 of WRDA 1992, the Sonoma Baylands project will receive 75% federal cost-sharing for its construction costs. These costs include the costs for a dike and other facilities needed to prepare the site to receive dredging sediments used for wetlands restoration.

Port of Richmond Harbor Deepening Project

In 1989, using state legislation that allows the creation of new assessment districts, Richmond created an assessment district that adjoins the harbor channel and includes 12 privately owned marine terminals, many owned by large oil companies. These private sector firms will benefit from the deepening. With annual assessments available from these firms for debt repayment, the Port is able to borrow the required 25% local sponsor share of the project's costs. The federal cost share will be 75% based on specific congressional authorization in Section 201 of WRDA 1986.

Montezuma Wetlands Restoration Disposal Site

Two private companies formed a joint venture to finance this project. One of the companies invested more than 1,800 acres of land in return for stock. To pay for its stock, the other company, an environmental engineering and science firm, is contributing expertise and cash to obtain permits, complete the design phase, and begin construction. The joint venture plans to borrow part of the construction funds for each of the four construction phases. Operating revenues, including tipping fees from dredgers disposing of dredged materials, are expected to cover operating costs, cover repayment of borrowed funds, and provide a profit to investors. No state or federal financing is being provided.

INSTITUTIONAL ISSUES

This section identifies institutional barriers to dredging and disposal financing and identifies policy options to overcome these institutional barriers.

Existing Institutional Barriers to Project Financing

The following institutional barriers now hamper financing of dredging and disposal activities; they make it far more difficult to finance the added costs of using upland and beneficial reuse sites:

- **Developing cost-sharing arrangements to include all local beneficiaries can be difficult.** When a channel to an upstream port, such as the Port of Sacramento, is deepened, many small harbors along the route also benefit. It is difficult, however, to project the benefits to small harbors, and it may be impractical to obtain their agreement to provide some financing for the project. Additionally, beneficiaries of deepening projects often include foreign-owned ships. Designing a structure that allows for cost sharing among such a widely dispersed group of benefitting parties is difficult.

- **Federal cost-sharing policies for dredging activities favor aquatic (in-bay and ocean) disposal methods.** The federal cost-sharing formulas for O&M work are based on the "federal standard". This standard requires the Corps to perform its dredging and disposal work in the least costly manner that is consistent with sound engineering principles and that meets all applicable federal and state environmental standards. In actual practice, the in-bay site would almost always be the lowest cost disposal site.

  For new construction work, the cost-sharing formulas are based on the approved NED Plan for the project. This would be the plan with the highest net economic benefit consistent with protecting the environment. In theory, it does not have to be the lowest cost plan. However, the environmental benefits from using a beneficial reuse or upland disposal site are rarely expressed in monetary terms or included in benefit-cost analysis in a way that increases the net economic benefit. In actual practice, the lower costs of an in-bay disposal site appear to have a major influence on the selection of the NED Plan.

  Unless it is approved as the NED Plan disposal site, the use of an upland site requires the local sponsor to pay all the added costs for disposal at such a site. In addition, the local sponsor must provide the site itself, paying for the costs for land, easements, rights-of-way, and utility relocations.

- **Programs for federal and state government participation in the acquisition and development of disposal sites for "unsuitable" materials are lacking.** Federal and state regulation changes in recent years have increased significantly the quantities of dredged sediments that are considered "unsuitable" for unconfined aquatic disposal. Local sponsors, such as the Port of Oakland, must now provide a disposal site and must pay all the added cost of disposing of such sediments. Although the increased need for such disposal sites arose from federal and state regulatory actions, no government programs exist to help local sponsors finance the acquisition of land or the development costs needed to create disposal sites for "unsuitable" sediments.

- **Prerequisites to qualify for federal financing of new project dredging can be costly.** Federal law requires ports to pay 50% of the cost of preauthorization feasibility studies and planning work for a dredging program in a lump-sum payment to the Corps. This requirement, which can be relatively costly, has caused some ports to fund dredging costs without federal assistance on a pay-as-you-go basis.

- **Corps cost-sharing procedures can dissuade potential local sponsors.** The Corps' standard project cooperation agreement requires agencies to agree to cost-share a fixed percentage of the total project cost, as authorized by Congress. Therefore, the non-federal sponsors' commitment is not a fixed amount. Because the Corps' budget estimate can include substantial amounts for contingencies there is a bias toward overestimating anticipated costs that discourage potential local sponsors.

- **Revenues available to disposal sites are limited.** The Sonoma Baylands project sponsors initially had hoped to charge a tipping fee for accepting dredged materials from the Port of Oakland's deepening project. The project sponsors eventually decided against charging a tipping fee because of the additional cost burden that the tipping fees would impose on the Port of Oakland under the Corps' cost-sharing policies. Without tipping fees or other income for debt repayment, a disposal site will be unable to raise private sector financing for future expansion.

- **Federal funds for disposal site monitoring are lacking.** After a disposal site is in use, no federal cost-sharing funds are usually available for site monitoring costs. An exception to this practice was approved specifically for the Sonoma Baylands project; however, monitoring costs typically must be borne by local sponsors or by other public agencies. No long-term mechanisms are available for monitoring; current funding is on an ad hoc-specific basis.

Potential Changes to Eliminate Institutional Barriers

Potential changes to institutional, policy, and legal barriers to financing dredging activities are described below:

- **Change federal cost-sharing formulas.** Federal laws and regulations could be changed to allow new project exemptions from the NED least-cost alternative requirements when EPA determines that alternative disposal sites are required to meet environmental standards. For maintenance dredging projects eligible for federal cost-sharing, this would allow 100% federal funding for NED-exempt projects, including federal funds for the costs of disposing of "unsuitable" dredged materials. Cost-sharing policies also could be changed to allow 75% federal cost-sharing for development of confined aquatic and upland disposal sites, such as was provided for the Sonoma Baylands project.

- **Authorize an agency to acquire and oversee upland disposal sites.** Proposed changes to WRDA 1995 have recommended that a state agency, such as the California Coastal Conservancy, be allowed to acquire and manage land for upland disposal sites of dredged material. Changes in state law would also be needed. Using funds in the Regional Dredging Trust proposed below, the agency would invest in development costs for its sites. The agency also would have authority to enter into public-private partnerships to obtain private financing to develop sites and to obtain site management and monitoring services.

- **Replace the existing state lands dredging fee and the BCDC dredging fee with a single regional dredging fee by changing current state law.** The fee would be paid when dredging applications are submitted to the "single stop" dredging permit office now on a pilot basis. The dredging fee would be set at a level to cover the costs for permit processing and provide funds to invest in upland and beneficial reuse sites. The fee should be high enough to provide a significant revenue stream into the proposed Regional Dredging Trust for expanding the use of upland sites.

- **Authorize the creation of a Regional Dredging Trust for dredging fees through new state legislation.** The dredging fees collected from dredgers, except for amounts needed to fund regulatory agency costs, would be deposited in a newly created trust. The amounts collected from year to year would vary with the level of dredging activity. The funds in the trust would be reserved to finance acquisition and development of sites for upland disposal of "unsuitable" dredged sediments and the beneficial reuse of dredged sediments. Such funds could also be used for site monitoring. These funds could not be spent for other state government purposes.

- **Provide dredgers with incentives to reduce use of in-bay disposal.** State regulatory agencies could consider an added fee or surcharge levied on large dredgers for disposal of dredged materials at in-bay disposal sites. Regulatory agencies could further consider setting firm quotas on the amounts of dredged materials that could be disposed of in the bay. Because some dredgers, such as federal agencies, cannot pay such fees, dredgers could be allowed to trade or sell portions of their in-bay disposal entitlements to other dredgers. A portion of such sale proceeds could be collected for administration of the program and to add to funds in the Regional Dredging Trust.

- **Raise revenues for operators of upland disposal sites by enabling them to charge tipping fees.** Tipping fees could be paid by dredgers disposing of materials at upland disposal sites. The fees would be collected by site operators and could offset part of the proposed investment in site acquisition. They also could cover the costs of having an upland site manager provide continuing monitoring and management. To avoid negative incentives that would discourage the use of upland sites, tipping fees would need to be included in the costs shared with the federal government. This would require changes to federal law and the Corps' regulations.

- **Change policies on the use of the HMTF.** With the approval of Congress, regulations and policies concerning the HMTF could be changed so that the fund pays the federal 75% cost share for channel-deepening projects serving commercial navigation.

  An obstacle to the increased use of the HMTF, the federal budget balancing procedures could be surmounted by transferring to the HMTF those expenditures for deepening commercial navigation channels that are now paid for through the regular Corps budget. This budget "savings" would allow the same expenditures to be made through the HMTF, which would help to reduce the surplus in that fund.

Appendix A to LTMS EIS/EIR Appendix Q

Case Studies

Appendix A. Case Studies

Following are descriptions of the financing methods used to fund dredging and disposal activities associated with three projects: the Port of Oakland deepening project, the Port of Richmond deepening project, and the Montezuma Wetlands restoration disposal site project. These projects were briefly summarized in the main Task 3 report.

PORT OF OAKLAND DEEPENING PROJECT (INCLUDING THE SONOMA BAYLANDS SITE)

Project Concept

The Corps will be receiving federal cost-sharing to deepen the inner harbor and the outer harbor from its present 38-foot depth to a depth of 42 feet. A recent study shows that 55% of the vessels calling on the harbor had design drafts greater than the present 38-foot depth and more than 20% had drafts greater than 42 feet. Competing ports, such as those in Seattle, Los Angeles, and Long Beach, already can handle vessels with drafts of 42 feet and greater.

The lack of an approved ocean disposal site has been a major factor contributing to the long delay in deepening Oakland Harbor. In September 1994, the present ocean disposal site was approved. Also in 1994, the proposed Sonoma Baylands wetlands restoration site was approved for upland disposal of clean sediments. The port's Galbraith Golf Course site will be used for upland disposal of sediments that are "unsuitable" for aquatic disposal. An estimated 6.6 million cubic yards will be removed in the deepening project. The disposal sites to be used by the Port of Oakland and the estimated quantities follow:

Ocean disposal site	2.9 million cubic yards
Sonoma Baylands site	2.5 million cubic yards
Galbraith Golf Course site	1.2 million cubic yards
Total	6.6 million cubic yards

Financial Summary

Total project costs are estimated at $8.5 million for the Sonoma Baylands project. Total project costs for the Oakland deepening project are expected to be in the vicinity of $85 million.

Costs for construction of the Sonoma Baylands project will be financed on a 75% federal, 25% non-federal basis. The authorization in Section 106 of the Water Resources Development Act of 1992 (WRDA 1992) also approved financing of postconstruction monitoring on a 75% federal, 25% non-federal basis.

The General Navigation Features (GNFs) of the Oakland deepening project will be financed on a 75% federal, 25% nonfederal basis. Since this is a navigation project, however, the Port of Oakland is also required to pay an amount equivalent to 10% of the project's cost over a period of no more than 30 years. Furthermore, the port must finance 100% of the costs incurred for upland disposal of dredged sediments at its city-owned Galbraith Golf Course site.

The port plans to use operating revenues to finance its investment in the deepening project. It plans to invest $13.5 million in lands, easements, rights-of-way, relocations, and disposal (LERRD) sites. The port can credit the amount of its LERRD investment against the required future payment of 10% of the project costs.

Financing for Sonoma Baylands

In 1990, the nonprofit Sonoma Land Trust acquired an 830-acre hay ranch near the mouth of the Petaluma River, using $1.75 million in grants from the California Coastal Conservancy for the land purchase and for a $250,000 design plan for the southern piece of the property.

In April 1994, the Conservancy authorized the expenditure of up to $2,125,000 to provide the 25% local cost-share required for the project, so the U.S. Army Corps of Engineers (Corps) could begin construction at the Sonoma Baylands site.

The Conservancy will receive credits against its required 25% for the cost of lands, postauthorization engineering and design and utility modifications. It has also allocated $1 million of the above $2,125,000 to pay the Conservancy's 25% share of future site monitoring and any remediation costs.

The Sonoma Baylands project is also required to finance the added cost of disposing of dredged sediments there versus the cost of ocean disposal. Currently, this added cost is budgeted at $3,820,000 by the Corps, including reserves for contingencies. The Conservancy has agreed to pay a 25% share of this $3,820,000, or $955,000. However, the actual costs of the Oakland project are likely to vary from the estimates and will probably be lower. The Conservancy has agreed to pay its

25% share of the Sonoma Baylands obligation by paying 1.095% of the total cost of the GNFs of the Oakland deepening project.

In a separate agreement, the Port of Oakland has agreed to cap the Conservancy's obligation at $1 million if the total costs of the deepening project exceed the budgeted amounts on which the added cost estimate was based.

Tables A-1, A-2, and A-3 summarize the financial characteristics of the deepening and disposal projects.

PORT OF RICHMOND DEEPENING PROJECT

Project Concept

In 1989, the City Council of Richmond authorized creation of an assessment district, the Harbor Navigation Improvement District. This allowed the local sponsor share of funding for the Richmond deepening to be recovered from private sector beneficiaries. The district is a geographical area that immediately adjoins the channel and includes 12 privately owned marine terminals, many of which are owned by large oil companies.

To assist Richmond, the State of California passed legislation authorizing local governments like Richmond to set up special assessment districts. The port will use assessment funds collected from this assessment district to pay its share of the cost to dredge the present 35-foot depths to 38 feet and to dredge an added foot of "overdepth".

An estimated 2,000,000 cubic yards will be dredged. Ocean disposal is planned for about 93% of the dredged material. The remainder, estimated at 150,000 cubic yards, will be "unsuitable" for unconfined aquatic disposal and will require an upland disposal site.

Once the project costs for deepening the inner and outer harbors are established, the port will use an engineering study to figure out the amounts of the assessments. Using the annual assessment payable as the source for debt repayment, the port will then be able to borrow the total amount of the investment funds needed for its share of the deepening costs.

To provide the equivalent of an upland site for the "unsuitable" sediments, the port now intends to remediate a toxic site with the material. The port states that it will have to pay 100% of the added cost of preparing these "upland" facilities to receive the "unsuitable" sediments.

The total project cost, for planning purposes, was estimated by the Corps at $33 million (Table A-4), or $16.50 per cubic yard. The port expects the upland portion to cost from $30 to $50 per cubic yard.

Table A-1. Estimated Costs for the Oakland Harbor Deepening Project

Type of Cost	"Recommended" Case (in thousands of dollars)
General navigation features	
Mobilization/demobilization	$11,722
Navy sewer line relocation	750
Dredging	29,376
PED through fiscal year 1994	19,488
PED, sunk and estimated costs, fiscal year 1994	105
Port's PED, sunk and estimated costs	3,700
Construction management	2,220
Monitor - ocean	1,620
Corps groundwater monitor	74
Galbraith return flow monitor	878
Subtotal	$69,933
LERRD	
Monitor/dry - Galbraith	878
LERRD costs - lands	3,766
LERRD costs - site preparation	8,876
Subtotal	$13,520
Other project costs	
Aids to navigation (U.S. Coast Guard)	120
Berth dredging (Port of Oakland)	581
Subtotal	$701
Total cost of project	$84,153

Notes: Total does not include cost of Beery Pier removal ($1,229).
PED = preconstruction engineering and design.
LERRD = lands, easements, rights-of-way, relocations, and disposal.

Table A-2. Current U.S. Army Corps of Engineers' Budget Estimates of Sonoma Baylands Financing

Type of Cost	Budgeted Cost (in thousands of dollars)
Lands, including land administration costs	$940
Relocation - utilities[a]	290
Levees and floodwalls (includes peninsulas)	1,640
Navigation - ports and harbors (the added costs of upland vs. ocean disposal)[b]	3,820
Engineering and design (includes estimate of work done in house by California Coastal Conservancy)	1,230
Construction management	580
Total	$8,500
Projected federal cost (75%)	$6,375
Projected non-federal cost (25%)	$2,125

[a] These costs and $100,000 for engineering will be credited toward the California Coastal Conservancy's 25% share of project construction costs.

[b] The total amount of these added costs, and the conservancy's 25% share of financing for them, is included in Oakland Harbor costs shown in Table A-1.

Source: U.S. Army Corps of Engineers data.

Table A-3. Cost Sharing: Port of Oakland Dredging Costs

Type of Cost	Cost (in thousands of dollars)	Cost Share (percent)
Port of Oakland		
Preconstruction share	$16,719	
Berth costs	581	
Port's LERRD	13,520	
Postconstruction 10%	6,688	
LERRD credit	(6,688)	
Subtotal	$30,819	37
Federal costs		
General Navigation Features	$52,450	
Aids to navigation	120	
Subtotal	52,570	62
California Coastal Conservancy (1.095% of General Navigation Feature costs)	764	1
Total cost of project	$84,153[a]	100

Note: LERRD = lands, easements, rights-of-way, relocations, and disposal.

[a] Does not include contingency amounts for possible modifications to Oakland dredging contract or for variations of actual quantities dredged from quantities estimated in budget.

Source: February 1995 estimates from Port of Oakland.

In WRDA 1986, Congress authorized deepening the Port of Richmond, with the port paying 25% of the cost, based on ocean disposal. The present ocean disposal site was developed through the LTMS effort and was designated in September 1994. The port now expects to begin construction in 1996.

Table A-4. Port of Richmond Deepening Financing Summary

	Cost (in thousands of dollars)	Cubic Yards (in thousands)	Cost per Cubic Yard (in dollars)
Total project cost (Corps' planning estimate)	$33,000	2,000	$16.50
Less disposal site acquisition, site preparation and disposal of unsuitable sediments (port's midrange estimate)	$6,000	150	$40.00
Equals (indicated cost of ocean disposal)	$27,000	1,850	$14.59

MONTEZUMA WETLANDS RESTORATION PROJECT

Project Concept

Two private sector firms have formed a joint venture corporation to create a wetlands restoration project that will restore 1,800 acres of tidal brackish and seasonal marsh in the San Francisco Estuary, 40 miles northeast of San Francisco. Montezuma will be the largest tidal wetlands restoration in the western United States.

The site has the capacity to accept about 20 million cubic yards of dredged sediments from multiple users, which will raise the former marsh back to natural intertidal elevations. It will be able to accept both "cover" and "noncover" sediments, as classified by the San Francisco Regional Water Quality Control Board.

One sponsor, Catellus Development Corporation, will provide the land, and the other sponsor, Levine Fricke, an environmental engineering and science firm, will provide know-how and funds to start the project. A portion of the Phase One construction costs (Table A-5) may be financed through loans or through advances from users. User fees for beneficial use disposal are estimated at $7-8 per cubic yard, which is comparable to the costs of ocean disposal. From these fees, Montezuma will pay operating costs, make additional capital improvements, repay financing, and earn a return on its shareholders' investment.

When restoration has been completed, about 10 years after Phase One begins, the sponsors plan to donate the wetlands to a public agency or conservation group for permanent wildlife protection and public enjoyment. The sponsors will provide a maintenance and monitoring fund to accompany the gift.

Table A-5. Montezuma Wetlands Restoration Financing Summary

	Cash Investment (in thousands of dollars)
Project planning, environmental studies, permitting (Note: planning work on project began in 1989.)	$3,000
Land investment by landowner (for stock in venture)	0
Design	$1,000
Construction of Phase One (includes offloading of equipment, relocating roads and utilities)	$8,000
Total investment through Phase One	$12,000

Notes: Construction of Phases Two through Four will be financed through tipping fees.

Operations: From tipping fees collected, the venture will pay project operating costs, including sediment placement, marsh restoration, and ongoing administration; costs of biological, chemical, and physical monitoring; taxes to Solano County; and costs for capital improvements for Phases Two through Four.

Appendix B to LTMS EIS/EIR Appendix Q

NED Planning and Benefit-Cost Methodology

Appendix B. NED Planning and Benefit-Cost Methodology

This appendix presents a description and evaluation of the National Economic Development (NED) planning process, which is used for new construction work. It also describes how benefit-cost analysis is used to implement it. Specific objectives of this evaluation are to:

- describe briefly the NED planning process and the valuation techniques used to perform the analysis,
- identify how use of these techniques precludes consideration of beneficial reuse of dredged material, and
- identify possible changes in these techniques to give beneficial reuse considerations full and equal standing with traditional cost considerations.

REGULATORY BACKGROUND

The federal objective of water and related land resource planning is to contribute to NED consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other federal planning requirements (U.S. Water Resources Council 1983).

The U.S. Army Corps of Engineers (Corps) and other federal agencies dealing with water resources development are required to follow certain principles and guidelines for cost-benefit analysis, as approved in the Water Resources Planning Act of 1965 (PL 89-80) as amended (42 USC 1962a-2 and d-1). The President approved the current principles on February 3, 1983. These principles and guidelines (P&G) were developed with the help of a large group of experts from a variety of professions after extensive public comment.

The P&Gs are intended to ensure proper and consistent planning by federal agencies in the formulation and evaluation of water and related land resources implementation studies. To provide more specific guidance on steps for implementing the P&Gs, the Corps issued ER 1105-2-100 on December 28, 1990, which includes detailed procedures for the analysis of navigation projects, deep-draft navigation, and environmental considerations.

Local non-federal sponsors of dredging projects must follow the planning process specified in these regulations to qualify for federal cost-sharing on new projects. Among the key points covered in these regulations are:

- A federal interest must exist. This is based on the type of improvements needed, public purpose, public access, and the commerce served.

- NED benefits must be expressed in monetary units and a benefit-cost analysis prepared for each alternative plan.

- Special procedures in the NED planning process are used to set monetary values for safety, risk reduction, and recreation experience outputs.

- Environmental benefits are not generally included in benefit-cost analysis studies because most benefits are not expressed in monetary terms.

- Monetary benefits affecting local economic development and regional economic development are not used to justify a project.

- The analysis compares long-term forecasts of the project's expected net economic benefits with the economic benefits expected if the project is not approved.

- The plan selected as the NED Plan is the planning alternative that reasonably maximizes net NED benefits.

As outlined in the Corps' ER 1105-2-100, the deep-draft navigation projects for which NED Plan analysis is done include the construction of new harbors and channels and improvements to existing or natural harbors on the sea coasts to meet the requirements of ocean-going and Great Lakes shipping. Harbor improvements also include such structural projects as the construction of protective breakwaters and jetties and the provision of entrance channels, interior channels, turning basins, and anchorage areas. The planning process also covers nonstructural deep draft measures, including improved traffic management and pilotage regulations.

NED PLANNING

The general process used for NED planning is outlined in Table B-1; the specific planning process used for navigation projects is outlined in Figure B-1.

Valuation Methodology

Key elements of the valuation methodology include the time period used for analysis; the type of benefits assessed; operation, maintenance, and replacement (OM&R) costs; and the determination of net benefits. These issues are discussed below.

Table B-1. Steps in NED Planning Process

A. Specify the water and related land resources problems and opportunities associated with the federal objective and specific state and local concerns

- Broad statement of each problem and opportunity identified
- Statement of desired conditions for the future for each problem or opportunity

B. Inventory, forecast, and analyze related land resource conditions in the planning area relevant to the identified problems and opportunities

C. Formulate alternative plans covering all reasonable alternatives

D. Evaluate the effects of the alternative plans

- Assessment of differences between "with-plan" and "without-plan" conditions for each category of effects
- Appraisal to assign social values to technical information gathered in assessment

E. Compare the alternatives, focusing on differences among alternative plans

- Economic benefits and costs for national economic development
- Economic benefits and costs for regional economic development
- Beneficial and adverse effects on environmental quality
- Other social effects of alternative plans

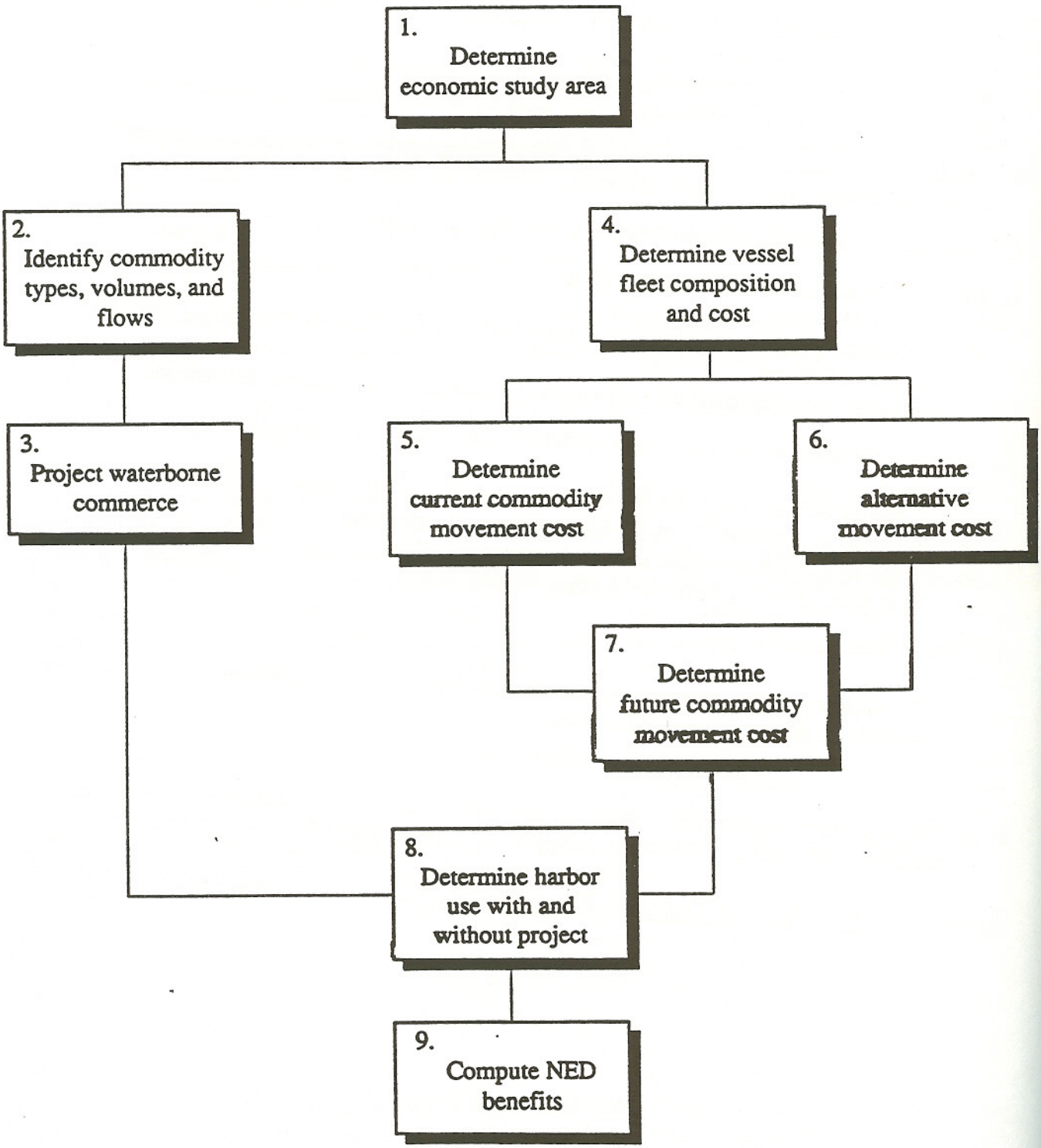
F. Select a recommended plan

- The alternative plan with the greatest net economic benefit consistent with protecting the nation's environment is the NED Plan.

Note: The "net economic benefit" is based on forecasts of the stream of economic benefits and the stream of costs over the life of the project. A project life of 50 years is assumed.

Source: U.S. Army Corps of Engineers, ER 1105-2-100, Chapter 5, "Planning Principles".

Figure B-1. Flowchart of Deep-Draft Navigation Benefit Evaluation Procedures



Source: U.S. Army Corps of Engineers, ER 1105-2-100, Chapter 6, Economic Considerations

Time Period

The evaluation process compares NED benefits and costs at a common point in time, using financial techniques to discount future benefits and future costs to their present value. The analysis covers a time period that is relevant to the planning alternatives being compared. A planning period of 50 years or more is generally required.

Project Benefits

Using specialized forecasting techniques, the pattern of expected benefits from the project (the "benefit stream") is estimated over the time period studied for each alternative plan under consideration. The NED Plan for dredging projects must be formulated using navigation benefits only. Land creation is not considered in the net benefit evaluation.

As explained in the NED procedures manual (Institute for Water Resources 1991), navigational benefits may arise from:

- reduced cost of transportation through use of vessels instead of other modes of transportation (modal shift), through safer or more efficient operation of vessels and/or use of larger and more efficient vessels (channel enlargement), and through use of new or alternate vessel routes (new channels or port shift);

- increased net return to producers from access to new sources of lower cost materials, or access to new and more profitable markets (shift of origin or destination); and

- increased production through new or greater production opportunity (commercial fishing and offshore minerals) or new economic activities involving new commodity movements (induced movements).

OM&R Costs

The analyst forecasts the expected costs over the study's time period for OM&R necessary to maintain the benefit stream of the project and agreed-upon levels of mitigation of losses to fish and wildlife habitats.

Net NED Benefits

The Corps policy is to require calculation of the present values of the benefit stream, the OM&R costs, and the deferred installation costs to the beginning of the time period studied. The present value is then converted to average annual equivalent terms, and the net NED benefits are calculated in average annual equivalent terms.

PROVISIONS APPLYING TO ENVIRONMENTAL BENEFITS

The following key provisions of the NED planning process apply to evaluating environmental benefits.

- **Environmental contributions are usually measured in terms of outputs and therefore are not included in benefit-cost calculations.** As provided in current regulations (ER 1105-2-100), the environmental quality (EQ) effects must be evaluated with and without the project. These are recorded in the EQ account for the project, not the NED account. The EQ account uses non-monetary outputs such as habitat units created and acres of wetlands restored.

  Any contributions or effects that can be measured in monetary terms could be included in the NED account. However, little guidance is provided concerning what should be included. One guideline does allow including monetary values in cases where a project provides net NED benefits for flood damage reduction, navigation, and other traditional benefit categories (Institute for Water Resources 1994). Wetlands projects may also be credited for the filtration of runoff water and groundwater discharge (Tong pers. comm.).

- **A neutral process for valuing environmental benefits exists in the Water Resources Development Act of 1986.** Section 907 of that Act directs:

  > In the evaluation by the Secretary [of the Army] of benefits and costs of a water resources project, the benefits attributable to measures included in a project for the purpose of environmental quality . . . shall be deemed to be at least equal to the costs of such measures.

- **Incremental analysis is now widely used on environmental projects**. These techniques can be used to calculate changes in costs for increasing levels of environmental output. When the analysis shows an output level that costs considerably more per unit to produce, such as cost per habitat unit, the planner may question whether the added environmental output is "cost effective".

- **Decisions to include incremental environmental features in projects appear to be linked closely to "cost-effectiveness" as determined by incremental analysis.** P&Gs include the following requirement:

  > In general, in the formulation of alternative plans, an effort is made to include only increments that provide net NED benefits after accounting for appropriate mitigation costs. . . . Increments that do not provide net NED benefits may be included, except in the NED Plan, if they are cost-effective measures for addressing specific concerns. (paragraph 1.6.2.[b].)

Planning guidance in ER 1105-2-100 further requires:

> An incremental cost analysis shall be performed for all recommended mitigation plans. The purpose of incremental cost analysis to discover and display variation in cost, and to identify and describe the least cost plan. (paragraph 7-35h.)

- **The 75% federal share of General Navigation Feature costs for most new federal navigation projects is based on the costs of the NED Plan.** This plan reflects the costs of the least-cost environmentally acceptable disposal alternative. Cost sharing is based on this NED Plan alternative, regardless of which disposal plan is actually chosen. In the San Francisco Bay Area, this standard often means the cost for in-bay disposal.

- **Creation of land or wetlands is not considered in the net benefit evaluation.**

- **Toxic cleanup costs are the responsibility of the local sponsor.** Any costs incurred with the cleanup of hazardous materials located on project lands (including submerged lands) and that are covered under the Comprehensive Environmental Response Compensation, and Liability Act are considered a non-federal responsibility for which no cost-sharing credit is given.

- **The continuing review of federal costs by congressional budget-cutters leads the Corps to be conservative in the scope of spending approved.**

IMPACT ON BENEFICIAL REUSE OF DREDGED MATERIAL

The effect of these provisions on the beneficial reuse of dredged materials can be summarized as follows:

- **The NED Plan process does not recognize any value for the creation of land or wetlands.** Therefore, the NED Plan would not be a plan that includes such costs and makes such extra costs eligible for federal cost sharing.

- **The lack of federal cost-sharing would make a sponsor prefer the lowest cost plan that will qualify for the necessary environmental permits.** There are no incentives to incur the extra costs for beneficial reuse.

- **The use of incremental analysis on environmental projects sometimes creates new difficulties that can cause projects to be rejected.** While incremental analysis is intended to promote cost-effectiveness, it sometimes results in unworkable solutions. Although the process asks the planner to identify combinable management measures, problems still occur. For example, such analysis can lead planners to insist that only part of an environmental project be done when the physical layout of the project area makes a partial solution impossible. (Getzen pers. comm.)

- **The NED Plan is formulated by treating all environmental matters as a net zero, financially, except for the penalty of added costs for environmental cleanup.**

POSSIBLE CHANGES IN PROCEDURES

Possible changes in the procedures that would give beneficial reuse considerations more equal standing with traditional cost considerations are identified below:

- **Use the Section 204 program funding for ecosystem restoration projects in connection with dredging, with emphasis on beneficial reuse sites.** If the ecosystem restoration project is part of the base plan, it is considered a navigation harbor construction cost and is eligible for federal cost-sharing (EC 1105-2-209, paragraph 4a).

- **Evaluate maintenance dredging projects for possible use of Section 1135 funds**. Link approval of projects to areas where a civil works project contributed to degradation of the area, where a cost-sharing partner is available, and where restoration is achievable through modifying an existing project.

- **Approve a trial period in which a valuation technique is provisionally allowed for wetlands and creation of upland disposal sites.** The sponsor could be allowed to propose a technique based on mitigation costs or on opportunity costs related to other uses of the land that were given up to allow the wetland use to occur. The values of the environmental benefits must be established through legal or institutional recognition, scientific recognition, and public perception of value (EC 1105-2-209, paragraph 4b).

- **Support a program of using monetary values for environmental benefits on a trial basis, proposing values to be used for a project in the reconnaissance study.**. Special techniques are now used to value such intangibles as safety, risk reduction, and recreational experience. Guidance from Institute for Water Resources (1995) suggests developing a summary of "look up" NED environmental benefit estimates for use in incremental justification. On a trial basis, market-based techniques, hedonic prices, and the contingent value method could be tested.

- **Make greater use of the exception authority that exists to approve projects with significant environmental features.** ER 1105-2-100 states that the NED Plan is to be the base plan accepted *unless* the secretary of a department or head of an independent agency grants an exception when there is some overriding reason for selecting another plan, based on other federal, state, local, or international concerns.

  The Secretary of the Army has approved such NED Plan exceptions in some cases. The Secretary of the Army approved an exception to the NED Plan for the Houston-Galveston deepening project for the purpose of adding wetland creation to the project.

The added costs incurred in these cases were cost-shared on a 75% federal, 25% local sponsor basis. (Worthington pers. comm.)

- **Through greater restrictions on disposal of dredged materials in the bay, the U.S. Environmental Protection Agency and the Regional Water Quality Control Board could effectively increase the cases where upland disposal sites are the least cost environmentally acceptable plan.**

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