1.0 EXECUTIVE SUMMARY

Introduction

This Environmental Impact Statement (EIS) presents information about the environmental effects of various dredging and disposal alternatives for the Federal Providence River and Harbor Maintenance Dredging Project and seventeen non-Federal projects in Rhode Island. The EIS was prepared in compliance with the National Environmental Policy Act of 1969 (NEPA) and describes compliance with all applicable Federal and State environmental regulations, laws, and executive orders. The Notice of Intent to Prepare a Draft EIS for the project was published in the Federal Register on April 29, 1994.

The U.S. Army Corps of Engineers, the lead agency for this EIS, coordinated with relevant agencies, organizations and the public in developing the scope for and preparing the EIS. The primary issues identified during the EIS scoping process were:

- alternatives to dredging
- alternative disposal sites
- dredging costs
- effects on fish and the fishing industry
- sediment quality and related dredging and disposal effects
- water quality effects
- effects to the marine environment (such as eelgrass, shellfish beds, spawning areas)
- navigation safety and accident potential
- economic impacts of shoaling

Purpose and Need

The purpose of the Providence River and Harbor Maintenance Dredging Project is to restore the navigation efficiency and safety of the Providence River Shipping Channel for deep draft vessel traffic by restoring the authorized depth of 40 feet (12 meters) below mean low water.

The benefits of deep draft navigation include cost reductions for shippers transporting goods, which are directly related to the costs consumers pay for products such as gasoline, home heating oils, and other products. Without dredging, existing conditions in the channel will continue to deteriorate, resulting in even greater restricted access for larger vessels to the Providence River and Harbor and continued hazardous navigation conditions. All of the economic benefits of the port would be foregone. Without a viable port, oil and other goods would have to be transported by truck resulting in increased traffic and associated air quality impacts and higher costs for goods. The bottom sediment would continue to be disturbed and resuspended by vessels passing over shoals. An assessment made of the potential for increased oil spills due to lightering (transfer of cargo between larger and smaller vessels) did not indicate an increased risk under existing conditions. However, continued shoaling (reduction in water depths due to disposition of sediment) could increase the potential for groundings in the future, which would increase the potential for oil spills or the release of other hazardous materials into the harbor.

Description of the Providence River Federal Navigation Project

The Federal navigation project, a 16.8 mile (27 kilometer) long channel, begins near the head of Providence Harbor and follows the river on a southerly course to deep water near Prudence Island (Figure 1-1). The upper two and one-half miles comprise the Main Harbor. Providence River and Harbor together constitute the principal commercial waterway in Rhode Island. The deep-draft traffic in Providence River and Harbor consists mainly of tankers, barges, and general cargo vessels.

There has been no significant dredging in Rhode Island in approximately 22 years, since the last time the Providence River and Harbor Navigation Project was dredged in 1976. Since its last dredging, shoaling has reduced controlling depths in the channel to as shallow as 30 feet (9.2 meters) below mean low water. The present level of shoaling has forced the Coast Guard to place one-way traffic and draft restrictions on ship traffic in the channel.

Dredging the channel to restore the authorized dimensions will require removal of 4 million cubic yards (3 million cubic meters) of sediment. Four million cubic yards of material is enough to cover 160 acres (0.65 square kilometers) of land twenty feet (6 meters) high. These figures demonstrate the magnitude of the disposal problem addressed in this EIS.

In the water, the material would take on a mound shape and cover up to 530 acres of the bottom. More than a quarter of the material (1.2 million cubic yards) is, due to contamination, considered unsuitable for ocean disposal without being managed to reduce the potential for impacts. Sediments deposited in the channel come from resuspended sediment in the Providence River, input from Narragansett Bay, and the surrounding watershed. Any reductions in sediment input from upland sources would lower the rate of sedimentation in the channel, reducing the need for future dredging.

An evaluation of the need for dredging to achieve the full authorized width and depth of the channel at the present time, instead of dredging the project in phases, indicated that the full project should be dredged now to fulfill its authorized purpose.

Non-Federal Dredging Projects

Seventeen applicants have requested permits from the Corps of Engineers under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. These applicants fall into two groupings. The first includes the marine terminals and facilities that directly depend upon the Federal navigation channel to provide access and maintain operations (six locations). The second includes marinas and other facilities located throughout Narragansett Bay and related waters that have expressed an interest in dredging because the Federal project dredging represents an opportunity to use an active disposal site. An estimated 458,000 cubic yards (350,000 cubic meters) of material would be dredged from these projects.

Alternative Disposal Sites

Twenty-nine disposal options at 18 different locations are evaluated in detail in this EIS (Figure 1-2). These sites were identified from an original list of 158 potential upland (on-land disposal), open water, and beneficial use sites. Beneficial use means, for example, creation or restoration of a salt marsh. The sites that are evaluated in detail include three open water sites in Narragansett Bay; four open water sites in Rhode Island Sound; seven beneficial use habitat creation sites, with various size options; two beneficial use park creation/expansion options; and

Figure
1-1 Federal Navigation Project and Limits of Dredging

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Figure
1-2 Sites Under Consideration for Dredged Material Disposal

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and five upland alternatives, including a landfill option. The major advantages and disadvantages of the alternatives are listed in Table 1-1, along with the alternative of not dredging.

Table 1-1 Primary Advantages and Disadvantages of the Major Types of Alternatives Considered for the Providence River and Harbor Maintenance Dredging Project.

Type of Alternative	Primary Advantages	Primary Disadvantages
No Action		
Dredging not Implemented	Results in no impacts to disposal site and dredging site resources over existing conditions and may eventually result in restoration of some of the former characteristics of the upper estuary.	Would result in the eventual elimination of commercial navigation from the harbor and channel and severe economic impacts.
Confined Aquatic Disposal (CAD) Cells		
Disposal in CAD Cells in the ship channel	Results in isolation of contaminated sediments in the vicinity of dredging and their present location and over a relatively small surface area.	Requires dredging and disposal of additional volume, prolonging the duration of dredging, and is relatively expensive. May not be affordable for smaller marina facilities.
Open Water Sites		
Disposal at open water sites in Narragansett Bay or Rhode Island Sound	Does not result in a long term change in habitat type, impacts are of short duration, and cost is lowest among alternatives. Contaminated sediments can be capped and isolated from the environment.	Results in short term (up to three years) impacts to water quality, sea bed habitats, and fishing industry. The cap must be suitable to allow all existing uses in a heavily used area to continue.
Upland Sites		
Upland disposal (i.e., disposal on existing land)	Avoids disposal in the aquatic environment and associated impacts.	Is very expensive, requires multiple handling of dredged material with associated water quality impacts, results in land use, air quality and traffic impacts.
Upland landfill disposal	Avoids disposal in the aquatic environment and associated impacts.	Is very expensive, requires multiple handling of dredged material with associated water quality impacts, results in air quality and traffic impacts, and loss of landfill space.

Beneficial Use Sites		
Salt marsh construction	May result in a net increase in the value of aquatic habitats and enhance the value of surrounding habitats.	Results in a permanent change in the type of aquatic habitat and is relatively expensive. Capacity is low relative to the total quantity of material to be dredged.
Island construction	May provide important water bird habitat and may minimize the surface area affected by disposal.	Results in the permanent conversion of aquatic habitat to upland island habitat, is difficult to construct and relatively expensive. Impacts to existing waterbird use may occur while the material dewaters.
Park construction	May provide important shoreline recreational facilities.	Results in the permanent conversion of aquatic habitat to upland and is relatively expensive. Would not be useable until the material properly dewaters.

Confined Aquatic Disposal (CAD) Cells

This option would involve the construction of a number of discrete pits within the upper reaches of the ship channel. The pits would be located in the channel area where the material is considered unsuitable for ocean disposal without management. The unsuitable material in the channel (down to 40 feet (12 meters) mean low water) that lies above the pits would be excavated and initially placed into scows (dredged material barges) and set aside. The material suitable for open water disposal (below 40 feet (12 meters) mean low water) would then be dredged and placed at an open water disposal site. The unsuitable material would then be deposited into the CAD pit from the scows.

The quantity of contaminated material from the Federal project that would be placed in the CAD cell is 1.2 million cubic yards (920,000 cubic meters). The volume of material would increase during excavation as air and water are incorporated, so that the volume that would have to be disposed at another site would increase from 1.2 million cubic yards (920,000 cubic meters) to about 1.56 million cubic yards (1.2 million cubic meters).

Two alternative CAD cell locations were considered: in the upper reach of the channel, and adjacent to the channel at Site 150 near Watchemoket Cove. Both locations have relatively low quality estuarine habitat because of the concentrations of contaminants in the sediments. The relatively low habitat quality of both sites would be improved after the project is complete since the site would be capped with cleaner material.

The advantages of the CAD cell disposal are that it: permanently isolates from the aquatic environment contaminated material which is presently exposed; maintains the contaminated material near its present location, minimizing the risk of exposing new areas to contaminants; and allows the material to be disposed in a lower energy environment, minimizing the loss of material during disposal and prior to capping.

There are several major disadvantages to CAD cell disposal. The first is the increased volume of material that must be excavated to create a CAD cell, which results in a longer project

completion time, a larger volume of clean material, and an increased duration of time that areas near the CAD cell will be exposed to elevated concentrations of suspended solids. The additional material that is suitable for open water disposal would increase the quantity of material for open water disposal and would therefore increase the duration of disposal, and associated duration of suspended sediment concentrations in water, and increase the size of the disposal mound. Finally, the cost of CAD cell disposal is much higher than capping at an open water site. It would increase the cost compared to capping at the lowest cost open water site by approximately $36 million.

Open Water Sites

Three open water sites are located in Narragansett Bay and four are located in Rhode Island Sound. For disposal at the open water sites, dredged material would be loaded onto a scow and deposited at specified locations within the site. The disposal at the open water sites would create a mound up to 25 feet (7.6 meters) thick.

When the dredged material is deposited at any of the open water sites, sediments are released into the water in the course of the mixing that occurs as the sediments fall to the sea floor. The sediments contained in the water can adversely affect resources such as fish and other marine animals and plants. Disposal at the open water sites would temporarily increase suspended sediment and contaminant concentrations. After about four hours following each disposal event, these concentrations would generally fall to levels that would not adversely affect nearby resources. Water quality testing found that predicted initial suspended sediment and contaminant concentrations exceed water quality criteria without dilution, but modeling indicated that this dilution is achieved rapidly at the potential open water disposal sites.

Currents at the Narragansett Bay sites reach speeds that can erode unconsolidated material up to several times per month, compared to about 10 times per year for the Rhode Island Sound sites. After a period of time, dredged material deposited at an open water site consolidates and “armors” itself against further erosion and becomes stable over the long term. The potential for erosion is most important if contaminated material is placed at the open water sites. Capping could be conducted at the open water sites in Narragansett Bay.

The magnitude of impacts to living resources at the disposal sites depends on the compatibility of the material with existing sediment at the site, the quality and quantity of resources at the site, and their ability to recover after disposal. In general, all of the open water sites have sediments compatible in grain size to the Providence River material, and recovery of sea bed species, finfish, and wildlife is expected to occur within four months to one year after the completion of disposal operations. Mobile animals would leave the area disturbed by disposal operations, but sedentary species would be destroyed. Threatened and endangered species (i.e., certain whales and sea turtles) do not typically occur in upper Narragansett Bay where the potential Narragansett Bay open water sites are located, but threatened and endangered whales and sea turtles may occur at the sites in Rhode Island Sound.

The assessment of the potential impacts to the fishing industry of using an open water disposal site indicated that for the more impacted sites the economic cost could be in the range of $600,000 over the three-year construction and recovery period. Commercial fishing could resume after disposal operations are complete.

All of the sites in Narragansett Bay and Rhode Island Sound have the potential to contain historic and archaeological resources. Documented resources are in the vicinity of the

Narragansett Bay sites, but the precise locations are not known. There are no known historic or archaeological resources at any of the Rhode Island Sound sites. Any of the open water sites in Narragansett Bay or Rhode Island Sound would have to be surveyed for archaeological resources prior to disposal.

The open water disposal sites have the lowest disposal cost, and the cost of using these sites increases with distance from the dredging site.

Overall, Site 3, located between Prudence and Hog Islands, appears to have the least abundant resources, except lobsters, of the open water disposal sites considered. Lobster abundance was highest at Site 3 by a small margin compared to the two other Narragansett Bay sites. Disposal at this site would decrease the maximum depth from about 70 feet (21 meters) to about 45 feet (14 meters), changing the characteristics of the site as a deepwater refuge.

Upland Sites

Five upland disposal sites (i.e., sites based on land), including one landfill, are evaluated in the EIS. At all of the upland sites, construction of the dewatering and dike facilities would be required prior to starting dredging. Dike construction would generally consist of gravel dikes 15 to 20 feet (4.6 to 6.1 meters) high. Once the dewatering and disposal facilities are constructed, material would be dredged from the channel by mechanical equipment, loaded into scows and transported to an offloading area near the dewatering site. Material would then be mechanically or hydraulically offloaded from the scow into trucks. The trucks would then transport the material to the nearby dewatering site, where it would be deposited. Once sufficiently dry, the material would be loaded onto trucks and transported over local roadways to the upland site. Assuming 26-cubic yard (20-cubic meter) dump trucks would be used, this would result in over 150,000 truck trips.

An area on Fields Point has been identified as a potential dewatering site, but its availability is not yet confirmed. If it is available, its use as a dewatering facility would preclude other uses over a period of approximately two or more years while the site was constructed, operated, and deconstructed. Dewatering would also involve a nearly continuous discharge of water containing suspended solids and dissolved and suspended contaminants into the upper Providence River.

Coordination with the Rhode Island Department of Transportation indicated that the only upland site under consideration with a suitable trucking route for transporting the dredged material is the Central Landfill. Disposal of dredged material at this site would involve the loss of a substantial amount of landfill capacity (over 4 million cubic yards or 3 million cubic meters), shortening the life of the landfill. Impacts of using the other upland sites are related to the substantial number of truck trips disposal would generate and changes in land use. Wildlife and wetland resources are generally not of high quality at the sites, and the facilities would be designed to avoid offsite impacts due to runoff or groundwater contamination. Disposal of dredged material at an upland site would result in the creation of a solid waste landfill based on State regulations. The upland sites are also very expensive to use, but avoid most of the impacts associated with aquatic sites.

Beneficial Use Sites

Four types of beneficial use sites are considered: salt marsh restoration/creation, island expansion, park creation/expansion, and offshore reef creation.

Salt Marsh Restoration/Creation

Salt marsh construction would involve constructing confining structures and filling the site to salt marsh elevations, then planting. Two of the three salt marsh restoration/creation options considered appear to have the potential for net benefits to the environment that exceed their environmental costs. The sites are located at the head of the Providence River at Green Jacket Shoal (Site 60) and just outside of Watchemoket Cove (Site 150). Salt marsh construction at these locations would cover moderate-value sea bed resources and finfish habitats, but cover contaminated sediments and increase the overall quality of habitats in the upper river by restoring a pattern of habitats more similar to the historic pattern. However, the alternatives are very expensive based on their cost per cubic yard disposed and their cost per acre of salt marsh created. They do not appear to be eligible for further consideration under the Army Corps of Engineers authority for using dredged material to restore fish and wildlife habitat under Section 204 of the Water Resources Development Act of 1992.

Island Expansion

Island expansion alternatives involve the construction of confining structures and placing dredged material inside to elevations above the height of maximum tides. Two alternative locations for expansion of islands are considered in this EIS: Spar Island (Site 10) and Greene Island (Site 159). Three different sizes were considered for Spar Island: 4 acres (0.016 square kilometers), 50 acres (0.2 square kilometers), and 225 acres (0.9 square kilometers). In addition, a 740-acre (3 square kilometer) underwater disposal option for Spar Island was also considered but would have unacceptable impacts to fish resources. A 13-acre (0.05 square kilometer) island was considered for Greene Island.

The primary purpose of the island expansion sites would be to provide colony nesting waterbird habitats. Restoration of the eroded shoreline of Greene Island would be more effective if dredged material were used from projects with material coarser than that in the Providence River Federal channel. Coarse material could be placed without confining dikes reducing the construction cost. Two of the Spar Island expansion alternatives (or an intermediate size between the 4- and 50-acre sizes considered) appear to have the potential for net benefits exceeding their costs. However, their cost per acre of habitat created and per cubic yard disposed is very high. Other options for Spar Island using sand rather than the fine material available from the Providence River project could have a lower cost as well as providing a substrate more compatible with the existing sand and shell on the island. They do not appear to be eligible for further consideration under the Corps of Engineers' authority for using dredged material to restore fish and wildlife habitat under Section 204 of the Water Resources Development Act of 1992.

Park Creation/Expansion

The park alternatives are located in the upper Providence River and would involve confining the dredged material in structures adjacent to the shoreline as a foundation for park development. Since these alternatives result in filling of aquatic habitat, and other options are available with less environmental impacts, they are not consistent with the requirements of the Clean Water Act, Section 404 (b)(1) guidelines and are not recommended for implementation.

Offshore Reef Creation

The offshore reef alternatives involve creation of reef structures by placing the sediments in geotextile bags. The sites are located in Rhode Island Sound at sites also considered for open water disposal. The geotextile bag technology is expensive and does not appear to be at a stage to make this option feasible, and it is not presently recommended for further consideration.

Alternative Treatment Technologies

An assessment was conducted of alternative technologies, involving treatment of the dredged material, that could be applied instead of disposal at an open water site or beneficial use. This assessment was based on research performed for the recent Boston Harbor improvement project. The conclusions from the assessment are that, other than the dewatering/upland disposal alternative considered in this EIS, alternative technologies are not presently feasible.

Dredging Technology Assessment

Mechanical or clamshell dredging is the preferred method of removing the material from the Providence River channel and harbor. Hydraulic or cutterhead dredging would result in greater impacts and was not considered further. Among the three main mechanical dredge bucket types, the enclosed clamshell bucket appears to result in the best compromise between elevated solids levels at the dredging site and disposal sites.

Sediment Quality

Sediments from Providence River Federal channel were extensively tested and evaluated to assess their potential for environmental impacts. These evaluations were guided by the requirements of the Marine Protection, Research and Sanctuaries Act and the Clean Water Act, Section 404(b)(1) guidelines. The evaluations included assessment of metal and organic contaminant levels, toxicity to marine organisms, and the potential for bioaccumulation of metals and organic compounds.

Sampling was first conducted as part of evaluation for the project in 1992, with additional efforts conducted in 1993, 1994, and 1997. The first effort consisted of taking sediment samples along the length of the channel where shoaling has occurred. Based on the results of the 1992 sampling, biological testing of sediments (toxicity and bioaccumulation analyses) was conducted on several stations to further evaluate the potential environmental impacts.

In general, biological testing data indicated that the inner harbor sediments (1.2 million cubic yards (970,000 cubic meters) from the Fox Point Reach of the channel) should be managed to minimize the potential for adverse environmental impacts. Water quality assessments involved both measurement of the amount of contaminants released when the sediments are mixed with water and exposing organisms to the water mixed with the sediments to assess toxicity. Relatively lower contaminant concentrations in the upper layers of sediments suggest that the Providence River is receiving lower amounts of contaminants than in years past. Bioaccumulation testing indicated that contaminants do not have the potential to accumulate in aquatic animals to unacceptable levels.

U.S. Army Corps of Engineers Preferred Alternative

Based on the information and evaluations in this EIS, the Preferred Alternative is the alternative that the Corps of Engineers feels most closely fulfills its mission of maintaining the Federal project and its responsibilities under the Clean Water Act and other applicable laws. *The Preferred Alternative is preliminary, and does not constitute the final decision of the Corps of Engineers*. The review of the draft EIS and comments from the public and interested agencies will help the Corps to make the final decisions about the project in a Record of Decision which will follow the Final EIS.

The preferred alternative of the Corps of Engineers and the Base Plan is:

1. Allow marina facilities located outside of the upper Providence River to dispose of dredged material that is "suitable for ocean disposal without management" at Site 3, Hog Island South.

2. Dredge all reaches of the Federal channel and harbor using an enclosed clamshell bucket dredge and allow no overflow of the scow while it is being filled.

3. Dispose of material from the Fox Point Reach of the channel that is classified as unsuitable for open water disposal in a Confined Aquatic Disposal cell at Site 150, Watchemoket Cove. Allow non-Federal dredging projects with material classified as unsuitable for open water disposal to dispose of their material in the Confined Aquatic Disposal cell by paying the incremental cost through the State of Rhode Island.

4. Use material from the lower Fox Point/upper Fuller Rock Reaches, classified as suitable for open water disposal without restrictions, to cap the unsuitable material in the Confined Aquatic Disposal cell with at least 60 cm (24 inches) of material.

5. Dispose of the material excavated to create the Confined Aquatic Disposal cell classified as suitable for open water disposal at Site 3. During construction, temporarily store the unsuitable surface material excavated from the Confined Aquatic Disposal cell. Permanently dispose of the unsuitable surface material in the Confined Aquatic Disposal cell.

6. Dispose of the material from the Fuller Rock-Sabin Point Reaches south to the Rumstick Neck Reach at Site 3, Hog Island South in Narragansett Bay. This material is classified as suitable for open water disposal without management. Proceed with dredging and disposal southward.

No dredging windows (periods when sensitive life stages of aquatic species are least impacted) are proposed because the potential for impacts is small and windows are not practical for an 18-month project. However, it may be possible to minimize the potential for adverse effects to finfish and shellfish resources by sequencing dredging operations to avoid the most sensitive areas during the most sensitive times of year.

Modeling identified the potential to exceed the restrictive toxicity-based ocean disposal criterion when discharges of greater than 2,000 cubic yards (1,530 cubic meters) of material are conducted at the open water disposal sites with material from the lower Fox Point/upper Fuller Rock Reaches. Although, from a legal perspective, this criterion does not apply to the

Narragansett Bay sites, the Corps intends to limit the discharge volume for sediments from these portions of the channel to 2,000 cubic yards to ensure that the discharge does not exceed the criterion.

The total cost of the Preferred Alternative is $88.8 million. The cost per cubic yard is approximately $22 ($29 per cubic meter). This alternative requires State cost sharing of 25% of the cost of construction of the confined aquatic disposal cell. Of this initial cost of construction the State share is estimated at $7.4 million.

Scoping and Coordination

The Corps of Engineers, the lead agency for this EIS, met frequently with a group of agencies composed of the Federal Cooperating Agencies (U.S. Environmental Protection Agency, National Marine Fisheries Service, and the U.S. Fish and Wildlife Service) and the two State agencies with regulatory authority over the project (Rhode Island Coastal Resources Management Council and Rhode Island Department of Environmental Management) throughout the development of the Draft EIS. This agency coordination was conducted to ensure that the scope of the document encompassed all reasonably relevant and appropriate subject areas. The Corps also met several times during the development of the Draft EIS with a technical group assembled by the Rhode Island Coastal Resources Management Council, the designated State lead agency in coordinating dredging issues.

Following publication of the notice of intent to prepare a draft EIS, three formal public scoping meetings and a number of other meetings were held in May and June of 1994 throughout Rhode Island to determine the scope and significant issues to be analyzed in depth in the EIS. Additional meetings of the Cooperating/Regulatory Agencies, Governor's Commission on Dredging, its Technical Advisory Group, the former Technical Advisory Committee and Dredging Task Force were held periodically, as work on the EIS progressed. Members of the Technical Advisory Committee included representatives of Save the Bay, the Marine Trades Association, fishing industry organizations, shipping interests, the University of Rhode Island, and State and Federal agencies. The Corps also met with representatives of the fishing industry several times to discuss potential disposal alternatives, sampling plans, and other concerns and conducted two workshops on beneficial uses of dredged material.