

ENVIRONMENTAL ASSESSMENT

CHARLESTON HARBOR DEEPENING/WIDENING CHARLESTON HARBOR, SOUTH CAROLINA

INTRODUCTION

A. Project Authority and Purpose

Resolutions adopted by the Senate on March 27, 1990 and by the House of Representatives on August 1, 1990 authorized the U.S. Army Corps of Engineers to study Charleston Harbor and determine if any modifications should be made to the existing Charleston Harbor Project, with particular emphasis on deepening and/or widening the federal navigation channel.

B. Project Location and Description

The Charleston Harbor federal navigation channel is located in Charleston Harbor, South Carolina which lies approximately midway along the South Carolina coastline. It is approximately 140 statute miles southwest of the entrance to Cape Fear River, North Carolina and 75 statute miles northeast of the Savannah River, (see Figure 1).

The proposed project consists of deepening Charleston Harbor from a depth of 40 feet to 45 feet below mean low water (MLW) with two (2) feet of advance maintenance and two (2) feet of allowable overdepth. Furthermore, the project will also include realignment of the channel at Horse Reach and Shutes/Folly Reach to improve navigation by straightening the channel. The entrance channel will be 47 feet deep and 800 feet in width from the 47-foot ocean contour to station 0+00 inside the jetties. The channel will slope upward to 45 feet and remain at 800 feet wide to a point adjacent to Sullivans's Island where it will narrow to 600 feet wide. The remainder of the navigation channel will remain at the present 500 to 800 feet wide with the following exceptions. The Daniel Island Reach will vary from approximately 600 feet to 875 feet in width for the proposed terminal access and include a turning basin approximately 1200 feet in length. Upper Town Creek will be reduced to 16 feet deep and 250 feet wide. The entrance channel will not be deepened in any area where the present depth is already at 47 feet. In addition, two existing contraction dikes located on the west side of the

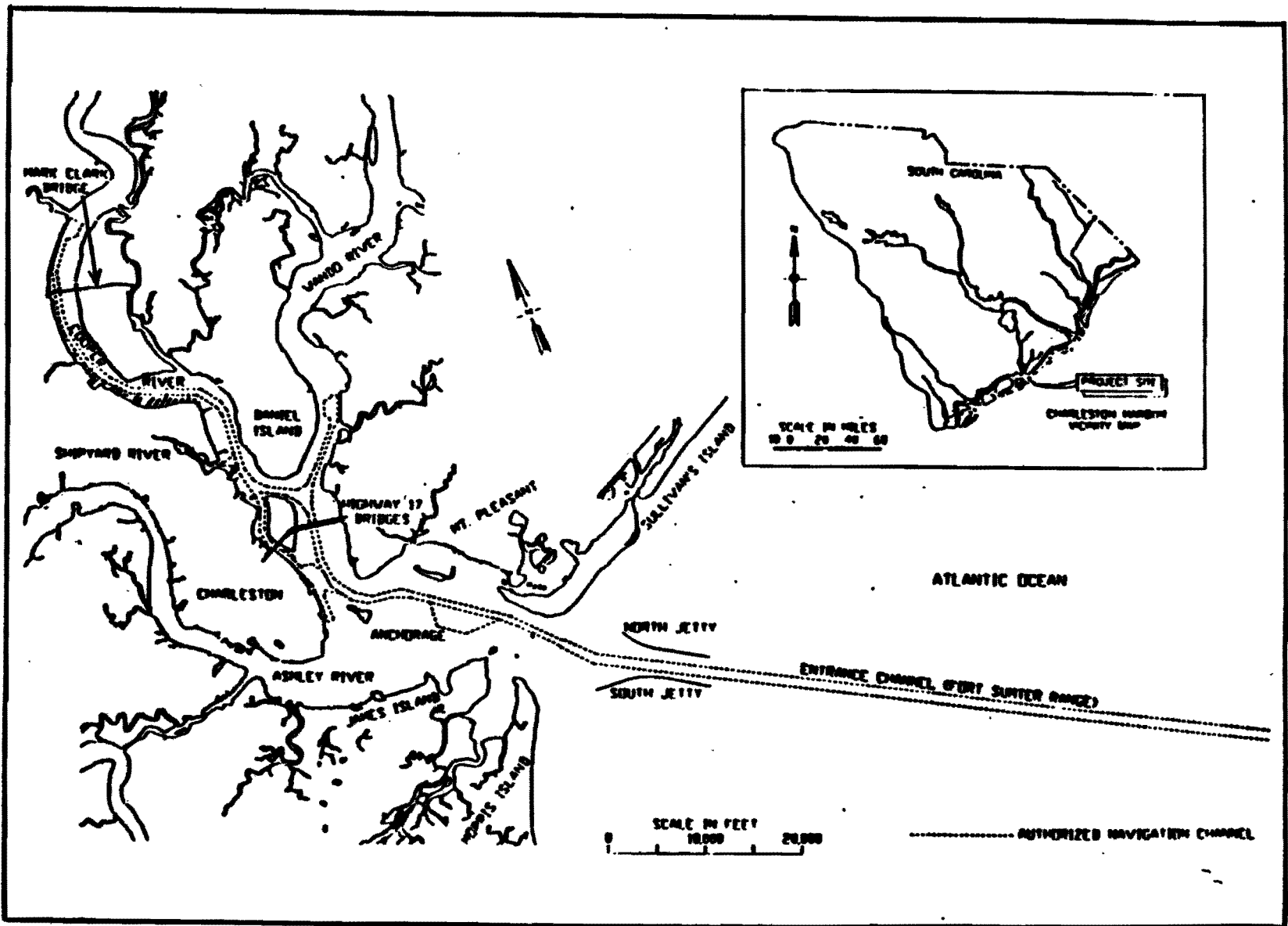


Figure 1. Location and vicinity map

Cooper River, across from the proposed new Daniel Island Terminal will be refurbished. The existing contraction dike located at Daniel Island will be removed and a new 700 foot long contraction dike located approximately 150 feet upstream of the degaussing pier on the west side of the Cooper River will be constructed, (See Figure 2).

ENVIRONMENTAL SETTING

A. General Description of the Area

The harbor covers an area of approximately 14 square miles and is formed by the confluence of the Ashley, Cooper, and Wando Rivers. The City of Charleston is located to the west of the harbor, James Island and Morris Island to the south, Mt. Pleasant and Sullivan's Island to the north and the Atlantic Ocean to the east. The majority of upland areas around Charleston Harbor are composed primarily of residential, commercial, and industrial development. Docking and maintenance facilities of the harbor are concentrated along the west shore of the Cooper River extending from Battery Point of the peninsular city to the mouth of Goose Creek.

The Cooper River has its origin at the confluence of its East and West Branches (locally termed "The Tee") from which it flows 32 miles southward to its outlet in Charleston Harbor. The East and West Branches of the Cooper River extend some 20 miles inland in a northward direction to their origins as small ill-defined channels in a low-lying area of Berkeley County known as Ferguson Swamp.

The Ashley River originates in the coastal plain and flows into the western part of Charleston Harbor. Areas of the river are bordered by historic plantations, a large portion of the Ashley River Basin is now occupied by residential or commercial development.

The Wando River originates in the coastal plain and flows into the eastern part of Charleston Harbor. Portions of the lower Wando River are bordered by marsh which changes to woodland in the upper reaches of the river. Development along the Wando River has been encouraged with recent completion of an interstate highway system. At present, residences and subdivisions are present along stretches of the river as are a shipyard and the State Port Authority's Wando River Terminal.

B. Water Quality

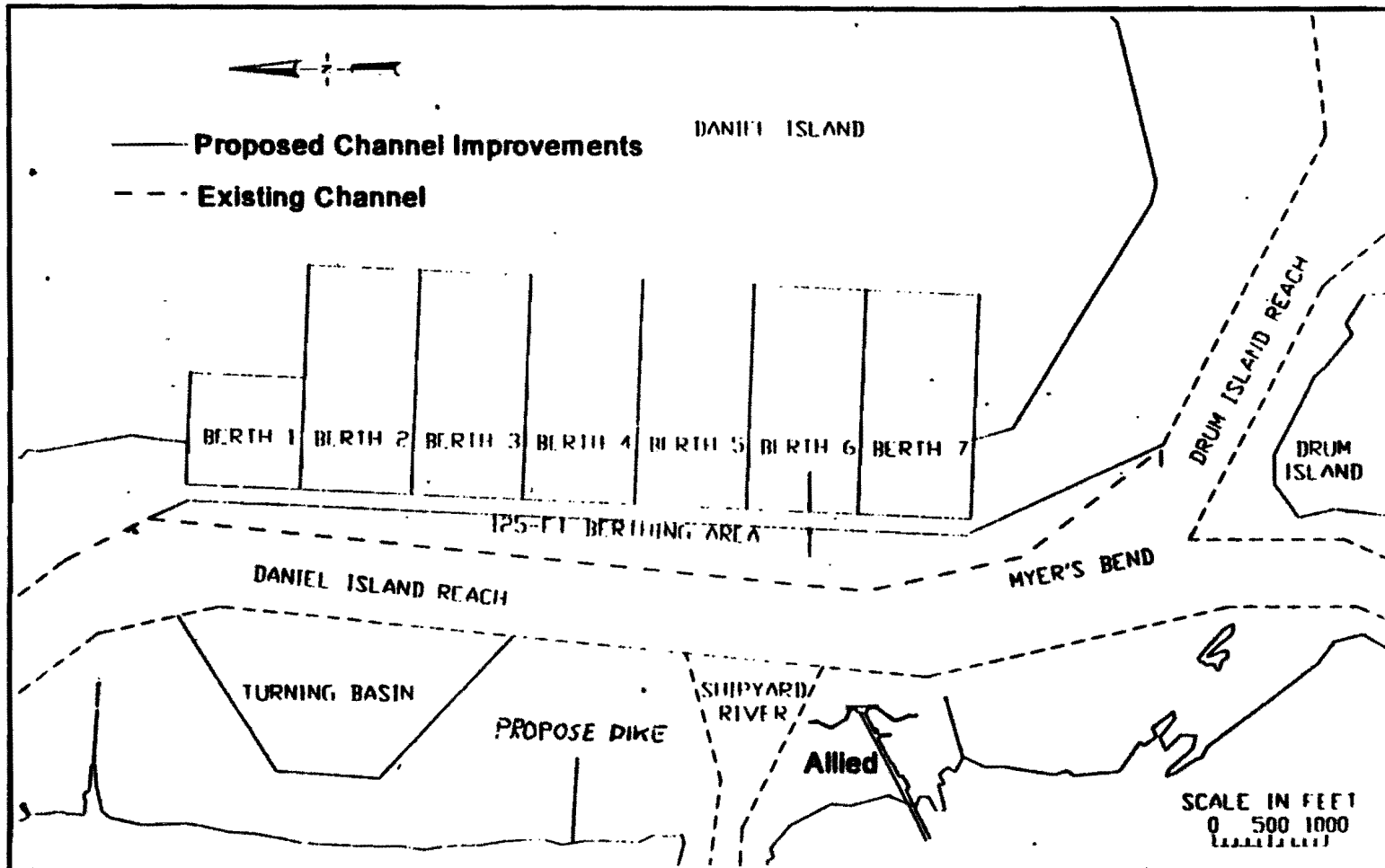


Figure 2: Daniel Island Terminal location

Water quality in Charleston Harbor is classified as SB by the South Carolina Department of Health and Environmental Control, (SCDHEC). The SB rating applies to tidal salt water suitable for primary and secondary contact recreation, crabbing, and fishing, except for the harvesting of clams, mussels, or oysters for market purposes or consumption. These waters are also suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora. Waters rated as SB should not have dissolved oxygen concentrations less than 4 mg/l and fecal coliform concentrations should not exceed a geometric mean of 200 colonies/100 ml based on five consecutive samples taken within a 30 day period.

Although these concentrations have been exceeded occasionally, recent review of data collected by SCDHEC indicate that water quality within the harbor basin often meets SB standards for dissolved oxygen and fecal coliform levels.

Water quality in the Wando River is classified SFH (Shellfish Harvesting Waters) for the portion of the river from its headwaters to a point 2.5 miles upstream of its confluence with the Cooper River. This classification applies to tidal saltwaters protected for shellfish harvesting. SFH water must maintain a daily average dissolved oxygen concentration of 5 mg/l or higher with a low of 4 mg/l and have median coliform concentrations of 14 colonies/100 ml with no more than 10% of the samples exceeding 43 colonies/100 ml. For the portion of the Wando River from its confluence with the Cooper River to a point 2.5 miles upstream, the river is classified as SA waters. SA waters have the same designated uses as SB waters, although the water quality standards are stricter for dissolved oxygen. SA waters require a daily average of dissolved oxygen of not less than 5 mg/l with a low of 4 mg/l.

C. Hazardous and Toxic Waste.

The proposed project is primarily located in the existing navigation channel where dredging occurs on a twelve to eighteen month rotation. Because of the frequent dredging activity, it was not expected that any hazardous or toxic waste would be encountered. However, bulk sediment chemistry was conducted on the sediments proposed for the deepening project. The analysis indicated that hazardous and toxic material is not present in the sediments.

D. Sediment Analysis.

To obtain Section 401 Water Quality Certification and Section 103 approval for ocean disposal of the material, sediment testing for physical, chemical, and biological parameters was conducted on maintenance and deepening material (including new work areas). Analytical results indicated that the vast majority of sampling sites

required no further testing. However, polynuclear aromatic hydrocarbon (PAH) concentrations were notably higher at two sites, one in Shipyard River and one in the Cooper River near the proposed Daniel Island Terminal site. All analytical data was submitted to the Environmental Protection Agency (EPA) for review to determine if additional testing was needed for ocean disposal. Correspondence from EPA dated May 18, 1995 required no additional testing at any site, with the exception of PAH tissue testing at the two sites mentioned above. Bioaccumulation studies have been completed, and analytical results were received in October 1995 and submitted to EPA for review. Correspondence from EPA dated November 14, 1995 approved material from all but one site, CH-3, for ocean disposal.

E. Threatened and Endangered Species

The U.S. Fish and Wildlife Draft Coordination Act Report dated December 1994, advised the Corps that the following federally listed endangered (E) and threatened (T) species are known to occur in Charleston County, South Carolina:

- West Indian manatee (Trichechus manatus) - E
- Bald eagle (Haliaeetus leucocephalus) - E
- Bachman's warbler (Vermvora bachmanii) - E
- Wood stork (Mycteria americana) - E
- Red-cockaded woodpecker (Picoides borealis) - E
- Arctic peregrine falcon (Falco peregrinus tundrius) - T
- Piping plover (Charadrius melodus) - T
- Kemp's ridley sea turtle (Lepidochelys kempii) - E
- Loggerhead sea turtle (Caretta caretta) - T
- Leatherback sea turtle (Dermodochelys coriacea) - E
- Green sea turtle (Chelonia midas) - T
- Shortnose sturgeon (Acipenser brevirostrum) - E
- Canby's dropwort (Oxyopolis canbyi) - E
- Pondberry (Lindera melissifolia) - E
- Sea-beach pigweed (Amaranthus pumilus) - T
- Chaff-seed (Schwalbea americana) - E

The National Marine Fisheries Service advised on January 11, 1995 that the following endangered (E) and threatened (T) species and critical habitats are listed under that agencies jurisdiction in South Carolina:

- Finback whale (Balaenoptera physalus) - E
- Humpback whale (Megaptera novaeangliae) - E
- Right whale (Eubaleana glacialis) - E

Sei whale (Balaenoptera borealis) - E
Sperm whale (Physeter catodon) - E
Green sea turtle (Chelonia mydas) - T
Hawksbill sea turtle (Eretmochelys imbricata) - E
Kemp's (Atlantic) ridley sea turtle (Lepidochelys kemp) - E
Leatherback sea turtle (Dermochelys coriacea) - E
Loggerhead sea turtle (Caretta caretta) - T
Shortnose sturgeon (Acipenser brevirostrum) - E

Species proposed for listing - None
Listed critical habitat - None
Proposed critical habitat - None

Additional correspondence from the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) dated March 6, 1995 and January 30, 1995, respectively, provide documentation that the District has concluded its consultation responsibilities under Section 7 of the Endangered Species Act.

F. Cultural Resources

The City of Charleston is one of the oldest permanent settlements in the United States and has many areas and structures of great significance in the history of the country from the Revolutionary War and the Civil War to the Reconstruction period. Prominent among these are:

1. Charleston Historical District located on the lower third of peninsular Charleston.
2. Fort Sumter National Monument located off an island at the entrance to Charleston Harbor.
3. Site of Old Charles Town located on Albemarle point.
4. Castle Pinckney located on Shute's Folly.
5. Middleton, Magnolia and Drayton Hall Plantations located along the Ashley River and Boone Hall Plantation located in Mount Pleasant.

Following coordination with the State Historic Preservation Office (SHPO), a magnetometric survey of the navigation channel and new work areas was conducted in

the summer of 1994. The survey resulted in the identification of 32 magnetic and/or acoustic anomalies. Of the 32 targets located by remote sensing, 26 could be identified as modern debris on the basis of data generated during the magnetic and acoustic survey. Of the remaining six targets, only two were located near the navigation channel where they might be subject to impacts from this project. A diving reconnaissance was conducted on these two sites in April 1995. Both targets were identified as modern debris. The draft archeological report for this project was submitted to the SHPO on June 1, 1995 with a request for comments. Final copies of the archeological report were received by this office in August 1995. Correspondence from the SHPO office dated September 7, 1995 provided concurrence with the district determinations that no cultural or historic resource would be impacted by this project (see EA Appendix).

POTENTIAL IMPACTS OF THE PROPOSED ACTION

A. Benthic Impact.

One of the most significant short - term impacts of hydraulic dredging is the destruction of benthic invertebrates in the path of the dredge cutterhead. The greatest concentration of benthic invertebrates in the Charleston Harbor estuary occur in and around salt marshes in lieu of the deeper channeled areas. Much of the salt marsh in the project area provides suitable habitat for invertebrates including fiddler crabs, oysters, and mollusks such as the common marsh periwinkle snail. Polychaete worms, are found on a wide variety of substrates and are common in salt marshes. Deepening in the present navigation channel, where maintenance of reoccurring shoals are dredged on a 12 to 18 month rotation, will not significantly effect benthos. The majority of benthic impacts will be located in the realignment areas of Horse reach and Shute's/Folly reach; Channel widening of the Daniel Island reach; construction of a new contraction dike; and the new ships turning basin. The benthic impacts in these areas would however, be temporary as invertebrates including polychaetes will recolonize the disturbed areas in a short time.

B. Water Quality.

1. Temporary changes in water quality at the dredging and disposal sites are expected; however, permanent changes in water quality due to this project are not anticipated or expected. A Section 401 Water Quality Certification was issued for upland disposal of dredged material associated with the project by the South Carolina Department of Health and Environmental Control (SCDHEC) on May 2, 1995. Further, the SCDHEC, Office of Ocean and Coastal Resource Management provided

certification that the deepening project was consistent with the Coastal Zone Management Program by letter on March 10, 1995 (see EA Appendix). An amended Coastal Zone Consistency was received on February 1, 1996 and the Section 401 is anticipated in March 1996 for placement of the contraction dike, refurbishment of the existing dikes, removal of the Daniel Island contraction dike, and dredging of the proposed Daniel Island Turning Basin.

2. Correspondence from the South Carolina Department of Natural Resources dated February 6, 1995 reported that the top of the Cooper Formation lies between the approximate elevations of -10 and -60 feet mean sea level with thickness varying from 200 to 260 feet. As a result, no adverse impacts to the existing aquifers is expected as a result of deepening Charleston Harbor a maximum of five feet (see EA Appendix).

3. Hydrodynamic, salinity intrusion and sedimentation models were conducted by the Army Corps of Engineer, Waterways Experiment Station for this project. The numerical models were used to develop the channel velocities and water levels for the base condition and the proposed conditions in support of the ship simulation and the sedimentation study. The salinity intrusion model indicated that no significant difference was found between the existing -40 foot channel and the proposed -45 foot channel. Because the channel will be deeper and wider in specified areas, the sedimentation model indicated that there will be an increase in the expected sedimentation compared to present conditions. It is however, considered a manageable and acceptable increase. Additional information and detail concerning the models are found in Section 4.1.4 Increased Annual Maintenance.

C. Endangered/Threatened Species.

Official lists of endangered/threatened species have been requested and received from the USFWS and the NMFS (see Section E, ENVIRONMENTAL SETTING). The only potential impacts of harbor deepening on the listed species are as follows:

There are potential impacts to threatened/endangered sea turtles related to hopper dredging in the entrance channel. However, these impacts will be reduced/eliminated by the use specialized equipment, monitoring by trained observers, and/or compliance with a dredging window (1 November - 31 May, or whatever the window may be at the time of dredging). Further, hydraulic dredging (pipeline) discharging into scows will be utilized to remove the harder material (coquina) and during the turtle season when hopper dredges cannot be used. In addition, measures to provide manatee protection if construction occurs during summer months (June through September) has been included in the project and will be incorporated in

the plans and specifications. The USFWS and the NMFS have concurred with this determination and have indicated that Section 7 Consultation with the District has concluded, (see EA Appendix).

Further, recommendations provided by the USFWS in the Draft Coordination Act Report, 1994 have been responded to in this document and/or have been taken into consideration for planning and contract purposes (see EA Appendix).

D. Land Disruption.

Not applicable.

E. Wetlands. Construction of the new contraction dike will require the excavation of a corridor through a fringe of Spartina wetlands. This excavated corridor will be approximately 80 feet wide by 1000 feet in length total (approximately 500 feet will be in marsh). This corridor will be excavated down to -10 MLLW. Once the corridor is excavated to the approximate dimension a dredge will be used to pump approximately 280,000 cubic yards of marl on the bottom of the excavated corridor bringing the bottom up to elevation - 4.0 MLLW. After the marl base is in place, 0.5 " corrugated metal sheet pilings will be driven into it creating the desired contraction dike. Approximately 4,000 cubic yards of 12" to 24" stone will be placed along both sides of the sheet piles for the entire length of the dike for stabilization. A layer of riprap will then be placed on top of the stone to act as a cap to hold the stone in place. Stockpiled marsh material from the original excavation will be returned to the 80 by 500 foot marsh area and placed on each side of the sheet pile contraction dike to the same elevation and slope as the original and adjacent marsh. Spartina is expected to quickly reestablish itself naturally in this disturbed area. All marl , stone foundation blanket and riprap will be below elevation - 00 with approximately 5.5 feet of fine grained material on top of the 80 foot by 500 foot marsh area. The contraction dike will be anchored on its landward end with riprap. Some of the riprap anchor will by necessity, be toed into the edge of the marsh to prevent scouring on high tides.

F. Noise.

There would be an increase in the ambient noise level during the dredging phase of the project. However, the noise level would be no different than that experienced during normal maintenance dredging.

G. Air Quality.

Any increase in air pollution would be due to exhaust from the dredging equipment. The increase would be minor and temporary. Further, the entire state of South Carolina is an attainment area for standard pollutants at this time. The dredge is a mobile source and is not regulated by the state of South Carolina. It is not anticipated that the dredged material will be rehandled in a dry state after its initial placement.

H. Flora.

Not applicable.

I. Fishery.

Given the length of the study area and the scope of the proposed project, the fishery resource of Charleston Harbor would not be significantly impacted by the proposed project. This premise is substantiated in the Final Environmental Impact Statement for the Charleston Harbor Deepening Project, Charleston Harbor and Shipyard River, South Carolina, U.S. Army Engineer District, Charleston, South Carolina, April 1976, and associated references as listed in that document.

J. Cultural Resources.

The cultural resource investigation is complete. No cultural or historical resources were identified in the study area.

K. Dredged Material Disposal.

1. Quantities of material dredged and proposed disposal locations are identified and described in Section 3.2.3.

2. The environmental impact statement (EIS) written for the designation of the Charleston Ocean Dredged Material Disposal Site (ODMDS) addressed impacts associated with the disposal of dredged material at the site. Further studies indicating the presence of live bottoms in the western portion of the site have resulted in avoidance of disposal in that area and the development of an EPA/Corps Management and Monitoring Plan for the ODMDS. In addition, suitable material, ie. rock, marl, coquina, are utilized for construction of a berm within the disposal area to

prevent/reduce impacts to the live bottom areas whenever possible. Impacts associated with this dredging activity would be the same as those addressed in the ODMDS EIS and covered by the management plan.

3. All of the upland dredged material disposal sites proposed for use during this project are existing sites and have been utilized for dredged material disposal for many years. These areas are utilized on a consistent basis for dredged material disposal, so would not be suitable for management as wildlife habitat. Ultimately, the use and value of these areas will remain the same following completion of the proposed project.

4. Other alternative disposal sites other than those mentioned above are discussed in the Daniel Island Alternatives Study, 1993. Based on that study, the disposal sites proposed for use in this project are considered the least environmentally damaging and provide the least cost alternatives.

UNAVOIDABLE ADVERSE IMPACTS

Adverse environmental effects associated with this project are as follows:

There would be a temporary increase in noise and air pollution during the construction phase of the project.

There would be a temporary increase in turbidity which would have a temporary impact on water quality at the dredging and ocean disposal locations.

Impacts to benthic organisms at dredging sites is expected.

Impacts to Spartina marsh is expected at the construction site for the proposed contraction dike.

ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the proposed action include:

A. Various depths for deepening the navigation channel were examined. Proposed depths include -41 to -46 feet mlw. The economic evaluation for this project will play a significant role in determining the final project depth.

B. Alternatives for realignment were considered by WES and studied using sedimentation and ship simulation models. The proposed realignment is expected to provide optimum navigation with minimal sedimentation and environmental impacts.

C. The no-action alternative is not considered a viable option because of the navigation hazard associated with the present alignment, and because the purpose of the study was to determine if modifications to the present channel were advisable. Studies indicate that the proposed project modifications are advisable.

D. Disposal options for the material included ocean disposal and upland disposal at dredged material disposal areas. A meeting was held in September 1994 with state and federal agencies to discuss possible beneficial uses of the dredged material. Potential uses included nesting habitat, and beach or island renourishment. Potential locations for disposal included Morris Island Beach, Folly Beach, Bird Key, Castle Pinckney, Crab Bank, Morris Island Lighthouse, Ft. Sumter, placement for drift to beaches south of Charleston, and Daniel Island.

The chief drawback for use of proposed dredged material for any of the sites within the harbor is the grain size. Only suitable material which would be predominantly sand could be used for bird nesting or island renourishment. Material from the entrance channel is dredged using a hopper dredge. Placement of material on beaches would require the use of a hydraulic dredge which would increase the cost of disposal. An economic evaluation was conducted on the placement of material on Morris Island Beach as a beneficial use. Morris Island was studied because it is the closest potential site to the entrance channel, it is a disposal area for dredged material, and the oceanward side of the island is eroding. However, the benefit/cost ratio would not support this as a disposal site. Further, the local sponsor has indicated that any additional expense to the dredging and disposal activity would not be acceptable. State agencies expressed an interest in the beneficial uses of suitable material, but indicated that no funds were available to assist with the projects.

At the present time, additional coordination with resource agencies and the local sponsor is underway to determine the possibility of placing some material at Castle Pinckney and Crab Bank. Depending on the type of material and the logistics of placing the material in a beneficial location near the proposed sites, these locations may still be viable options.

CONCLUSIONS

The proposed action does not constitute a major Federal action significantly affecting the quality of the human environment, therefore, the preparation of an

Environmental Impact Statement (EIS) is not required. In addition, this project is consistent, to the maximum extent practicable, with the South Carolina Coastal Zone Management Program. Finally, the proposed action has been thoroughly assessed and coordinated and will not significantly affect the environment.

**FINDINGS OF NO SIGNIFICANT IMPACT
CHARLESTON HARBOR DEEPENING/WIDENING PROJECT
IN
CHARLESTON COUNTY, SOUTH CAROLINA**

Based upon the attached Environmental Assessment and in consideration of other pertinent documents, I conclude that the environmental effects of the proposed Charleston Harbor Deepening/Widening Project are not significant and the preparation of an Environmental Impact Statement is not warranted. Specific factors considered in making the determination include the following:

1. Wetlands would not be significantly affected.
2. No land use changes would occur.
3. Air quality would not be significantly affected.
4. Water quality would not be significantly affected.
5. The project would have a negligible impact on fish and wildlife resources.
6. Construction activity would enhance shipping traffic and result in no significant effect on recreational boating.
7. The proposed action is in full compliance with the Endangered Species Act.



Thomas F. Julich
Lieutenant Colonel, U.S. Army
District Engineer

8 Mar 96
DATE

EA APPENDIX

EA APPENDIX INDEX

- Appendix A: 404(b)(1) Evaluation
404(b)(1) Evaluation (amended)**
- Appendix B: Section 401 Joint Public Notice
Section 401 Joint Public Notice (amended)**
- Appendix C: U.S. Fish and Wildlife Final Coordination Act Report**
- Appendix D: Environmental Correspondence**

APPENDIX A

404(b)(1) EVALUATIONS

404(b)(1) Evaluation

Charleston Harbor Deepening Project Charleston, South Carolina

I. PROJECT DESCRIPTION

a. Location. The project area is the Charleston Harbor federal navigation channel located in Charleston Harbor, South Carolina. The harbor is located approximately midway along the South Carolina coastline, being approximately 140 statute miles southwest of the entrance to Cape Fear River, North Carolina, and 75 statute miles northeast of the Savannah River.

b. General Description. The project consists of deepening Charleston Harbor from 40 feet to 42 feet as a minimum depth and 45 feet as a maximum depth below mean low water (MLW) with two (2) feet of advance maintenance and two (2) feet of allowable overdepth. Furthermore, the project will also include realignment of the channel at Horse Reach and Shutes/Folly Reach to improve navigation by straightening the channel. The navigation channel will be 800 feet in width beyond the jetties. Just prior to reaching the jetties from the ocean, the channel will remain at the present 1000 feet in width, returning to 800 feet at a point within the jetties. From 800 feet, it will reduce further to 600 feet wide adjacent to Sullivan's Island. No changes are proposed for the rest of the navigation channel which varies from 500 feet to 800 feet in width, with two exceptions. The Daniel Island Reach will vary from approximately 600 feet to 875 feet in width for proposed terminal access, and the Horse Reach and Shutes/Folly Reach, where realignment is proposed, will be 900 feet to 1000 feet in width. The entrance channel is expected to extend out to the 51-foot ocean contour. However, it should be noted that the entrance channel will not be deepened in any area where the present depth is already at 47 feet.

c. Authority and Purpose. This project is being undertaken as part of the following study authority: "Pursuant to Senate and House resolutions adopted on 27 March 1990 and 1 August 1990, respectively (the latter published as House Document Numbered 100-27, 100th Congress, 1st Session), the Charleston District, through the Board of Engineers for Rivers and Harbors, was requested to review the reports of the Chief of Engineers on Charleston Harbor, South Carolina with a view to determining whether any modifications of the project are advisable at this time, with particular view toward deepening and/or widening."

d. General Description of Dredged or Fill Material. Core borings were conducted during the previous deepening project. Borings collected at that time were collected at depths sufficient to address this deepening project also. Additional borings have been collected during the feasibility phase of this project. From the borings, it is concluded that there are three types of material that will be encountered during the

deepening project. The three types are overburden soils, the Cooper Marl formation and Coquina. Overburden soils consist of sands, silts, clays and loose shell formations overlying the predominate Cooper Marl or Coquina. The Cooper Marl formation is a consolidated, fine grained, impure calcareous deposit that lies between the elevations of -10 and -60 feet mean sea level with thicknesses varying from 200 to 260 feet in the project area. The marl is composed primarily of an olive-brown to olive sandy clayey silt with occasional layers of very silty clayey fine sand. Overlying the Cooper Marl at locations in the entrance channel is a light gray calcareous cemented sandy shell hash referred to as Coquina. Coquina is also the predominate material beneath the overburden soils in some locations in the entrance channel.

e. Description of the Proposed Discharge Site. Placement of the dredged material is expected to occur over a period of years during individual dredging contracts. Because \pm 35 million cubic yards will be dredged, the majority of the material, if suitable, will be disposed of at the Charleston Ocean Dredged Material Disposal Site, (ODMDS). Additionally, disposal of the material will be made to upland contained disposal areas within economical pumping distance, where there is sufficient area for disposal or where the material is not suitable for ocean disposal. Existing upland areas which are under consideration for disposal include Clouter Creek Disposal Area, Daniel Island Disposal Area (if still under easement), Morris Island Disposal Area, the Naval Weapons Station Disposal Area, and Drum Island Disposal Area.

f. Description of Disposal Method. Hopper dredging will be used to dredge loose material in the entrance channel for ocean disposal. Hydraulic dredging (pipeline) discharging into scows will probably be utilized to remove the harder material (coquina) and during the turtle season when hopper dredges cannot be used. A clamshell dredge or hydraulic dredge will be used to excavate material in the inner channel if suitable for ocean disposal. The material will be placed in barges and transported to the ODMDS for disposal. Material determined to be unsuitable for ocean disposal or material that is located in the upper channel where the distance to the ODMDS makes transportation of the material economically infeasible will be hydraulically dredged, and the dredged material will be disposed of at an upland disposal site.

II. Factual Determinations.

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. Present depths in the Charleston Harbor navigation channel include 42 feet plus two (2) feet of advance maintenance and two (2) feet of allowable overdepth in the entrance channel, and 40 feet plus two (2) feet of advance maintenance and two (2) feet allowable overdepth in the inner channel. This depth is maintained throughout the channel with the following exceptions: 38 feet in the Shipyard River Entrance Channel and Turning Basin A; 30 feet in Shipyard River Connector Channel and Turning Basin B, and 40 feet in Town Creek with 4 foot horizontal to 1 foot vertical side slopes. The side slopes will remain unchanged; however, the depth of the channel will be deepened to 42 feet minimum to

45 feet maximum with two (2) feet of advance maintenance and two (2) feet of allowable overdepth.

(2) Sediment Type. Sediment types are discussed in detail in part I.d. of this document.

(3) Dredged/Fill Material Movement. Dredged material will be moved by hopper dredge, hydraulic dredge and/or clamshell dredge and transported to the Charleston ODMDS for disposal. A hydraulic dredge will be utilized for pipeline transport and disposal of material at existing upland disposal sites.

(4) Physical Effects on Benthos. Benthic animals in the vicinity of the dredging activity will be impacted. These impacts should be temporary in duration allowing for reestablishment following dredging activity.

(5) Actions Taken to Minimize Impacts. Hopper dredging will be conducted during the approved "window" of December 1 to March 31 (or whatever the window may be at the time of dredging) to avoid impacting sea turtles. As an alternative, a new drag head has been developed by the Army Corps of Engineers, Waterways Experiment Station which acts as a turtle excluder. This device may be used if agreement is reached by environmental resource agencies and if applicable at the time. Monitoring of the return water from the upland disposal areas will be conducted in order to minimize the discharge concentrations of total suspended solids (TSS) and other parameters as per a 1989 agreement with SC Department of Health and Environmental Control (SCDHEC).

b. Water Circulation, Fluctuation and Salinity Determinations.

(1) Water. Temporary impacts related to dredging and the return water from upland disposal area would be expected; however, permanent impacts to the aquatic ecosystem are not anticipated or expected.

a. Salinity. Impacts to the salinity gradient with particular reference to industries located along the Cooper River were addressed through a study conducted by the Army Corps of Engineers, Waterways Experiment Station, (ACOE-WES). The study indicated that no change in the salinity gradient was expected. Additionally, impacts to the salinity concentrations in the harbor are not expected.

b. Water Chemistry. Temporary changes to water chemistry in the vicinity of dredging/disposal may occur. These changes should be no different than those occurring during maintenance dredging and are considered minimal and temporary in nature.

c. Clarity. Water clarity may be reduced at project depths where dredging is occurring or at the outfall pipe of the upland disposal; however, reduced clarity within the total water column would not be expected. Again, the changes in clarity should be no different than those occurring during maintenance dredging activity.

d. Color. Not applicable.

e. Odor. Not applicable.

f. Taste. Not applicable.

g. Dissolved Gas Levels. A temporary, minor decrease in dissolved oxygen may occur at the dredging location project depth related to suspension of bottom sediments during dredging activity. Any impacts should quickly return to normal following dredging activity. Dissolved oxygen levels at the outfall pipes of upland disposal areas is usually higher due to the turbulence associated with the outfall structures.

(h) Nutrient Levels. Nutrient levels may temporarily increase at the dredging location project depth due to increased turbidity which may result in a release of nutrients from the disturbed sediments. Increased levels would be temporary in nature, returning to normal following dredging.

(i) Eutrophication. Not applicable.

(2) Current Patterns and Circulation.

(a) Current Patterns and Flow. Studies by ACOE-WES have been conducted to determine the optimum channel locations to minimize sedimentation rates. Some changes in current patterns are expected in relation to the realignment of the channel; however, these changes are not expected to have significant environmental effects. Furthermore, if sedimentation rates can be minimized, the frequency of maintenance dredging in the harbor may be reduced also, thereby further lessening impacts from dredging. It should also be noted that if a new State Ports Authority terminal is constructed at the proposed location on Daniel Island, an additional contraction dike is proposed for construction on the west side of the Cooper River just north of Shipyard River. The two existing contraction dikes on the west side of the Cooper River will be refurbished, and the existing contraction dike on the east side of the Cooper River will be removed.

(b) Velocity. As the channel is straightened, velocities may increase in the channel where the realignment is made; however, these changes are not expected to have a significant environmental effect.

(c) Stratification and Hydrologic Regime. No changes are anticipated.

(3) Normal Water Level Fluctuations. Not applicable.

(4) Salinity Gradients. Effects on salinity gradients are addressed in Section II.b.(1)(a) of this document.

(5) Actions That Will Be Taken to Minimize Impacts.

Contraction dikes will assist in maintaining present currents near Daniel Island if the proposed terminal is constructed. The only other location where currents are expected to change is at Horse Reach and Shutes/Folly Reach where realignment of the channel will be made. None of these changes in the present project are expected to cause significant environmental impacts.

c. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site. The return water from the disposal areas would be the only source of turbidity in the vicinity of the disposal site. Provided that the sites are operated as designed, there may be minor increases in TSS levels at the outfall but no permanent impacts are anticipated or expected.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration. No impact on light penetration is expected at the dredging site. A possible short-term decrease in light penetration resulting from a temporary increase in localized turbidity at the outfall pipes from the disposal areas may occur.

(b) Dissolved Oxygen. DO concentrations in the return water are usually 4.0 mg/l or higher depending on the season due to the turbulence associated with the outfall structures.

(c) Toxic Metals and Organics. Toxic metals and organics are not expected to be found in the new work material due to the depth and the type of material present. Cooper Marl and Coquina would not have toxic levels of contaminants. Initial testing addressing the return water has been conducted. Contaminant levels were not at toxic levels. Additional testing is scheduled to determine sediment contaminant levels and to conduct bioassay testing.

(d) Pathogens. Not applicable.

(e) Aesthetics. Aesthetic impacts are not expected at the disposal areas. The dredging site impacts would be limited to the visual impact of the dredge and the floating pipeline. These impacts would not be any different than those occurring during regular maintenance dredging.

(3) Effects on Biota

(a) Primary Production. Photosynthesis. There should not be a disruption in primary production, photosynthesis at the dredging site or the disposal site.

(b) Suspension. Filter Feeders. Organisms at the dredging site will be impacted. Following dredging, a rapid recovery is expected.

(c) Sight Feeders. A minimal, temporary disruption with rapid recovery is possible. Most sight feeders are transient and can relocate until dredging operations are complete.

(4) Actions Taken to Minimize Impacts. Impacts associated with the actual dredging operation of the hopper or hydraulic dredge are minimal and it is unlikely that further minimization is possible. Clamshell dredging usually creates more turbidity than hopper or hydraulic dredging, not only due to the actual dredging, but also due to overflow from the scow. Depending on the type of material being dredged and the location of the dredging, overflow may be reduced or eliminated to minimize the turbidity levels. Impacts at the ODMDS will be minimized by placing suitable hard material on the L-shaped berm that prevents fine material from drifting onto the live bottoms located to the west of the ODMDS. Impacts associated with the return water from upland disposal areas will be minimized by operation of the disposal area and by monitoring and inspections by COE personnel as discussed in part II.a.5.

d. Contaminant Determinations. Availability of contaminants is discussed in part II.c.(2)(c) of this document. Furthermore, there are specific locations addressed in the public notice for this project identifying where the navigation channel will be relocated. These new work areas have not been dredged and recent depositions may prove to have higher level of contaminants than areas of the channel that are dredged on a regular maintenance schedule. Sediment testing and bioassays will be conducted in January 1995 to determine the suitability of the material for ocean disposal. If unsuitable, this material will be placed in an upland disposal area and monitored during the dredging activity.

e. Aquatic Ecosystem and Organism Determinations.

(1) Effects on Plankton. Any effects on planktonic growth will be dependent on the concentration of turbidity resulting from the dredging and disposal operations. Any effects would be minimal and temporary in duration and would not result in unacceptable adverse impacts.

(2) Effects on Benthos. Any benthic activity at the dredging site (navigation channel) would be interrupted. Benthic activity at the ODMDS may be

impacted depending on the quantity, placement and duration of the discharges. This is a dispersive site, so the fine material that is placed there migrates elsewhere following dredging.

(3) Effects on Nekton. Effects on nekton are not expected. Free swimming organisms that do not rely on currents for their movement can move out of the way of the dredge or material disposal. As discussed earlier in part II.a.(5) above hopper dredging will be conducted during the "dredging window" or turtle deflectors will be utilized.

(4) Effects on the Aquatic Food Web. Temporary, localized effects may occur in the vicinity of the dredging and disposal activity. Effects would be related to sedimentation/turbidity and would rapidly return to normal following completion of the construction activity.

(5) Effects on Special Aquatic Sites. Not applicable.

(6) Threatened and Endangered Species. Impacts to sea turtles and Right Whales are possible; however, they are unlikely due to techniques utilized to minimize/eliminate these impacts. These techniques are discussed in parts II.a.(5) and II.e.(3) above and part II.e.(8) below.

(7) Other Wildlife. Impacts would be related to turbidity and are addressed above.

(8) Actions Taken to Minimize Impacts. Techniques to minimize/eliminate impacts to sea turtles are discussed in part II.a.(5) and part II.e.(3) above. Additionally, individuals are required to be present on the hopper dredges to watch for and prevent impact with Right Whales. Techniques to minimize turbidity include proper management and inspections of the upland disposal area, and monitoring of the return water.

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determinations. Not applicable.

(2) Determination of Compliance with Applicable Water Quality Standards. The Cooper River and Charleston Harbor Water Quality Classification is SB meaning that these are "tidal saltwaters suitable for primary and secondary contact recreation, crabbing and fishing, except harvesting of clams, mussels, or oysters for market purposes or human consumption. Also suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora." The Wando River is classified as SA waters which are "tidal saltwaters suitable for primary and secondary contact recreation. Suitable also for uses listed above for Class SB waters

with the same exception." No conflict with applicable water quality standards is anticipated.

(3) Potential Effects on Human Use Characteristics.

- (a) Municipal and Private Water Supply. Not applicable.
- (b) Recreational and Commercial Fisheries. Not applicable.
- (c) Water Related Recreation. Not applicable.
- (d) Aesthetics. Not applicable.

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. Not applicable.

g. Determination of Secondary and Cumulative Effects on the Aquatic Ecosystem. Effects from the deepening project should be no different than those associated with the general operation and maintenance dredging of the harbor which are minimal and do not result in long term impacts.

III. Findings of Compliance With the Restrictions on Discharge.

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. Alternative disposal sites are limited due to the quantity of material that will be dredged. The six existing disposal sites which may be used for this deepening project include the Charleston ODMDS, Clouter Creek Disposal Area, Daniel Island Disposal Area (if easement is still in place), Morris Island, the Naval Weapons Station Disposal Area, and Drum Island Disposal Area. Disposal locations will be related to the location of the dredging operation, the quality and the quantity of material. Realignment alternatives have been subject to studies conducted by ACOE-WES. The chosen alternative for realignment will straighten out the bend near Horse Reach and Shutes/Folly Reach thereby improving navigation by reducing the hazards of a sharp turn in the channel. The final depth of the project is expected to be 42 feet with two feet of advance maintenance and two feet of allowable overdepth. This is based on the present economic review. It is possible that the project may be deepened to 45 feet with the 4 feet of advance maintenance and allowable overdepth. However, this will be based on the completed economic review. One other alternative is "no action". Under a "no action" alternative, shipping traffic and navigation would continue as it is now. However, as stated in part I.c. of this evaluation, the authority and purpose of the study is to review the project to see if modifications are advisable. The study has determined that modifications are advisable in order to improve navigation for shipping traffic. Providing that there are no significant environmental impacts identified and associated with deepening/widening/realignment, the project is expected to go to construction phase.

c. The proposed deepening project described in this evaluation would not cause or contribute to violations of any known applicable state water standard.

d. The proposed project will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

e. The proposed project will not violate the Endangered Species Act of 1973.


f. The proposed project will not violate any specified protection measures for marine sanctuaries designated by the Marine Protection, Research, and Sanctuaries Act of 1972.

g. The proposed disposal of dredged material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur.

h. Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems include proper management of the disposal areas, inspections and monitoring of the return water. Additionally, a location for the disposal of material being placed at the Charleston ODMDS will be specified in contracts and the placement monitored.

i. The proposed project will not cause unacceptable adverse impacts to any significant historic sites.

j. On the basis of the guidelines, the proposed disposal sites for the discharge of dredged material are specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.


GEORGE H. HAZEL
Lieutenant Colonel, EN
Commanding

20 Jan 95
DATE

Amendment
404(b)(1) Evaluation

Charleston Harbor Deepening Project
Charleston, South Carolina

This amendment addresses changes and additions to the Charleston Harbor Deepening Project as described in the 404(b)(1) Evaluation dated 20 January 1995.

I. General Description. The proposed project consists of deepening Charleston Harbor from 40 feet to 45 feet below mean low water (MLW) with two feet of advance maintenance and two feet of allowable overdepth. Furthermore, the project will also include realignment of the channel at Horse Reach and Shutes/Folly Reach to improve navigation by straightening the channel. The navigation channel will be 47 feet deep and 800 feet in width from the 47-foot ocean contour to station 0+00 inside the jetties. The channel will slope upward to 45 feet and remain at 800 feet wide to a point adjacent to Sullivan's Island where it will narrow to 600 feet wide. The remainder of the navigation channel will remain at the present 500 to 800 feet wide with the following exceptions. The Daniel Island Reach will vary from approximately 600 feet to 875 feet in width for the proposed terminal access and include a turning basin approximately 1200 feet in length. Upper Town Creek will be reduced to 16 feet deep and 250 feet wide. The entrance channel will not be deepened in any area where the present depth is already at 47 feet. In addition, two existing contraction dikes located on the west side of the Cooper River, across from the proposed Daniel Island Terminal (Terminal X) will be refurbished. The existing contraction dike located at Daniel Island will be removed, and a new 700 foot long contraction dike, located approximately 150 feet upstream of the degaussing pier on the west side of the Cooper River, will be constructed. In addition, the degaussing line will be removed prior to deepening and relaid following deepening of the channel. Lastly, a turning basin is proposed for construction on the west side of the Cooper River directly across from the proposed Terminal X, (see Figure 1).

II. Suspended Particulate/Turbidity Determinations.

(1) Toxic Metals and Organics. Testing has been completed for the project. Section 401 Water Quality Certification (WQC) and Coastal Consistency for the project were issued on May 2, 1995 and March 10, 1995, respectively, for the entire project with the exception of the Daniel Island Turning Basin and the contraction dikes. Coastal Consistency for these additions to the project was issued February 14, 1996. Water Quality Certification is expected in March 1996. Further, correspondence from EPA approved disposal of material from all sites except material removed from Shipyard River at the Charleston Ocean Dredged Material Disposal Site (ODMDS). Material from Shipyard River must be placed at an upland disposal site.

III. Aquatic Ecosystem and Organism Determinations.


(1) Threatened and Endangered Species. The Atlantic and shortnose sturgeon and manatee are also endangered species which may be affected by the dredging operation. However, measures to provide manatee protection if construction occurs during summer months (June through September) have been included in the project and will be incorporated in the plans and specifications. Further, recommendations provided by the U.S. Fish and Wildlife Service in the Draft Coordination Act Report, 1994 have been responded to in this document and/or have been taken into consideration for planning and contract purposes.

IV. Findings of Compliance with Restrictions on Discharge.

(1) Disposal sites which will be utilized during the deepening project include the Charleston ODMDS and the Clouter Creek Disposal Site.

(2) The final depth of the project is expected to be 45 feet deep with two feet of advanced maintenance and two feet of allowable overdepth.

(3) On the basis of the guidelines, the proposed disposal sites for the discharge of dredged material are specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.


THOMAS F. DULICH
Lieutenant Colonel, EN
Commanding

8 Mar 96

DATE

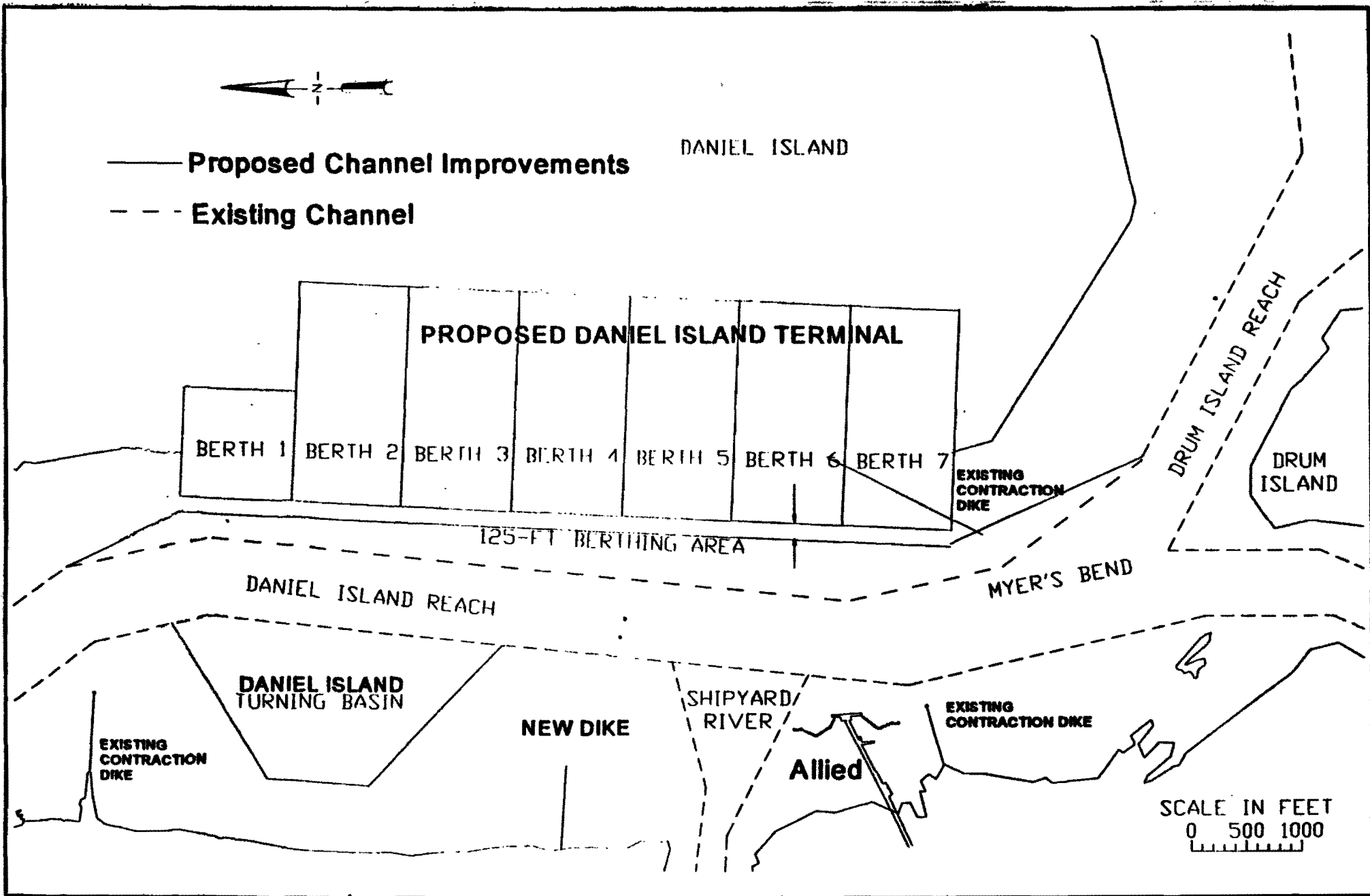


Figure 1: Location of Proposed Improvements

APPENDIX B

SECTION 401 JOINT PUBLIC NOTICE

**JOINT
PUBLIC NOTICE
P.O. Box 919
Charleston, South Carolina 29402-0919**

**and
THE SOUTH CAROLINA DEPARTMENT OF HEALTH
& ENVIRONMENTAL CONTROL**

**NOTE: THIS IS A CORPS OF ENGINEERS
CIVIL WORKS PROJECT**

CESAC-EN-PR

9 December 1994

Refer to: P/N 94-1R-498

**Charleston Harbor Deepening/Widening Project
Charleston, South Carolina**

The Charleston District, Corps of Engineers, Charleston, South Carolina proposes to perform the work described herein with due consideration and review being given to the relevant provisions of the following laws:

- 1. The Rivers and Harbors Act of 1899 (33 U.S.C. 403).**
- 2. The Clean Water Act (33 U.S.C. 1251. et. seq.).**
- 3. The Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1531, et. seq.).**

The purpose of this notice is to advise all interested parties of dredging activity in Charleston Harbor where dredged material will be placed in diked upland disposal areas and in the Charleston Ocean Dredged Material Disposal Site.

In order to give all interested parties an opportunity to express their views

NOTICE

is hereby given that written statements regarding the proposed work will be received at this office until

12 O'CLOCK NOON, MONDAY, 9 JANUARY 1995

from those interested in the activity and whose interest may be affected by the proposed work.

This public notice addresses the new work (deepening/widening or realigning) of the Charleston Harbor federal navigation channel, the disposal of the dredged material

and diked upland disposal area return waters. It also addresses the results of modified elutriate and column settling tests conducted on sediments collected from

eleven stations in Charleston Harbor. Additionally, it addresses the results of monitoring efforts performed on return waters from two upland disposal areas during the 1994 dredging cycle.

BACKGROUND

Charleston Harbor is the largest seaport in South Carolina and is ranked as the second largest container port on the East Coast of the United States. The harbor is a natural tidal estuary formed by the confluence of the Cooper, Ashley and Wando Rivers and located approximately midway along the South Carolina coastline, being approximately 140 statute miles southwest of the entrance to Cape Fear River, North Carolina, and 75 statute miles northeast of the Savannah River. The existing Charleston Harbor federal navigation project provides for a 40-foot deep navigational channel, 26.97 miles in length, from the 42-foot ocean contour to the North Charleston Terminal on the Cooper River; a 2.08 mile long 40-foot deep channel in the Wando River extending from the Cooper River to the Wando Terminal; a 38-foot deep channel in Shipyard River Entrance Channel and Turning Basin A; a 30-foot deep channel in Shipyard River Connector Channel and Turning Basin B; and a 40-foot channel in Town Creek.

PROPOSED PROJECT

The study authority for the feasibility phase of this project is as follows: "Pursuant to Senate and House resolutions adopted on 27 March 1990 and 1 August 1990, respectively (the latter published as House Document Numbered 100-27, 100th Congress, 1st Session), the Charleston District, through the Board of Engineers for Rivers and Harbors, was requested to review the reports of the Chief of Engineers on Charleston Harbor, South Carolina with a view to determining whether any modifications of the project are advisable at this time, with particular view toward deepening and/or widening."

Recommended improvements for Charleston Harbor consist of deepening Charleston Harbor from 40 feet to 42 feet as a minimum depth and 45 feet maximum below mean low water (MLW) with 2 feet of allowable overdepth and 2 feet of advance maintenance.

In addition, the navigation channel will be 800 feet in width beyond the jetties. Within the jetties it will remain 1000 feet wide, reducing to 600 feet wide near Sullivan's Island and remaining at 600 feet in width for the rest of the federal navigation channel, with the exception of the Daniel Island Reach which will vary from approximately 875 feet to 600 feet in width for proposed terminal access. The entrance channel is expected to extend out to the 51-foot ocean contour. Furthermore, the project will also

include realignment of the channel at Horse Reach and Shutes/Folly Reach to improve navigation by straightening the channel.

Modified elutriate tests were conducted with sediment collected from eleven sites in Charleston Harbor. In addition, a column settling test was conducted with sediment composited from the eleven sampling sites. The analytical results from the modified elutriate tests indicate that all concentrations were below detection limits with the exception of silver and arsenic. However, both of these parameters were below the EPA Water Quality Criteria for Chemicals of Concern in Marine Waters, Acute Concentration Levels.

During the deepening project, dredged material will be placed in existing upland disposal areas and at the Charleston Ocean Dredged Material Disposal Site. Potential upland disposal sites include the Clouter Creek Disposal Site, Daniel Island Disposal Site and Morris Island Disposal Site. Sediment chemistry and bioassay testing are planned to determine which material will be suitable for ocean disposal.

Monitoring of the return water from the existing upland disposal areas utilized in Charleston Harbor was conducted during the dredging operation and maintenance activity in 1993 and 1994. On two occasions when it was possible to collect influent samples, the percent removal of total suspended solids exceeded 99.0%. Monitoring information is available at the Charleston District office upon request.

This project is consistent, to the maximum extent practicable, with the South Carolina Coastal Zone Management Program. By this notice, the Charleston District requests concurrence from the South Carolina Department of Health and Environmental Control (SCDHEC) Office of Ocean and Coastal Resource Management (OCRM) that the proposed activity is consistent with the State's Coastal Zone Management Program. Concurrence is conclusively presumed if no state action is received within 45 days of receipt of this notice.

This document serves as a public notice on behalf of the SCDHEC for water quality certification (WQC). A certification is required from the SCDHEC stating that the proposed construction (dredging) and return water from upland contained disposal areas will be conducted in a manner consistent with the Clean Water Act. By this notice, the Charleston District requests SCDHEC to issue that certification. A Section 404(b)(1) Evaluation has been completed and determines that the proposed activity will have no significant adverse effects. The 404(b)(1) Evaluation is available at the Charleston District Office.

Persons wishing to comment or object to State Certification are invited to submit same in writing to the South Carolina Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201, within thirty (30) days of the date of this notice.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for a public hearing shall state, with particularity, the reasons for holding a public hearing.

Based on review of available information and evaluation of the proposed activity through the 404(b)(1) procedures, it is determined that the proposed project will not result in significant adverse impacts to the environment.

If there are any questions concerning this public notice, please contact Ms. Robin Coller-Socha of the Environmental Resources Section at telephone number 803/727-4696 or FAX number 803/727-4260.

**THOMAS W. WATERS, P.E.
Chief, Engineering and
Planning Division**

J O I N T
P U B L I C N O T I C E
Charleston District, Corps of Engineers
P.O. Box 919
Charleston, South Carolina 29402-0919
and
THE SOUTH CAROLINA DEPARTMENT OF HEALTH
& ENVIRONMENTAL CONTROL

NOTE: THIS IS A CORPS OF ENGINEERS
CIVIL WORKS PROJECT

CESAC-EN-FR

January 5, 1996

Refer to: P/N 95-1R-406
Amendment to:
Charleston Harbor Deepening/Widening Project
Charleston, South Carolina

The Charleston District, Corps of Engineers, Charleston, South Carolina, proposes an amendment to public notice 94-1R-498 published on December 9, 1994. The amendment includes the work described herein with due consideration and review being given to the relevant provisions of the following laws:

1. The Rivers and Harbors Act of 1899 (33 U.S.C. 401).
2. The Clean Water Act (33 U.S.C. 1251, et. seq.).
3. The Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1531, et. seq.).

The purpose of this notice is to advise all interested parties of additions to the deepening/widening project as described in P/N 94-1R-498. The additions include refurbishment of two existing contraction dikes and construction of a new contraction dike and turning basin. The refurbishment of existing contraction dikes and construction of the proposed contraction dike are necessary to reducing shoaling in the Daniel Island reach by 50 percent. (see Figures 1 & 2).

In order to give all interested parties an opportunity to express their views

N O T I C E

is hereby given that written statements regarding the proposed work will be received at this office until

12 O'CLOCK NOON, January 22, 1996

from those interested in the activity and whose interest may be affected by the proposed work.

PROJECT INFORMATION

The existing contraction dikes for refurbishment on the west side of the Cooper River are located downstream of Shipyard River and upstream of the U.S. Navy degaussing pier. The proposed contraction dike will be located approximately 100 to 200 feet upstream of the U.S. Navy degaussing pier, between the two existing contraction dikes.

Marl from the Charleston Harbor Deepening Project will be used to provide a base for the proposed dike. Approximately 30 feet of marl equaling 180,000 cubic yards of material will be placed as a base with a 12 inch foundation blanket equaling 4000 cubic yards of 6" - 12" stone and 3 feet of riprap equaling 12,000 cubic yards. The material will be placed by barge. The dike will be approximately 1000 feet in length, 300 feet of which

The two existing dikes will be repaired by replacing the sheet pile or by placement of rock around the existing dikes. No change in the existing footprint is expected. Again, all work will be conducted by water access.

In addition to the contraction dikes, a turning basin located north of Shipyard River and south of the existing contraction dike (see Figure 2) is proposed for construction. The turning basin will be deepened to the same depth as Charleston Harbor which is 45 feet plus two feet of maintenance and two feet of overdepth for a total depth of 49 feet. Material from the turning basin (3 million cubic yards) will be placed in the Clowder Creek diked disposal area. The total area of benthic impact will be approximately 80 acres. Testing requirements for upland disposal of the material were coordinated with SCDHEC and test results will be submitted to SCDHEC following completion of the testing regime.

ADDITIONAL CONSIDERATIONS

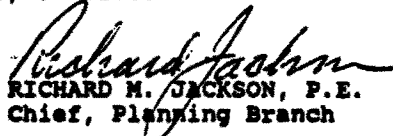
This project is consistent, to the maximum extent practicable, with the South Carolina Coastal Zone Management Program. By this notice, the Charleston District requests concurrence from the South Carolina Department of Health and Environmental Control (SCDHEC) Office of Ocean and Coastal Resource Management (OCRM) that the proposed activity is consistent with the State's Coastal Zone Management Program. Concurrence is conclusively presumed if no state action is received within 45 days of receipt of this notice.

The document serves as a public notice on behalf of the SCDHEC for water quality certification (WQC). A certification is required from the SCDHEC stating that the proposed construction, and any return water from upland contained disposal areas will be conducted in a manner consistent with the Clean Water Act. By this notice the Charleston District requests SCDHEC to issue that certification. Persons wishing to comment or object to State Certification are invited to submit same in writing to the South Carolina Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201, within fifteen (15) days of the date of this notice.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for a public hearing must state, with particularity, the reasons for holding a public hearing. These requests should be made to SCDHEC at the address listed above.

The Corps of Engineers is soliciting comments from the public; federal, state, and local agencies and officials, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to proceed with the project. Comments are used in the preparation of finalizing the Environmental Assessment pursuant to the National Environmental Policy Act.

If there are any questions concerning this public notice, please contact Mr. Jim Preacher, Chief of the District's Environmental Resources Section (EN-PR) at telephone number: 803/727-4264, FAX number: 803/727-4260.


RICHARD M. JACKSON, P.E.
Chief, Planning Branch

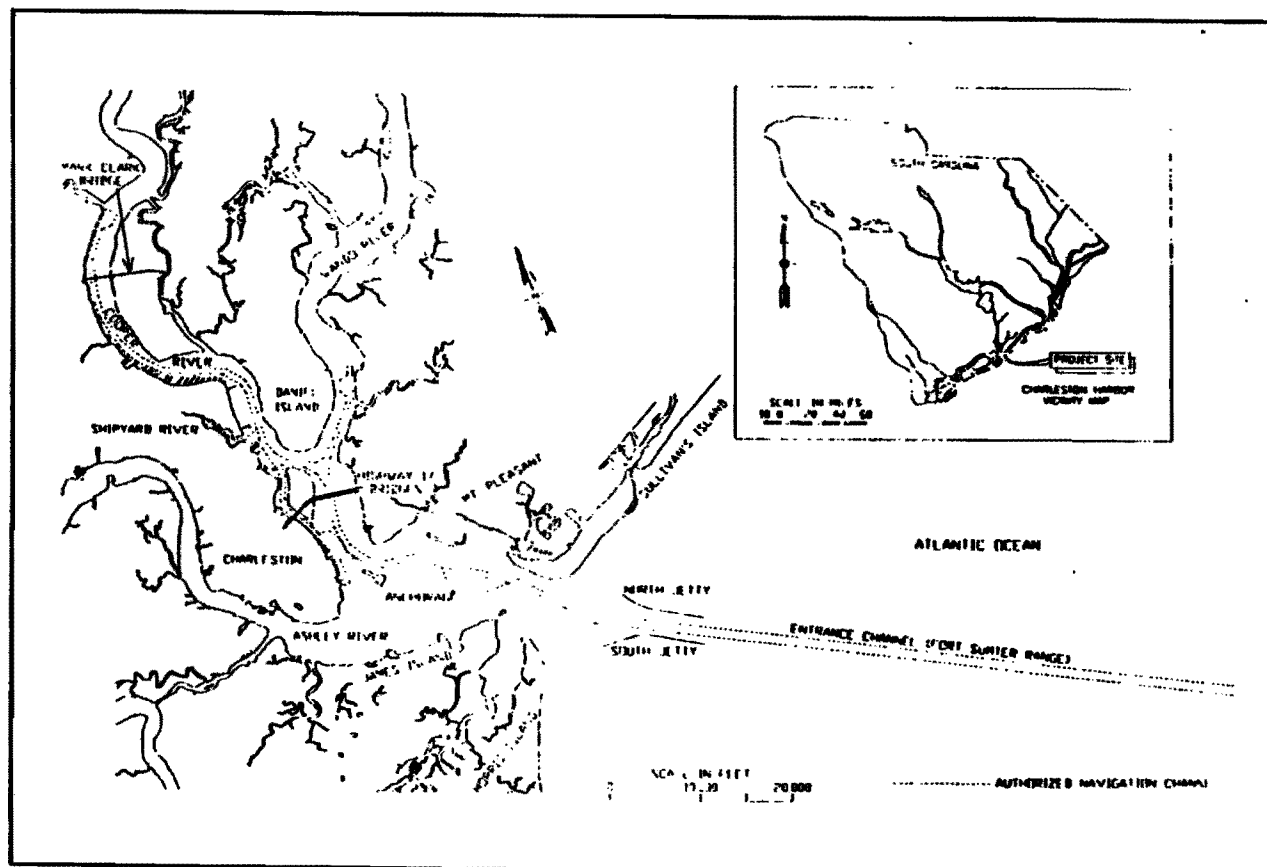


Figure 1. Location and vicinity map

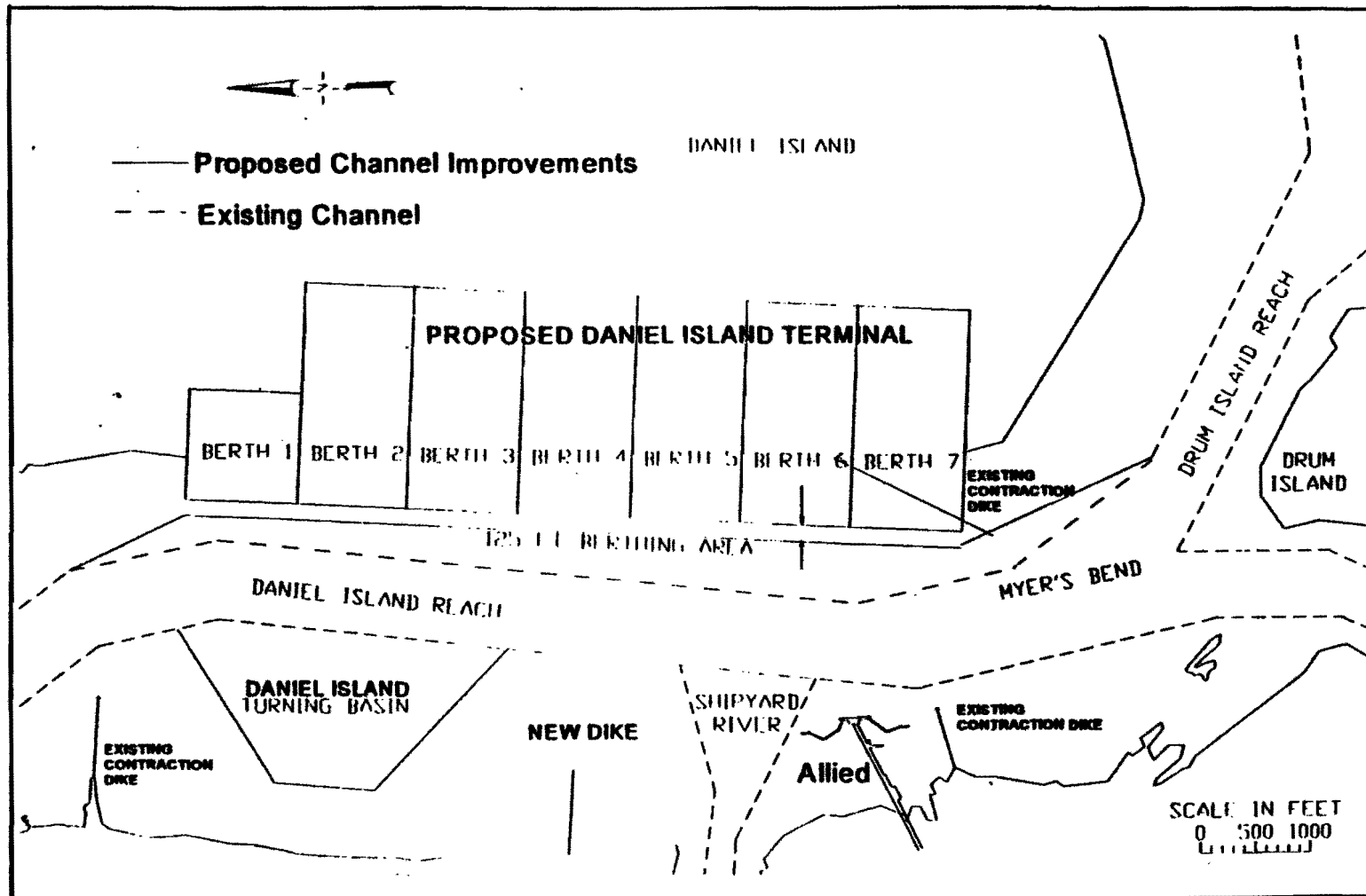
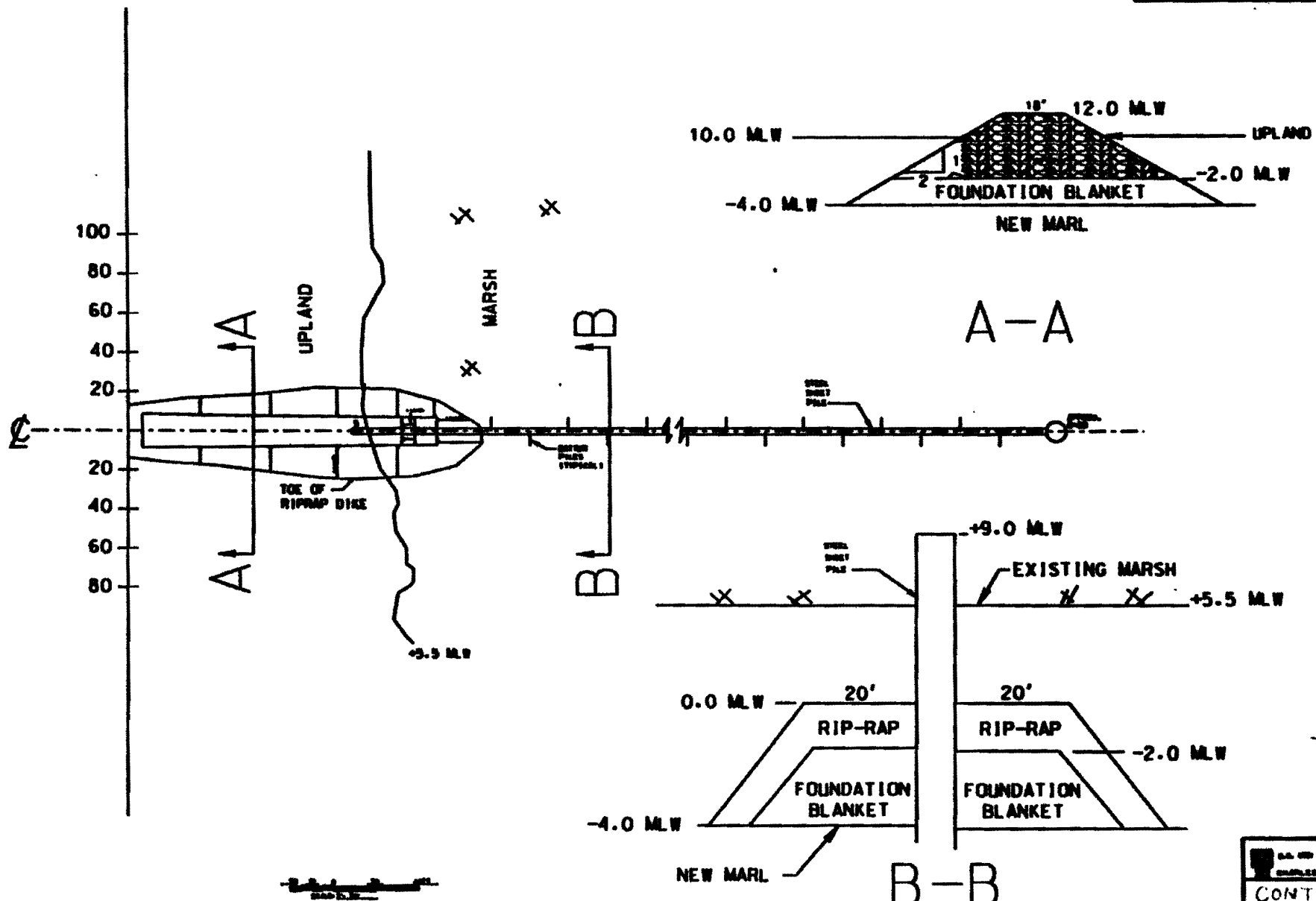


Figure 2: Location of Proposed Improvements

NO.	REVISIONS	DATE	BY	CHK



Not to Scale

U.S. ARMY CORPS OF ENGINEERS

 CONSTRUCTION DISTRICT

CONSTRUCTION DIKE "D" AMENDED

 DATE: _____

 DRAWN BY: _____

 CHECKED BY: _____

 SCALE: _____

APPENDIX C

**U.S. FISH AND WILDLIFE
FINAL COORDINATION ACT REPORT**



United States Department of the Interior



FISH AND WILDLIFE SERVICE
P.O. Box 12559
217 Fort Johnson Road
Charleston, South Carolina 29422-2559

January 29, 1996

Lt. Colonel Thomas F. Julich
District Engineer
U.S. Army Corps of Engineers
P.O. Box 919
Charleston, S.C. 29402-0919

Re: Fish and Wildlife Coordination Act Report on the Charleston Harbor Deepening Project

Dear Colonel Julich:

Enclosed please find the above-referenced report submitted in partial fulfillment of Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The report is based on the information contained in the October, 1995 Charleston Harbor Draft Feasibility Report with Environmental Assessment and supplemental information provided by Charleston District personnel. The majority of the comments received from the Charleston District on the draft FWCA report have been addressed in this report.

Due to time constraints the report is being forwarded for attachment to the Feasibility Report for Division level review without the comments or concurrence of either the National Marine Fisheries Service or the South Carolina Department of Natural Resources. Coordination with these agencies is ongoing. This report should be modified to incorporate letters of concurrence and/or adoption of recommended changes from these agencies prior to its being considered complete.

Sincerely yours,

Steven S. Gilbert
Acting Field Supervisor

/SG

**FISH AND WILDLIFE COORDINATION ACT REPORT
ON
CHARLESTON HARBOR DEEPENING STUDY**

Prepared by:
Steven S. Gilbert

Under the Supervision of
Roger L. Banks, Field Supervisor
Division of Ecological Services
Charleston, South Carolina

January, 1996

U.S. Fish and Wildlife Service
Southeast Region
Atlanta, Georgia

TABLE OF CONTENTS

	<u>Page</u>
EXECUTIVE SUMMARY	iii
INTRODUCTION	1
AUTHORITY	1
PURPOSE AND SCOPE	1
PRIOR STUDIES AND REPORTS	1
FWCA AGENCY COORDINATION	1
DESCRIPTION OF STUDY AREA	2
GENERAL DESCRIPTION	2
EXISTING NAVIGATION PROJECT	4
WATER QUALITY	5
FISH AND WILDLIFE RESOURCE CONCERNS AND PLANNING OBJECTIVES	6
EXISTING FISH AND WILDLIFE RESOURCES	10
AQUATIC SYSTEMS	10
FISH AND SHELLFISH	13
ENDANGERED SPECIES	14
FUTURE OF FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT	15
SELECTED PLAN AND ALTERNATIVES	15
DESCRIPTION OF POTENTIAL IMPACTS	16
DREDGING IMPACTS	16
DISPOSAL IMPACTS	19
NEW CONTRACTION DIKE IMPACTS	19
SECONDARY (INDIRECT) IMPACTS	20
COMPARISON OF IMPACTS OF ALTERNATIVE PLANS	20
RECOMMENDATIONS	21
POSITION OF THE FISH AND WILDLIFE SERVICE	22
LITERATURE CITED	23

LIST OF FIGURES

<u>Number</u>		<u>Page</u>
1	Charleston Harbor study area	3
2	Alternative disposal areas	17

LIST OF TABLES

<u>Number</u>		<u>Page</u>
1	Water quality classifications of Charleston Harbor and its tributaries to the point of salt water influence	5
2	Federal Endangered (E) and Threatened (T) Species occurring in Charleston County, South Carolina	14

EXECUTIVE SUMMARY

The purpose of this U.S. Army Corps of Engineer's (Corps) study was to determine if any modifications should be made to the currently authorized Charleston Harbor project, with particular emphasis on deepening and widening. The feasibility study evaluates deepening existing channels two to five feet in one foot increment alternatives. It also evaluates channel navigation improvements and improvements to support a new container cargo port terminal on the southwest end of Daniel Island. This fish and wildlife coordination act report evaluates fish and wildlife resources within the Charleston Harbor study area in both current and future scenarios, identifies potential impacts associated with the proposed project and alternatives, and makes recommendations to reduce impacts to fish and wildlife resources.

Charleston Harbor, a natural harbor approximately 14 square miles in area, is formed by the confluence of the Ashley River, Cooper River, and Wando River and lies approximately midway along South Carolina's Atlantic coast. The currently authorized navigation project for Charleston Harbor includes a 42-foot deep entrance channel, a 40-foot deep, 600-foot wide channel in the Cooper River to Goose Creek, and a 40-foot deep, 400-foot wide channel in the Wando River to the Wando terminal.

The Charleston Harbor study area supports significant fish and wildlife resources including marine hard bottom faunal assemblages and estuarine emergent wetlands. Charleston Harbor estuary supports large populations of penaeid shrimp and blue crab which are harvested both commercially and recreationally. Estuarine fish are also abundant in the study area and provide an important recreational harvest.

The juxtaposition of these habitats with major port development causes the potential for significant environmental impacts. Impacts which may result from the proposed project include loss/modification of benthic organisms and habitat at the dredge site, use of capacity at existing disposal sites promoting pressure for the need for new sites, endangered sea turtle mortality caused by hopper dredging in the entrance channel, disruption and/or mortality of immigrating or emigrating aquatic organisms, and direct and secondary habitat alterations resulting from navigational accommodation and construction of new or expanded port facilities and/or related industrial development.

The Service recommends the following measures to reduce the impact of the proposed project on fish and wildlife resources.

1. Review through interagency committee (i.e., Corps, Service, SCDNR, NMFS) the necessity and particulars of a dredging window for the "throat" of the harbor entrance between the jetties. This process should start by utilizing the methodology described in LaSalle (1991) and concentrate on important windows for ingress and egress of key resources such as penaeid shrimp, blue crab, flounder, and red drum.

- 2. Establish a dredging window for hopper dredge work based on seasonally restricting work to periods when the water temperature is below 16 degrees Celsius. Coordinate with the National Marine Fisheries Service to implement this and any other necessary measures avoiding hopper dredging impacts to endangered sea turtles.**
- 3. Dispose of suitable materials at the ODMDS in accordance with the signed management plan agreement. Also, in accordance with this plan, coordinate with appropriate agencies to plan for detailed monitoring of disposal operations which track the fate of the materials and their ecological effects (especially for large volumes of fine sediments).**
- 4. Develop, in association with water quality agencies and resource agencies, a water quality management/monitoring plan. The plan should address potential harbor deepening water quality impacts, control measures, and monitoring both at the dredge sites and at disposal areas.**
- 5. Avoid deepening any areas for which modeling indicates a high sedimentation rate.**
- 6. Bulk sediment sampling should be conducted in accordance with the Ocean/Inland Testing Manuals for all areas with the exception of those which meet the exclusion criteria based on sediment grain size. The results of all sediment testing including the completed elutriate tests should be provided to the Service for review.**
- 7. Conduct an alternatives analysis for the new contraction dike in the Cooper River. The analysis should, within engineering efficiency constraints, evaluate location, alignment, and construction alternatives consistent with reduction in impact on intertidal habitats, especially those vegetated with emergent marsh.**

CHARLESTON HARBOR DEEPENING STUDY

FWCA AGENCY COORDINATION

The following report has been coordinated with the National Marine Fisheries Service (NMFS) and the South Carolina Department of Natural Resources (SCDNR). Letters of concurrence from these agencies are attached as Appendix A. It should be noted that the NMFS letter requests coordination with their Protected Species Branch.

INTRODUCTION

AUTHORITY

Resolutions by the Senate Committee on the Environment and Public Works adopted March 27, 1990 and the Committee on Public Works and Transportation of the United States House of Representatives adopted August 1, 1990 authorized this U.S. Army Corps of Engineers (Corps) study. The Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) (FWCA) authorizes the U.S. Fish and Wildlife Service's (Service) involvement in this study. The Service prepared this report with funds transferred from the Corps under the National Letter of Agreement between our agencies for funding of FWCA activities.

PURPOSE AND SCOPE

The purpose of the Corps' study was to determine if any modifications should be made to the existing Charleston Harbor Project, with particular emphasis on deepening and/or widening the channel. This draft FWCA report describes existing fish and wildlife resources within the Charleston Harbor study area, the future of these resources with and without the project, evaluates the selected plan and alternatives, and identifies fish and wildlife conservation measures and recommendations.

PRIOR STUDIES AND REPORTS

The Service provided a FWCA Report on the currently authorized deepening project (40 foot Channel) in 1980 and a supplemental FWCA report on mitigation alternatives for this project in 1986. In 1982 the Service provided a FWCA Report on Charleston Harbor Wando River extension project. In 1991 the Service provided a FWCA Report on a proposal to deepen Shipyard River from 38 to 40 feet.

DESCRIPTION OF THE STUDY AREA

GENERAL DESCRIPTION

Charleston Harbor, a natural harbor approximately 14 square miles in area, is formed by the confluence of the Ashley River, Cooper River, and Wando River and lies approximately midway along South Carolina's Atlantic coast. The harbor is flanked by the City of Charleston on the western shore; James Island, a residential community, and Morris Island, a barrier island used as a dredged material disposal area, on the south; the community of Mount Pleasant and Sullivan's Island, a developed barrier island, on the north; and the Atlantic Ocean on the east (Figure 1).

The harbor substrate is composed predominately of sand, silt, and clay (Van Dolah et al. 1990). An average tidal range of 5.2 feet has contributed to the development of a fringe of regularly flooded marsh around a large portion of the Harbor. Marsh areas of up to one mile in width occur between Sullivan's Island and Morris Island and the adjoining mainland. The Harbor proper contains approximately 5,200 acres of regularly flooded marsh, the Wando 6,400 acres, the Ashley 4,300 acres and the Cooper 9,200 acres (U.S. Fish and Wildlife Service 1980). Due in part to the turbid conditions of the waters, the Harbor does not contain any substantial acreage of submerged vegetation with the exception of some algal growth. The majority of macrophytic primary production in the Harbor takes place in the fringing salt marshes. Nutrient inputs from these marshes and the river systems feed the Harbor's detrital based food web.

The majority of upland areas around Charleston Harbor contain either residential or commercial development. Daniel Island, which extends northward from the confluence of the Cooper and Wando rivers, currently supports agricultural activities and a diversity of wildlife habitats. Interstate highway access has recently been completed to Daniel Island, stimulating plans for major new residential, commercial, and port developments. The majority of the remaining undeveloped upland areas adjacent to the Harbor were formerly wetlands which are presently serving as dredged material disposal areas. It is estimated that within the Harbor approximately 6,300 acres of regularly flooded marsh have been lost due to dredged material disposal practices, while approximately 100 acres have been created as a result of past open water disposal practices (U.S. Fish and Wildlife Service 1980).

The Wando and the Ashley rivers originate within the coastal plains region, as once did the Cooper River, and consequently provide minor freshwater inflow. The Cooper River Rediversion Project, authorized by the River and Harbor Act of 1968 and completed in 1985, has rediverted, into the Santee River, the major portion of freshwater originating in the Santee

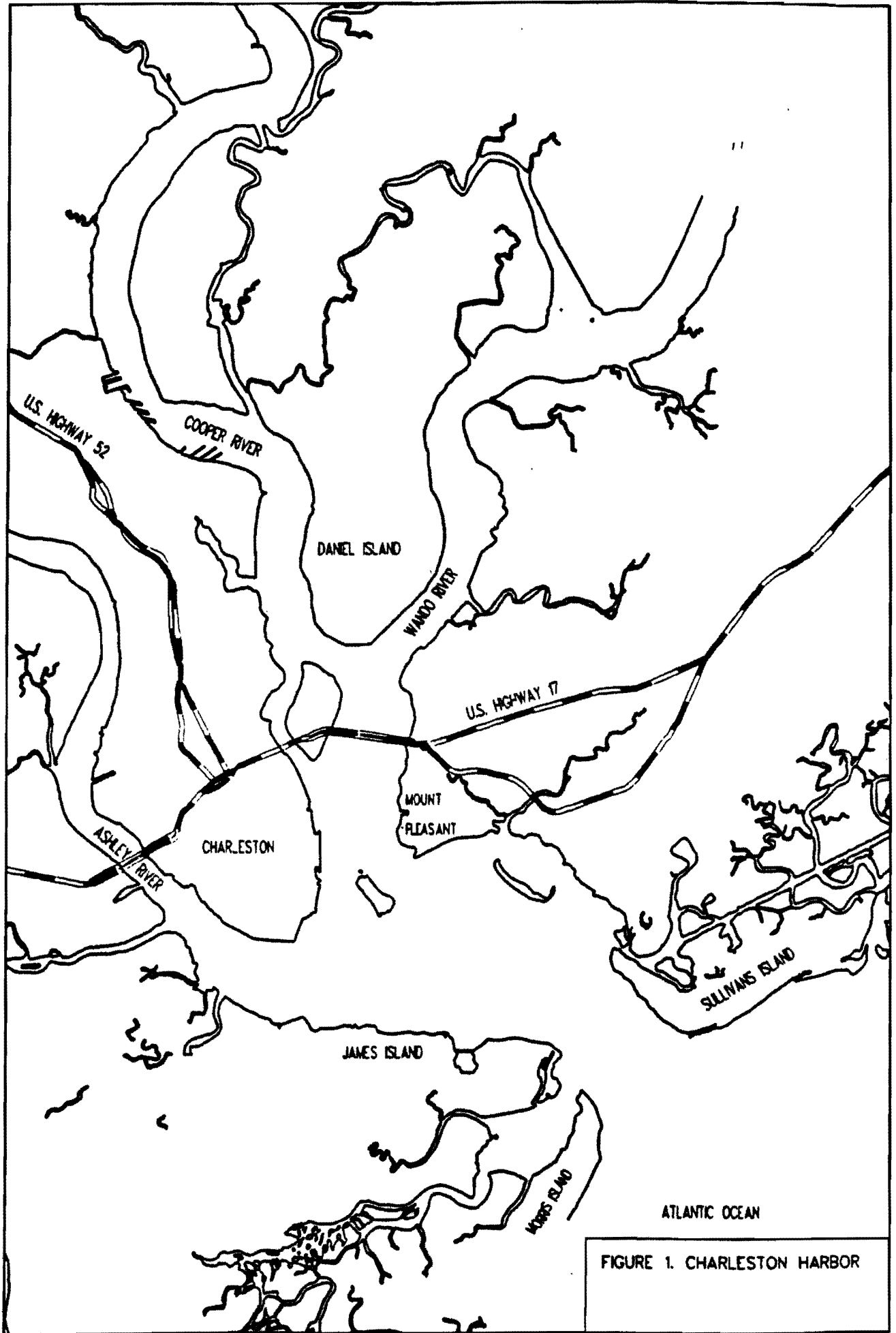


FIGURE 1. CHARLESTON HARBOR

River Basin. The project is designed to decrease shoaling in Charleston Harbor caused by construction of the South Carolina Public Service Authority's Santee-Cooper hydroelectric project during the 1940's which diverted water from the Santee River Basin into the Cooper River. Rediversion of this freshwater flow has reduced the post-1940 average discharge of 15,600 cfs to an average discharge of 4,500 cfs at Pinopolis Dam on the Cooper River (Van Dolah et al. 1990).

EXISTING NAVIGATION PROJECT

The Water Resources Development Act of 1986 (PL 99-662) (WRDA) authorized the deepening of Charleston Harbor from 35 to 40 feet generally in accordance with the plan recommended in the Chief Engineers Report dated 27 August 1981. The project as implemented consists of the following:

- a. Deepening Cooper River Channel from 35 to 40 feet (from 35 to 42 feet in the ocean bar and entrance channel) from the 42-foot ocean contour to Goose Creek, a distance of 26.9 miles;
- b. Widening Cooper River Channel to 500 feet between river miles 12.6 and 14.7;
- c. Enlarging turning basin diameter at head of Cooper River to 1,400 feet;
- d. Deepening Town Creek channel to 40 feet;
- e. Enlarging Columbus Street turning basin to 1,400 feet;
- f. Deepening the first tangent and the lower turning basin in Shipyard River from 30 to 38 feet;
- g. Easing a bend in Cooper River Channel at river mile 7.3 by diminishing the inside angle through widening.
- h. Realigning portions of Cooper River Shipyard River and Town Creek Channels to insure 125 feet clearance between pier head lines and edge of channel.

The WRDA also authorized a 40-foot deep, 400-foot wide channel in the Wando River to the South Carolina State Ports Authority terminal. The project also routinely includes two feet of advance maintenance dredging and two feet of overdepth dredging.

The entrance channel is maintained with a hopper dredge and the material is placed in an Ocean Dredged Material Disposal Site (ODMDS). The remaining channels are maintained by hydraulic pipeline dredging and the material is placed in existing diked disposal areas.

WATER QUALITY

Water quality in the majority of the harbor is rated as SB by the South Carolina Department of Health and Environmental Control (SCDHEC), although some tributaries have ratings of SA and SFH (see Table 1). The SB rating applies to tidal salt water suitable for primary and

Table 1. Water Quality Classifications of Charleston Harbor and its Tributaries to the Point of Salt Water Influence

Waterbody	Classification	Location
Wando River	SFH	From headwaters to a point 2.5 miles N. of confluence with Cooper River
Wando River	SA	From 2.5 miles N. of confluence with Cooper River to confluence with Cooper River
Ashley River	SA	Total salt water influenced portion to Charleston Harbor (although lowered D.O. requirement for portion from Church Creek to Orangegrove Creek)
Cooper River	SB	Total salt water influenced portion
Charleston Harbor	SB	From the Battery to the Atlantic Ocean

Class SFH = Shellfish Harvesting Waters - tidal saltwaters protected for shellfish harvesting.

Class SA = tidal waters suitable for primary and secondary contact recreation. Suitable also for uses listed in Class SB with the same exception.

Class SB = tidal saltwaters suitable for primary and secondary contact recreation, crabbing, and fishing, except harvesting of clams, mussels, or oysters for market purposes or human consumption. Also suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora.

secondary contact recreation, crabbing, and fishing, except for the harvesting of clams, mussels, or oysters for market purposes or consumption. These waters are also suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora (SCDHEC 1993). Waters rated as SB should not have dissolved oxygen concentrations less than 4 mg/l and fecal coliform concentrations should not exceed a geometric mean of 200 colonies/100 ml based on five consecutive samples taken within a 30 day period. Although these concentrations have been exceeded occasionally, recent reviews of data collected by SCDHEC indicate that water quality within the harbor basin often meets SB standards for dissolved oxygen and fecal coliform levels (Chestnut 1989; Davis and Van Dolah 1990).

The Ashley River and portions of the Wando River have a water quality classification of SA. Although SA waters have the same designated uses as SB waters, the water quality standards are stricter for dissolved oxygen (daily average of not less than 5 mg/l with a low of 4 mg/l, treated wastes, toxic wastes, deleterious substances and colored or other wastes (SCDHEC 1993). Water quality in the Wando River was recently upgraded to SFH above the Wando Terminal. This rating applies to tidal salt waters protected for shellfish harvesting and for uses listed in Class SA and Class SB. SFH water must maintain a daily average dissolved oxygen concentration of 5 mg/l or higher with a low of 4 mg/l and have median coliform concentrations of 14 colonies/100 ml with no more than 10% of the samples exceeding 43 colonies/100 ml (SCDHEC 1993).

FISH AND WILDLIFE RESOURCE CONCERNS AND PLANNING OBJECTIVES

In addition to providing significant wetlands and fish and wildlife habitat, Charleston Harbor has a long history of development as a major port. Charleston Harbor is currently a leading container port in the south Atlantic region. Associated with the port are major industrial and commercial facilities.

The juxtaposition of fish and wildlife habitats with major port development causes the potential for significant environmental impacts. Direct impacts of channel dredging and other project features include:

- (1) Loss/modification of benthic organisms and habitat at the dredge site;
- (2) Loss/modification of habitat at the dredged material disposal site;
- (3) Hydraulic modifications which in turn potentially affect circulation patterns, tidal exchange, sedimentation patterns and salinity distribution;
- (4) Water quality degradation at the dredge site and/or the disposal site.

- (5) Endangered sea turtle mortality caused by hopper dredging in the entrance channel.
- (6) Loss of tidal marsh, flats and shallow subtidal habitats associated with construction of the new contraction dike.

Potential secondary impacts (impacts induced by the project) include habitat alterations resulting from construction of new or expanded port facilities. Such impacts may involve dredging and/or filling of tidal marsh, intertidal flats and other estuarine habitats.

Loss of habitat at the dredged material disposal site has historically, and continues to be, one of the most obvious significant impacts of channel development. In Charleston Harbor approximately 6,300 acres of wetland habitat, primarily estuarine emergent habitat, has been lost. Deepening Charleston Harbor will require use of capacity in existing disposal areas including the Charleston ODMDS.

The Charleston ODMDS is one of the most active, frequently used sites in the South Atlantic Bight. Originally, the management plan for ocean dredged materials disposal associated with the Charleston Harbor complex called for two sites. The permanently designated ODMDS was approximately 3 X 1.5 nautical miles in size. This site was designated to receive all dredged material from maintenance dredging in the harbor and entrance channels. Surrounding the permanent ODMDS, was a larger disposal site. This site encompasses an area of approximately 5 X 3 nautical miles, and was designated for one time use in conjunction with the Charleston Harbor 40-foot deepening project.

Based on the above design, monitoring activities began in 1985 to assess the fate and impact of dredged material placed within the ODMDS. Detailed bathymetric monitoring of the ODMDS and surrounding area have generally been conducted annually by the Corps since 1985. The primary objectives of these bathymetric surveys were to: (1) document the location and configuration of mounds created with dredged material, which was placed along narrow corridors within the ODMDS, and (2) determine whether these mounds were stable.

Monitoring of bottom sediment characteristics and biological communities in the area was conducted primarily by the South Carolina Department of Natural Resources (SCDNR) working under contract to the Corps. This latter effort, which was conducted in 1987, focused largely on obtaining baseline data on the structure and composition of benthic communities and sediment characteristics (physical and chemical) in and around the permanently designated ODMDS (Winn et al. 1989). The SCDNR benthic sampling program was designed around the corridor disposal concept with a network of stations positioned to intercept the migration of material over the bottom, if it occurred, and assess changes in the benthic communities or surface sediment characteristics resulting from the movement of dredged material. The 1987 baseline survey detected minor changes in benthic community structure and sediment composition related to a disposal operation completed in 1986, and some movement of the material was detected away from the disposal site (Winn et al., 1989). However, this

movement did not appear to significantly alter sediment composition or benthic communities outside the ODMDS.

In the Fall and Winter of 1989-1990, local fishermen reported that disposal operations occurring in the permanently designated ODMDS were impacting a live bottom area within the western quarter of that area. Until that time, no significant live bottom areas were known to exist within or near either disposal area. Subsequent video mapping of the sea floor conducted by the EPA in the vicinity of the ODMDS confirmed several areas of live bottom within and beyond the boundaries of both sites. As a result of this survey, management strategies were developed to avoid disposal on the mapped live bottom areas. Studies to assess the impact of dredged material re-suspension and disposal plume turbidities on sessile live bottom fauna at one representative site within the ODMDS were initiated.

Based on the above, a Site Management Plan was developed through interagency coordination of the Corps, EPA, the Service, and the SCDNR. The plan was completed and signed by the Corps and the EPA in March of 1993. This plan requires that material suitability for ocean disposal be verified by the Corps and agreed to by EPA, places no seasonal restrictions on use of the site, specifies placement of materials at exact locations based on agreement between EPA and the Corps, and requires electronic verification of placement by dredging contractors as part of monitoring requirements. Fine grained materials are to be placed in the eastern portion of the site while coarse-grained materials not used for other beneficial purposes (i.e., beach nourishment) are to be used to expand a "deflection berm" providing an L-shaped barrier for protection of off-site resources to the south and west of the ODMDS. Since there is a high likelihood that the majority of materials from this project would be placed at the ODMDS, it is important to insure compliance with this management plan.

Ongoing baseline studies within and surrounding the ODMDS continue. Two annual assessments were conducted in 1993 and 1994. These sampled benthic assemblages and sediment characteristics at 200 stations during one intensive summer sampling period. These reports are due to be released shortly.

Although the Corps of Engineers does not have immediate plans to develop any new upland disposal sites, it is logical to assume that at some time in the future a number of other disposal area sites may need to be considered for future deepening and maintenance of Charleston Harbor. In anticipation of the loss of the Daniel Island disposal site due to development of the island, the Charleston Harbor Disposal Area Study funded by the South Carolina Coastal Council evaluated 20 sites in the project area based on environmental and engineering constraints. Results of this study may be used as a tool for initial analysis of any new disposal areas for future maintenance of the Charleston harbor project.

One of the greatest potential impacts of harbor deepening is the hydraulic modification which will result in changes in circulation, sedimentation, and salinity patterns (Allen and Hardy 1980). Increased erosion and/or sedimentation due to changes in circulation patterns may

degrade wetlands and fish/shellfish habitat. Increases in ocean derived sediments introduced into the harbor may lead to increased maintenance dredging and the need for additional dredged material disposal areas in the future. Although there has not been documentation of the sources of sediment deposition in the harbor, nor strong documentation of the success of the Rediversion Project at significantly lowering such deposition, there has been speculation that ocean derived sandy sediments may be contributory to the shoaling rates and hence maintenance dredging burden in Charleston Harbor. Salinity and sediment type are major factors controlling distribution of benthic populations in the Charleston Harbor estuary, although the relationship of these parameters with faunal distribution patterns is not very strong in the lower harbor area encompassed by this project (Van Dolah et al. 1990). Salinity is a major factor influencing plant species composition in tidal marshes (Pearlstone et al. 1990) and availability and distribution of nursery areas. According to a model run by the Corps' Waterways Experiment Station, the project would not result in a change in salinity patterns in the harbor.

At the dredging site, potential water quality impacts include increased turbidity and oxygen demand, and release of contaminants and nutrients - particularly free sulfides, hydrogen sulfide, and ammonia. Good maintenance and dredging practices can limit water quality impacts of pipeline dredging. Overflow from hopper dredges can cause high turbidity levels (Allen and Hardy 1980). At open water disposal sites water quality impacts are similar to the above, but of greater magnitude due to the release of larger amounts of dredged material into the water column.

Dickerson et al. (1991) reported that hopper dredging in several southeastern entrance channels has caused high sea turtle mortalities due to entrainment by the draghead. Van Dolah et al. (1992) concluded, after a 15 month survey of the Charleston Harbor entrance channel, that sea turtle densities were sufficient to warrant concern over mortality from hopper dredging.

The following planning objectives were developed considering the above problems.

1. Avoid impacts to estuarine wetlands in the Charleston Harbor study area.

Estuarine wetlands provide the highest quality fish and wildlife habitat in the Charleston Harbor study area. Harbor development and maintenance have resulted in loss of approximately 6,300 acres of wetlands due to filling and dredged material disposal. Future harbor activities should avoid or minimize the use of these highly valuable habitats.

2. Avoid impacts to marine live bottom habitat in the vicinity of the Charleston ODMDS.

Offshore live bottoms provide productive and diverse invertebrate and fish habitat and are important to recreational fisheries. The predominant offshore marine sand bottoms provide

only low value invertebrate and fish habitat. Therefore live bottom habitat needs to be protected.

3. Maintain water quality suitable for management of diverse and productive fish and wildlife populations in Charleston Harbor.

Good water quality is an essential component of productive wetland wildlife habitat. Currently, water quality in most of the study area is suitable for most fish and wildlife purposes. Proper planning needs to ensure that harbor development would not degrade water quality.

4. Avoid hopper dredging impacts to endangered sea turtles.

Available information indicates that hopper dredging in the Charleston Harbor entrance channel could cause substantial sea turtle mortality. Measures need to be implemented to avoid impacts to these endangered species. These measures should include state of the art avoidance measures such as those currently in use by the Charleston District in cooperation with the National Marine Fisheries Service including use of the new draghead designed for this purpose and limiting the temporal window for dredging to periods to those outside of the turtle's presence.

5. Avoid design alternatives which would inordinately increase the need for future maintenance dredging.

Increased maintenance dredging increases disturbances to benthic communities and water quality. It also puts pressure on the limited disposal space available.

EXISTING FISH AND WILDLIFE RESOURCES

AQUATIC SYSTEMS

Aquatic systems in the study area provide high value fish and wildlife habitat. Marine and estuarine wetland systems as described by Cowardin et al. (1979) are common in the study area.

Marine System

The near shore ocean community, which delimits the eastern boundary of the study area may be classified as marine, subtidal, unconsolidated bottom habitat (Cowardin et al. 1979). This community is comprised of surf zone, a shallow inshore water region, and a deep-water offshore area. Bottom sediments, which are predominantly sand, provide low value fish

habitat (Barans and Burrell 1976). Vascular plants are absent from the near shore community, although phytoplankton and seaweeds are present where sufficient light penetration and suitable substrate occur.

Widely scattered outcrops of rock, relict worm tube reefs, and other materials provide vertical relief and attachment sites for sessile benthic invertebrates. The physical cover and sessile invertebrates attract motile invertebrates and fish. These "live bottoms" are rich in abundance and diversity of invertebrates and fish and are important to the recreational marine fishery (Sandifer et al. 1980).

The ocean beach (to the high water line), sand bars, and sand flats in the study area are classified as marine, intertidal, unconsolidated shore (Cowardin et al. 1979). These intertidal beaches, sand bars, and flats experience almost continuous changes as they are exposed to erosion and deposition by winds, waves, and currents. Sediments are unstable and vegetation is absent. Wave action, long shore currents, shifting sands, tidal rise and fall, heavy predation, and extreme temperature and salinity fluctuations combine to create a rigorous environment for macroinvertebrates, the predominant fauna.

Zooplankton, benthic invertebrates, fishes, birds, mammals, and reptiles are all important faunal components of the marine system. Important game fishes in inshore waters include spot, croaker, flounder, spotted seatrout, sheepshead, bluefish, southern kingfish, black drum, and red drum. Some of the world's most popular big gamefish are found in deeper offshore waters, including king mackerel, wahoo, dolphin, blue and white marlin, swordfish, and sailfish. Numerous shorebirds and wading birds utilize the study area's marine habitats. Aquatic mammals, including various whale and dolphin species, occur in the marine waters.

Estuarine Systems

The estuarine system consists of open water tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have access (either open, partly obstructed, or sporadic) to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from land.

Brackish and salt marshes of the study area are classified within the estuarine system, as are mud flats, oyster reefs, stream beds, and shorelines. Classes of the estuarine system present include emergent wetlands, unconsolidated bottom, stream bed, unconsolidated shore, and reef.

Intertidal, emergent wetlands are the most conspicuous class of the estuarine system in the study area. These include salt and brackish water marshes. The low salt marsh is regularly flooded by daily tides and extends from about mean sea level to the mean high water (MHW) level. Low salt marsh is monospecific, being vegetated with smooth cordgrass. The high marsh occurs above MHW, is flooded irregularly by spring and storm tides, and has a varied

plant composition. Halophytes occurring in abundance include black needlerush, saltmeadow cordgrass, saltgrass, sea ox-eye, glasswort, saltwort, sea lavender, and marsh aster.''

Brackish water marshes represent a transition zone between salt marshes and tidal freshwater marshes. Plant species found in the more seaward brackish marshes are quite similar to those of the upper high marsh zone of the salt marsh. Pure stands of black needlerush may occur in these marshes. Saltmarsh bulrush, aster, marsh elder, sea-myrtle, panic grass, saltmeadow cordgrass, sea ox-eye, broomsedge, and seaside goldenrod also may be present. Giant cordgrass occasionally appears along upland borders of the more seaward brackish marshes. As salinity decreases, giant cordgrass generally replaces needlerush as the dominant plant.

These emergent wetlands are highly productive natural systems that provide spawning, nursery, and feeding habitat for important commercial and sport fishes. An estimated 95 percent of all commercial finfish and shellfish and most marine sport fishes inhabit estuarine areas during all or part of their life cycles. Estuarine emergent marshes also provide valuable habitat for various waterfowl and other wildlife species, including wading birds, shorebirds, and mammals such as the marsh rabbit, marsh rice rat, river otter and mink

Estuarine intertidal shorelines, sand bars, and mud flats are classified as intertidal, unconsolidated shore (Cowardin et al. 1979); these are typically grouped together as intertidal flats. Peterson and Peterson (1979) define intertidal flats as those portions of the unvegetated bottom of sounds, lagoons, estuaries, and river mouths which lie between the high and low tide marks. These areas occur along shorelines of islands and of the mainland and as emergent bottoms in areas unconnected to dry land. Intertidal flats are composed of sandy and muddy sediments in a wide range of relative proportions. Intertidal flats also provide valuable habitat for benthic invertebrates which are heavily preyed on by fish, wading birds, and shorebirds. Over 50 species of fish live and feed on intertidal flats during high tide. As many as 16 species of fish are, at least in part, dependent on prey which lives or forages on the flats (Peterson and Peterson 1979). These areas are also extremely important feeding areas for wading birds and shorebirds.

Estuarine, intertidal, reef habitat is represented primarily by oyster reefs occurring in estuarine intertidal zones. The American oyster can tolerate a wide range of salinity, temperature, turbidity, and oxygen tension and is therefore adapted to the periodic changes in water quality that characterize estuaries. Oysters often build massive, discrete reefs in the intertidal zone. Oyster reefs occur throughout the project area but are closed for recreational and commercial harvest due to unacceptable water quality. Water quality in the Wando River upstream of the Wando terminal is suitable for shellfish harvest. Closed oyster reefs still perform a variety of ecological functions in support of the estuarine system. These include stabilization of erosional processes, modification of long-term changes in tidal stream flow and overall marsh

physiography, mineralization of organic carbon and release of nitrogen and phosphorus in usable forms, and provision of stable islands of hard substrate in otherwise unstable environments. This latter function is particularly important from an estuarine habitat perspective (Bahr et al. 1981).

FISH AND SHELLFISH

Fishery resources within Charleston Harbor and the project area consist of numerous estuarine and marine species. Demersal fish species which are typically associated with the lower water column and substrate of Charleston Harbor include star drum, croaker, bay anchovy, Atlantic menhaden, spotted hake, weakfish, spot, blackcheek tonguefish, white catfish, and silver perch (Van Dolah et al. 1990, Shealy et al. 1974). Other fish species which are of commercial or recreational value and are commonly found within Charleston Harbor include flounder, red drum, spotted seatrout, bluefish, Atlantic croaker, spot and black drum. Life histories and population dynamics of several of these species was recently investigated in the Charleston Harbor estuary and other State waters (Wenner et al. 1990).

Four anadromous fish species, American shad, blueback herring, hickory shad, and striped bass, and one catadromous species, American eel utilize Charleston Harbor and its tributaries as migration routes and spawning areas. The shortnose sturgeon, an endangered species, has been documented as rarely occurring within Charleston Harbor (Van Dolah et al. 1990).

Fishes which commonly reside within the intertidal marshes of the project area include mummichog, sheepshead minnow, Atlantic silverside, and bay anchovy. Other species which frequent intertidal marshes include both species of mullet and several species of Sciaenids. Tidal pools in the high marsh areas are inhabited by species such as sailfin molly and mosquitofish.

Charleston Harbor estuary supports large populations of penaeid shrimp and blue crab which are harvested both commercially and recreationally. The shrimp fishery is South Carolina's largest commercial fishery, averaging 3.24 million pounds (11.8 million dollars) annually during recent years. The Charleston Harbor estuary contributed approximately 20% of the state's total 1978-1987 shrimp landings. Annual commercial landings of blue crab averaged 6.17 million pounds (1.7 million dollars) during recent years, with Charleston Harbor accounting for about 8% of the statewide total (Van Dolah et al. 1990). Charleston harbor also supports one of the state's highest utilized estuaries for recreational bait shrimping representing 43, 44, and 45 percent of statewide recreational shrimping use for 1988, 1989, and 1990, respectively (Joe Carson, SCDNR, personal communication). If these percentages are applied to the 13,366 issued licenses for 1994, the importance of this area for recreational use is impressive.

ENDANGERED SPECIES

The Charleston Harbor study area supports a number of endangered and threatened species (Table 2). Maintenance and enhancement of habitat for endangered and threatened species is an important Service goal. The species listed in Table 2 should be taken into consideration during the alternatives analysis for this project including potential needs for future new disposal sites.

Table 2. Federal Endangered (E), and Threatened (T), Species Occurring In Charleston County, South Carolina.

West Indian manatee (Trichechus manatus) - E
Bald eagle (Haliaeetus leucocephalus) - E
Bachman's warbler (Vermivora bachmanii) - E
Wood stork (Mycteria americana) - E
Red-cockaded woodpecker (Picoides borealis) - E
Arctic peregrine falcon (Falco peregrinus tundrius) - T
Piping plover (Charadrius melodus) - T
Kemp's ridley sea turtle (Lepidochelys kempii) - E
Loggerhead sea turtle (Caretta caretta) - T
Leatherback sea turtle (Dermochelys coriacea) - E
Green sea turtle (Chelonia midas) - T
Shortnose sturgeon (Acipenser brevirostrum) - E
Canby's dropwort (Oxypolis canbyi) - E
Chaff-seed (Schwalbea americana) - E
Pondberry (Lindera melissifolia) - E
Sea-beach pigweed (Amaranthus pumilus) - T

FUTURE OF FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

Threats to the above-described fish and wildlife resources of the Charleston Harbor area are primarily related to continued growth and development of the surrounding areas. Charleston's population is projected to increase by more than 50% from 500,000 to almost 800,000 over the next twenty years (Charleston Harbor Project, 1994). Direct loss of valuable aquatic and aquatic-related habitats from commercial and residential developments are not anticipated to be cumulatively significant due to in-place regulatory mechanisms and a public awareness of the value of these systems. However, increased population size is directly associated with increasing nutrient loads by increasing the demand for sewage treatment, industrial discharges, and stormwater runoff. The Charleston Harbor Project, funded by the National Oceanographic and Atmospheric Administration's Office of Coastal Resource Management through a Special Area Management Plan managed by the South Carolina Office of Ocean and Coastal Resource Management, has identified eutrophication as the most serious potential threat to the sustained health of the Charleston Harbor estuary (Charleston Harbor Project, 1994).

Such eutrophication could cause changes in dissolved oxygen levels and other water quality characteristics. This in turn could result in shifts in estuarine community structure affecting primary nursery areas and important feeding areas for many recreationally and commercially important species. Such trends could be controlled through careful planning, controlled growth, and control of both point and non-point discharges.

SELECTED PLAN AND ALTERNATIVES

As described in the Draft Feasibility Report for this project, the selected plan consists of deepening Charleston Harbor from 40 feet to 42 feet (minimum) or 45 feet (maximum) below mean low water with 2 feet of allowable overdepth and 2 feet of advance maintenance dredging (except for the entrance channel).

The navigation channel would be 800 feet in width seaward of the jetties and slope out to the 47 foot ocean contour. The channel would widen to 1000 feet just outside the jetties and return to an 800 foot width within the jetties, reducing further to 600 feet in width near Sullivan's Island. The width would remain at 600 feet for the rest of the federal navigation channel with the exception of the Daniel Island Reach which would vary from approximately 600 feet to 875 feet in width for proposed terminal access and the Horse and Shutes/Folly Reach where realignment to straighten the channel would result in a 900 to 1000 foot wide channel.

Dredged material from the deepening would be placed in existing upland disposal areas and at the Charleston ODMDS. Potential upland disposal sites include the Clouter Creek Disposal Site, the Daniel Island Disposal Site, the Navy Weapons Station Disposal site, the Drum Island Disposal Site and the Morris Island Disposal Site (see figure 2). Sediment chemistry and bioassay testing are planned to determine which material would be suitable for ocean disposal.

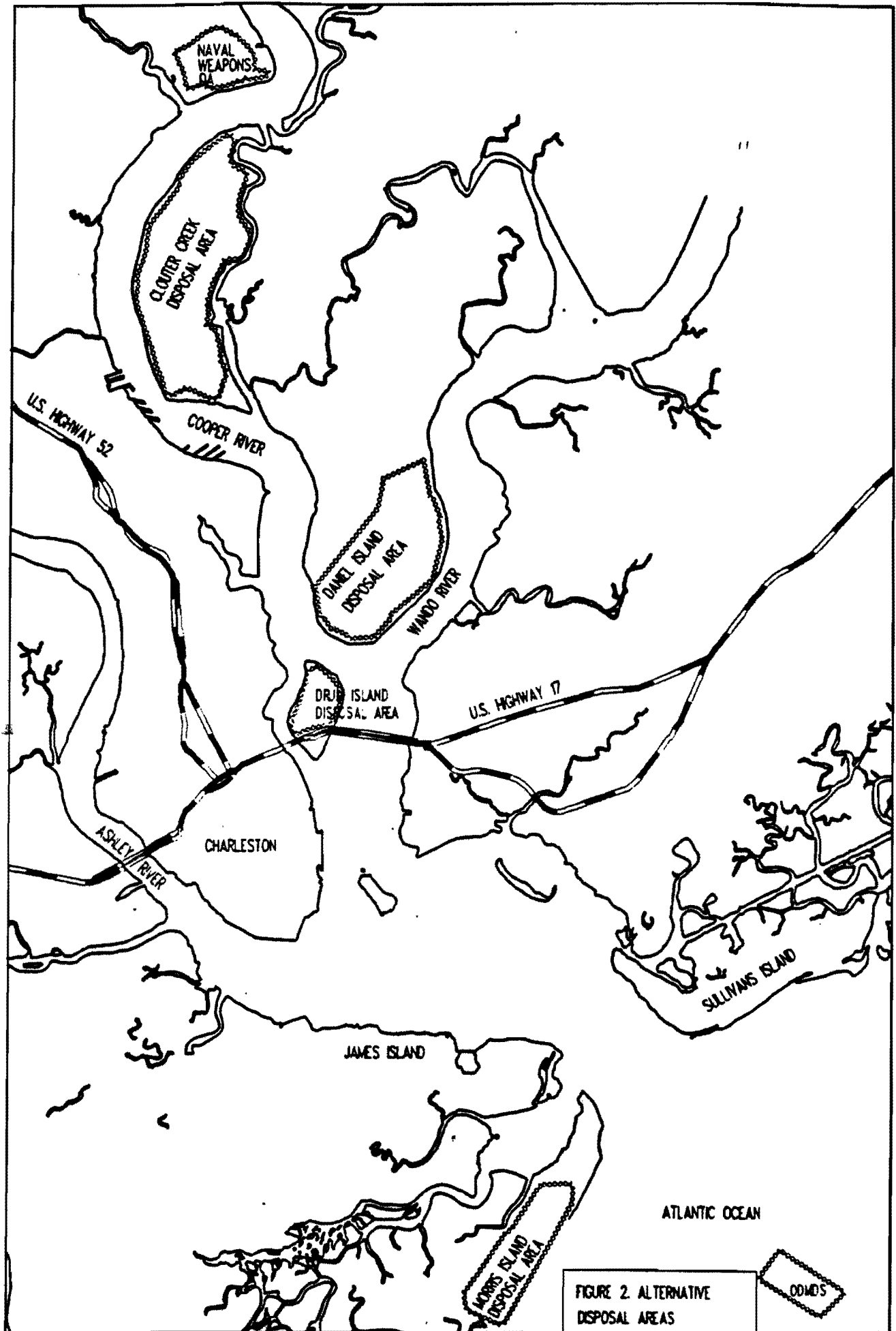
Project modifications which are proposed specifically to accommodate a new port facility at the southwest end of Daniel Island include: (1) construction of a 1000 foot long sheet pile contraction dike; (2) repairing two existing contraction dikes within their original footprint; (3) constructing an approximately 80 acre, 49 foot deep turning basin in subtidal bottoms; and (4) placement of approximately 3 million cubic yards of dredged material in the Clouter Island diked disposal area. As currently proposed, the new contraction dike would involve excavation of an 80 foot (bottom width) by -10 foot (MLW) canal through 300 feet of marsh, backfilling the excavated area with marl "crush and run" and rip-rap, constructing the sheet pile wall into the stone base, and restoring the excavated area to grade with excavated marsh materials.

Alternatives appear to be limited. A "no action" option would maintain the harbor at its previously authorized design depth of 40 feet plus 2 feet of allowable overdepth and 2 feet of advance maintenance (2+2). Depth options of 42 feet (and 2+2) to 45 feet (and 2+2) at one foot increments represent the primary alternatives considered with the exception of alternatives for material disposal. As described above these latter alternatives are limited to use of existing upland sites and/or the Charleston ODMDS. Some alternatives for the new contraction dike have been considered. As originally presented in the draft feasibility report, the contraction dike through marsh habitat was proposed as a solid fill marl causeway. Alternatives for location of the new terminal facility are not addressed in the study.

DESCRIPTION OF POTENTIAL IMPACTS

DREDGING IMPACTS

Loss of organisms at the dredge site results from physical removal by the dredge. Depending on the depth dredged, all or most of the resident organisms may be physically removed. Some studies indicate that benthic organisms will recolonize the dredge site (Allen and Hardy 1980). However, in a shipping channel, maintenance dredging of shoaling areas occurs at regular intervals, and may limit recovery of benthic populations. Van Dolah et al. 1990 found some evidence of reduced benthic populations in the Cooper River, which is more heavily developed for port and industrial activities, compared to the less developed Ashley River and Wando River. In the case of the project currently under consideration, most of the dredging would occur in current, deep, maintained channels. Therefore, in these areas, the post project conditions would be similar to pre-project conditions. However, conversion of shallow, soft



bottom benthic faunal communities to deeper water disturbed communities is anticipated at the realignments for the Horse and Shutes/Folly Reaches and along the margins of the deepened channel whose top width will expand due to deepening. Additional conversions may occur with construction of a turning basin and docking accommodation at the site of the new ports terminal.

The impacts of dredging on the more motile components of the Charleston Harbor system will depend upon their ability to avoid the immediate vicinity of the dredge and their individual tolerance to suspended particles generated by dredge operation. Impacts on weaker larval and post-larval organisms which may be present in high concentrations during seasonal immigrations are expected to be greater. The ability of these less motile organisms to avoid dredge entrainment is questionable and suspended particles block gills and food filters of larval fish and invertebrates (Grant 1973). These phenomena are summarized by the U.S. Army Corps of Engineers, Charleston District (1978):

Action of the dredge cutterhead poses a threat of physical injury or mortality to any creature in its path. However, the mobility of fish populations enables them to avoid this danger, with the exception of weakly mobile embryonic or larval stages which are susceptible to adverse effects when they occur in the vicinity of dredging activity. Actual mortality of these early life forms in significant numbers is unlikely unless they occur in great density however.

LaSalle (1991) suggests several key criteria in determining whether significant potential impacts may warrant establishment of a dredging "window". One key factor is whether site morphometry allows for organisms to bypass the dredge operation. Since immigration/emigration routes for important estuarine and marine organisms are not confined to the dredged channel area for much of Charleston Harbor, these effects are not likely to be significant. However, organism ingress/egress is largely confined to the dredged channel in the relatively narrow "throat" entrance to the harbor between the jetties and further investigation into a seasonal window for dredging in this area may be appropriate.

Potential water quality impacts at the dredging site include increased turbidity and oxygen demand, and release of contaminants and nutrients - particularly free sulfides, hydrogen sulfide, and ammonia. Good maintenance and dredging practices can limit water quality impacts of pipeline dredging. Overflow from hopper dredges can cause high turbidity levels (Allen and Hardy 1980).

In response to previous concerns relative to hydraulic modification from deepening the harbor channel potentially causing changes in circulation, sedimentation, and salinity patterns, a study was initiated by the Waterways Experiment Station of the Corps of Engineers. Although we have not reviewed the finalized study, our understanding is that modeling efforts have demonstrated no significant changes in these parameters of concern.

Dredging by hopper dredge in the outer entrance channel may result in the incidental take of threatened and endangered sea turtles. Such incidents have been well documented in the literature (Dickerson et al. 1991; National Marine Fisheries Service, 1991). Loggerhead (*Caretta caretta*) and Kemp's ridley (*Lepidochelys kempfi*) turtles have been shown to frequent the Charleston Harbor entrance channel when water temperatures are above 16 degrees Celsius (Van Dolah et al. 1993). A seasonal window for hopper dredge operations may be necessary to avoid these impacts. It is our understanding that the Charleston District intends to comply with the dredging restrictions in the November 1991 National Marine Fisheries Service generic biological opinion on channel dredging which should serve to limit impacts on the turtles.

DISPOSAL IMPACTS

Loss of habitat at the dredged material disposal site has historically, and continues to be, one of the most obvious significant impacts of channel development. In Charleston Harbor approximately 6,300 acres of wetland habitat, primarily estuarine emergent habitat, has been lost. Deepening Charleston Harbor will require use of capacity in existing disposal areas including the Charleston ODMDS promoting additional pressures for development of new disposal areas.

Water quality may be affected by return waters from upland disposal sites. However, Charleston District reports two sampling events when the removal of suspended solids exceeded 99 percent. Rupture of disposal dikes at existing areas is relatively infrequent but could be disastrous for adjacent sensitive marsh and mudflat systems.

At open water disposal sites such as the ODMDS water quality impacts can be of concern due to the release of large amounts of dredged material into the water column. Recent baseline studies at the ODMDS which measured response of sponge respiration rates have shown that live bottom communities adjacent to fine material dumping sites can be adversely affected (Bob Van Dolah, SCDNR, personal communication). While following the current management plan for the ODMDS will limit such impacts, it may be important to include detailed monitoring of the fate and ecological effects of the materials disposed of at the ODMDS.

NEW CONTRACTION DIKE IMPACTS

This analysis is based on the current proposal (construction of a 1000 foot sheet pile structure). Most impacts relate to the construction of the sheet pile wall through the marsh rather than the physical presence of the wall itself. In consideration of sloughing and slope stabilization along the proposed 80 foot (bottom width) by 10 foot (MLW) deep excavated canal and deposition of excavated materials adjacent to the cut, an estimated 320 foot wide by 300 foot long (2.2 acre) marsh area would be affected. Provided that the marsh is successfully restored as proposed, these impacts may be relatively short-term (approximately four to five growing seasons). Degree of impact and recovery will be dependent upon

sensitivity in design and implementation as well as careful monitoring and remediation if necessary of the marsh recovery.

SECONDARY (INDIRECT) IMPACTS

The primary purpose of the proposed deepening is to improve commercial navigation primarily for the port and port related industries. Expanded port facilities are important economically for the Charleston area. However, such expansions may result in physical impacts to fish and wildlife resources through direct and indirect affects on habitat and water quality. These impacts may take place at expanded port facilities such as the new container terminal proposed at Daniel Island or at associated industrial sites which are induced by the new or expanded port facilities.

Since the proposed project would use only existing dredged material disposal sites, direct affects of creating new or expanded sites for these purposes are absent. However, as mentioned earlier, use of existing capacity by this project may indirectly require creation of new or expanded disposal sites in the future. This is particularly true in light of the project's predicted increase in annual shoaling quantities of 780,000 cubic yards (Draft Feasibility Report, page 50).

COMPARISON OF IMPACTS OF ALTERNATIVE PLANS

As mentioned earlier, alternatives to the project are primarily limited to alternative depths. While the no action alternative would reduce or eliminate the impacts, maintenance of the currently authorized 40 foot deep channel with 2 feet of overdredging and 2 feet of advanced maintenance would still result in the class of impacts typical of dredge operations in shoal buildup areas.

Similarly, selection of a shallower depth alternatives, rather than the 45 foot alternative, would entail conversion of incrementally less undredged bottoms along the channel margins and generate a reduced amount of material to be disposed.

It is unclear how integrally related the dredging of the turning basin and construction of the compression dike for a new terminal at Daniel Island are to the project and planning alternatives. Should the terminal be located further up the Cooper River at the navy base, site specific impacts of the various options would have to be explored at that time.

RECOMMENDATIONS

Based on the projected impacts above, The Service recommends the following actions/plan modifications to reduce the potential impacts of the project on fish and wildlife resources.

1. Review through interagency committee (i.e., Corps, Service, SCDNR, NMFS) the necessity and particulars of a dredging window for the "throat" of the harbor entrance between the jetties. This process should start by utilizing the methodology described in LaSalle (1991) and concentrate on important windows for ingress and egress of key resources such as penaeid shrimp, blue crab, flounder, and red drum.
2. Establish a dredging window for hopper dredge work based on seasonally restricting work to periods when the water temperature is below 16 degrees Celsius. Coordinate with the National Marine Fisheries Service to implement this and any other necessary measures avoiding hopper dredging impacts to endangered sea turtles.
3. Dispose of suitable materials at the ODMS in accordance with the signed management plan agreement. Also, in accordance with this plan, coordinate with appropriate agencies to plan for detailed monitoring of disposal operations which track the fate of the materials and their ecological effects (especially for large volumes of fine sediments).
4. Develop, in association with water quality agencies and resource agencies, a water quality management/monitoring plan. The plan should address potential harbor deepening water quality impacts, control measures, and monitoring both at the dredge sites and at disposal areas.
5. Avoid deepening any areas for which modeling indicates a high sedimentation rate.
6. Bulk sediment sampling should be conducted in accordance with the Ocean/Inland Testing Manuals for all areas with the exception of those which meet the exclusion criteria based on sediment grain size. The results of all sediment testing including the completed elutriate tests should be provided to the Service for review.
7. Conduct an alternatives analysis for the new contraction dike in the Cooper River. The analysis should, within engineering efficiency constraints, evaluate location, alignment, and construction alternatives consistent with reduction in impact on intertidal habitats, especially those vegetated with emergent marsh.

POSITION OF THE U.S. FISH AND WILDLIFE SERVICE

The direct impact areas for the proposed project are largely limited to areas already disturbed for these purposes (i.e., dredging and deepening existing deep navigation channels; disposing of materials in existing disposal areas). As a result, the project should not result in significant and unacceptable impacts to fish and wildlife resources provided that the Service's recommendations (above) are incorporated into the project. The Service favors the shallower 42 foot depth project because of reduced dredge activity and volume both initially and for future maintenance activities. This alternative should be selected over the 45 foot depth alternative unless there is an overriding economic justification for choosing the latter. Environmental documentation in compliance with the National Environmental Policy Act (NEPA) has not been initiated for the new port terminal facility. Therefore, the work proposed in accommodation of the proposed Daniel Island port terminal appears premature and pre-decisional relative to NEPA alternatives analyses for port location.

LITERATURE CITED

- Allen, K. O., and J. W. Hardy. 1980. Impacts of navigational dredging on fish and wildlife: a literature review. U.S. Fish and Wildlife Service, Biological Services Program. FWS/OBS - 80/07. 81 pp.
- Bahr, L.M., and W.P. Lanier. 1981. The ecology of intertidal oyster reefs of the South Atlantic coast: a community profile. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C. FWS/OBS-81/15. 105 pp.
- Barans, C. A., and V. G. Burrell, Jr. 1976. Preliminary findings of trawling on the continental shelf off the Southeastern United States during four seasons (1973-1975). S.C. Mar. Resour. Cent. Tech. Rep. No. 13. 16 pp.
- Charleston Harbor Project. 1994. Annual Report Project Year 3. Charleston Harbor Project, SC Office of Ocean and Coastal Resource Management, Charleston, SC
- Chestnut, D. 1989. A review of Charleston Harbor water quality data 1974-1987. South Carolina Department of Health and Environmental Control Technical Report No. 002-89, Columbia. 46 pp.
- Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31. 103 pp.
- Davis, K. B., and R. F. Van Dolah. 1990. Characterization of the physical, chemical and biological conditions and trends in the Charleston Harbor estuary: 1970-1985. Final report submitted to South Carolina Sea Grant Consortium under Agreement No. R/ER-6.
- Dickerson, D. D., J. I. Richardson, J. S. Ferris, A. L. Bass, and M. Wolf. 1991. Entrainment of sea turtles by hopper dredges in Cape Canaveral and King's Bay ship channels. U.S. Army Corps of Engineers Information Exchange Bulletin, Vol. D-91-3. 9 pp.
- Grant, M.J. 1973. Rhode Island's ocean sands: management guidelines for sand gravel extraction in state waters. University of Rhode Island, Coastal Resources Center Marine Technical Report No. 10 Warragnasett. 51pp.
- LaSalle, M.W., D.G. Clark, J. Homziak, J.D. Luñz, and T.J.Fredette. 1991. A framework for assessing the need for seasonal restrictions on dredging and disposal operations. Technical Report D-91-1,, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

- National Marine Fisheries Service. 1991. Biological opinion: Dredging of channels in the Southeastern United States from North Carolina through Cape Canaveral, Florida, 27p.
- Pearlstine, L., W. Kitchens, P. Latham, and R. Bartleston, 1990. Application of a habitat succession model for the wetlands complex of the Savannah National Wildlife Refuge. Florida Cooperative Fish and Wildlife Research Unit, University of Florida. Gainesville.
- Peterson, C. H., and N. M. Peterson. 1979. The ecology of intertidal flats of North Carolina: a community profile. U.S. Fish and Wildlife Service. FWS/OBS-79/39. 73 pp.
- Sandifer, P. A., J. V. Miglarese, D. R. Calder, J. J. Manzi and L. A. Barclay. 1980. Ecological characterization of the Sea Island coastal region of South Carolina and Georgia. Vol. III: Biological features of the characterization area. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C. FWS/OBS-79/42. 620 pp.
- South Carolina Department of Health and Environmental Control. 1993. Water classifications and standards. Classified waters. State of South Carolina. SCDHEC, Columbia. 36 pp.
- Shealy, M. H., Jr., J. V. Miglarese and E. B. Joseph. 1974. Bottom fishes of South Carolina estuaries - relative abundance, seasonal distribution and length-frequency relationships. S.C. Marine Resources Center, Technical Report No. 6. 189 pp.
- U.S. Army Corps of Engineers Charleston District. 1978. Survey report on beach erosion control and hurricane protection for Folly Beach, South Carolina.
- U.S. Fish and Wildlife Service. 1980. Fish and Wildlife Coordination Act for Charleston Harbor Deepening. Charleston, SC. 23 pp.
- Van Dolah, R. F., and P.P. Maier. 1993. The distribution of loggerhead turtles (Caretta caretta) in the entrance channel of Charleston Harbor, South Carolina, U.S.A. Journal of Coastal Research, 9:4, pgs. 1004-1012.
- Van Dolah, R. F., P. P. Maier, S. R. Hopkins - Murphy, G. F. Ulrich, and D. M. Cupka. 1992. A survey of turtle populations in the Charleston Harbor entrance channel. South Carolina Wildlife and Marine Resources Department, Charleston, SC. 23 pp.
- Van Dolah, R. F., P. H. Wendt, and E. L. Wenner. 1990. A physical and ecological characterization of the Charleston Harbor estuarine system. South Carolina Wildlife and Marine Resources Department, Charleston. 634 pp.

Wenner, C.A., W.A. Roumillat, J.E. Moran, Jr., M.B. Maddos, L.B. Daniel III, and J.W. Smith. 1990. Investigations on the life history and population dynamics of marine recreational fishes in South Carolina: Part 1. Marine Resources Research Institute, South Carolina Wildlife and Marine Resources Department, Charleston.

Winn, R. N., R. F. Van Dolah, A. Frankenburg and T. W. Kana. 1989. Benthic and sedimentological studies of the Ocean Dredged Material Disposal Site (ODMDS) for Charleston, South Carolina. Vol. I. Submitted to U.S. Army Corps of Engineers, Charleston District, Charleston, SC, April 1989. Prepared under Agreement No. DACW60-87-H-0001.

Appendix A

**FWCA Letters of Concurrence From the National Marine Fisheries Service and
the South Carolina Department of Natural Resources**



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702-2432

February 5, 1996

Mr. Roger Banks
Supervisor
Charleston Field Office
U.S. Fish and Wildlife Service
P.O. Box 12559
Charleston, South Carolina 29412

Dear Mr. Banks:

The National Marine Fisheries Service has reviewed the Fish and Wildlife Coordination Act Report on the Charleston Harbor Deepening Study. The report describes fish and wildlife resources in the study area, identifies potential effects on those resources, and provides recommendations for reducing possible impacts.

We concur with the findings made in your agency's report and we endorse implementation of the recommendations provided. By copy of this correspondence we hereby notify the Charleston District of their need to coordinate with our Protected Species Branch personnel concerning possible impacts to shortnose sturgeon and sea turtles. Related correspondence should be addressed to Mr. Charles Oravetz at the letterhead address.

We appreciate the opportunity to review the subject document.

Sincerely,

for

Andreas Mager, Jr.
Assistant Regional Director
Habitat Conservation Division



South Carolina Department of
Natural Resources



James A. Timmerman, Jr., Ph.D.
Director

February 22, 1996

Mr. Roger Banks
U.S. Fish & Wildlife Service
P.O. Box 12559
Charleston, SC 29422-2559

Dear Mr. Banks:

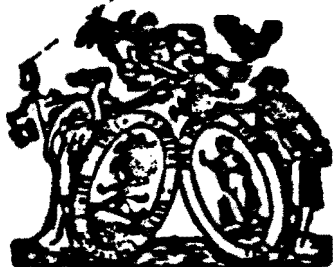
Personnel of the South Carolina Department of Natural Resources have reviewed the Fish and Wildlife Coordination Act Report on Charleston Harbor Deeping Study and concur in its findings and recommendations.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert E. Duncan".

Robert E. Duncan
Environmental Programs Director

APPENDIX D
ENVIRONMENTAL CORRESPONDENCE



South Carolina Department of Archives and History

1430 Senate Street, P.O. Box 11,603, Columbia, South Carolina 29211 (803) 734-8577
State Records (803) 734-7914; Local Records (803) 734-7917

September 7, 1995

Mr. Richard Kimmel
U.S. Army Corps of Engineers
Wilmington District, Environmental Section
P.O. Box 1890
Wilmington, NC 28402-1890

Re: Underwater Archaeological Site Survey at Charleston Harbor,
Charleston, South Carolina

Dear Mr. Kimmel:

Thank you for the opportunity to examine the final draft. Its contents appear to be consistent with state and federal guidelines for the identification and documentation of cultural resources.

We concur with the finding of the Corp's consulting archaeologist that targets FA-01 and CL-15 are not archaeological sites or cultural materials worthy of further investigation. Consequently, we have no objection to the proposed harbor and channel improvements anticipated by your office.

These comments have been provided to assist you with your responsibilities under Section 106 of the National Historic Preservation Act as amended. If you have any questions or comments regarding this matter, please contact me at 803\734-8478.

Sincerely,

Lee Tippett
Staff Archaeologist
State Historic Preservation Office

cc: Mr. Ralston Cox, Advisory Council
Mr. Jim Woody, SAC, U.S. Army Corps of Engineers



South Carolina Department of Archives and History

1430 Senate Street, P.O. Box 11,669, Columbia, South Carolina 29211, (803) 734-8577
State Records (803) 734-7914; Local Records (803) 734-7917

January 9, 1996

Lt. Col. Thomas F. Julich
District Engineer, Corps of Engineers
Charleston District
P. O. Box 919
Charleston, SC 29402-0919

Re: Charleston Harbor Deepening
Draft Feasibility Report and
Environmental Assessment

Attn.: Mr. Braxton Kyzer

Dear Col. Julich:

Thank you for your letter of January 2, 1996, and a copy of the "Draft Feasibility Report and Environmental Assessment for Charleston Harbor, South Carolina".

We have reviewed the sections that address cultural resources and have no additional comments.

We appreciate the opportunity to comment. If you have questions, please call me at 803/734-8615.

Sincerely,

A handwritten signature in cursive script that reads "Nancy Brock".

Nancy Brock, Supervisor
Review and Compliance Branch
State Historic Preservation Office

South Carolina Department of Natural Resources



James A. Timmerman, Jr., Ph.D.
Director

Alfred H. Vang
Deputy Director for
Water Resources

February 6, 1995

Ms. Robin Socha
EN-PR
Dept. of the Army
Charleston District, Corps of Engineers
P.O. Box 919
Charleston, SC 29402-0919

RE: Charleston Harbor Deepening Project

Dear Robin,

I have reviewed the 404(b)(1) Evaluation for the Charleston Harbor Deepening Project for any potential adverse impacts on underlying aquifers. The project involves deepening the Charleston Harbor from 40 feet to between 42 and 45 feet below mean low water.

According to SCDNR-WRD records, the top of the Cooper Formation lies between the approximate elevations of -10 and -60 feet mean sea level in the project area, with thickness varying from 200 to 260 feet. This formation acts as the upper confining layer to the Santee Limestone. The aquifers of the Santee Limestone and the underlying Black Mingo Formation contain salt water in the vicinity of Charleston Harbor.

In light of hydrogeologic conditions, no adverse impacts to aquifers are expected as a result of deepening Charleston Harbor by a maximum of five feet. Should you need additional information, please feel free to contact this office.

Sincerely,

Brenda L. Hockensmith P.G.

Brenda L. Hockensmith, P.G.
Senior Hydrologist

cc: Rod Cherry, Section Chief
A. Drennan Park, Regional Hydrologist
file

South Carolina Department of Natural Resources



James A. Timmerman, Jr., Ph.D.
Director

January 18, 1995

LTC George H. Hazel
District Engineer
U.S. Army Corps of Engineers
P.O. Box 919
Charleston, SC 29402-0919

REF: P/N 94-1R-498 - Charleston Harbor Deepening & Widening Project
Charleston County

Dear Colonel Hazel:

The South Carolina Department of Natural Resources has reviewed the above referenced public notice which proposes the deepening, widening and realignment of the federal navigation channel for Charleston Harbor, South Carolina.

The plan consists of deepening Charleston Harbor from the existing project depth of 40 feet to 42 feet as a minimum depth and 45 feet as a maximum depth below MHW with 2 feet of allowable overdepth and 2 feet of advance maintenance.

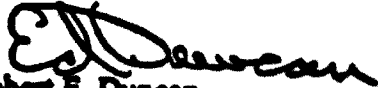
The navigation channel would be 800 feet wide beyond the jetties. Within the jetties the channel width would remain at 1000 feet, reducing to 600 feet wide near Sullivan's Island and remaining at 600 feet wide for the remainder of the federal navigation project. The width of Daniel Island Reach would vary from approximately 875 feet to 600 feet for proposed terminal access. The entrance channel would extend to approximately the 51 foot ocean contour. Channel realignment would include Horse Reach and Shutes Folly Reach to improve navigability.

Dredged material is proposed to be placed in existing upland disposal areas and at the Charleston Ocean Disposal Site (ODMDS). Potential upland disposal sites include Clouter Creek Disposal Site, Daniel Island Disposal Site and Morris Island Disposal Site.

The U.S. Fish and Wildlife Service has submitted to you a comprehensive draft Fish and Wildlife Coordination Act Report on the project, dated December, 1994, which provides an overview of the possible impacts to fish and wildlife resources that might occur as a result of the project and recommendations of measures to provide for optimum protection of those resources.

The DNR was consulted during the preparation of the report and has reviewed it in detail. We concur with its findings and recommendations and request that they be accepted as the position of the Department of Natural Resources

Sincerely,



Robert E. Duncan
Environmental Programs Director

cc: OCRM/Moore
USFWS
USEPA
NMFS

South Carolina
DHEC
 Department of Health and Environmental Control
 2000 Bull Street, Columbia, SC 29201

Commissioner: Douglas E. Bryant

Board: John H. Purries, Chairman
 Sandra J. Molander, Secretary

Richard E. Jabbour, DOS
 William M. Paul, Jr., MD
 Roger Leake, Jr.

Promoting Health, Protecting the Environment

May 2, 1995

U.S. Army Corps of Engineers
 Charleston District
 P.O. Box 919
 Charleston, SC 29402-0919

Post-It™ Fax Note 7671		Date	5-9-95	# of pages	2
To	Robin Socha	From	Heather Skelworth		
Co./Dept.	Corps	Co.	DHEC		
Phone #		Phone #	731-5301		
Fax #	727-4260	Fax #			

Re: Certification in Accordance with Section 401 of the
 Clean Water Act, as amended.

U.S. Army Corps of Engineers
 Dredging
 Charleston Harbor
 Charleston County
 P/N 94-1R-498

Dear Sir:

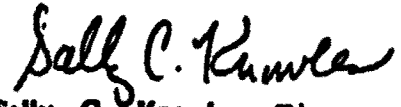
We have reviewed plans for this project and determined there is a reasonable assurance that the proposed project will be conducted in a manner consistent with the Certification requirements of Section 401 of the Federal Clean Water Act, as amended. In accordance with the provisions of Section 401, we certify that this project, subject to the indicated conditions, is consistent with applicable provisions of Section 401 of the Federal Clean Water Act, as amended. We also hereby certify that there are no applicable effluent limitations under Sections 301(b) and 302, and that there are no applicable standards under Sections 306 and 307.

This certification is subject to the following conditions:

1. Dredging must be limited, when possible, to the winter months when D.O. concentrations are highest and biological activity is lowest (Nov. 1 through Mar. 31).
2. Monitoring reports from the chosen disposal sites should be routinely submitted to the Department's Division of Water Quality for review.

The S. C. Department of Health and Environmental Control reserves the right to impose additional conditions on this Certification to respond to unforeseen, specific problems that might arise and to take any enforcement action necessary to ensure compliance with State water quality standards.

Sincerely,



Sally C. Knowles, Director
Division of Water Quality
and Shellfish Sanitation
Bureau of Water Pollution Control

SCK:HWS

cc: Army Corps of Engineers,
Charleston District
Trident District Office
OCRM

Commissioner: Douglas E. Bryant

Board: John H. Burriss, Chairman
Sandra J. Molander, Secretary

Promoting Health, Protecting the Environment

Richard E. Jabbour, DDS,
William M. Hull, Jr., MD
Roger Leaks, Jr.

Office of Ocean and Coastal Resource Management

H. Wayne Beam, Ph.D., Deputy Commissioner

Christopher L. Brooks, Assistant Deputy Commissioner

(803) 744-5838

(803) 744-5847 (fax)

February 1, 1996

Mr. Richard M. Jackson, P. E.
Charleston District Corps of Engineers
Post Office Box 919
Charleston, South Carolina 29402-0919

Re: Amendment to Charleston Harbor
Deepening Widening Project
Charleston county
Federal Consistency

Dear Mr. Jackson:

The staff of the Office of Ocean and Coastal Resource Management (OCRM) certifies that the above referenced project is consistent with the Coastal Zone Management Program. This project approval is based upon revised plans submitted to SCDHEC/OCRM on January 31, 1996, and marked as such. Except as shown on these plans, no construction is to occur in any wetland areas. These plans do not include approval for construction of the proposed Daniel Island Terminal Facility.

Interested parties are provided ten days from receipt of this letter to appeal the action of the OCRM.

Sincerely,


Robert D. Mikell
Director of Planning and
Federal Certification

JHA
JHA/23197/jk

cc: Dr. H. Wayne Beam
Mr. Christopher L. Brooks
Mr. H. Stephen Snyder

South Carolina
DHEC
Department of Health and Environmental Control
4190 Faber Place, Suite 300
Charleston, SC 29405

Commissioner Douglas E. Bryant

Board: Richard E. Jabbour, DDS, Chairman
Robert J. Stripling, Jr., Vice Chairman
Sandra J. Melander, Secretary

John H. Burris
William M. Hill, Jr., MD
Roger Laska, Jr.
Burnet R. Maybank, III

Promoting Health, Protecting the Environment

Office of Ocean and Coastal Resource Management

H. Wayne Beam, Ph.D., Deputy Commissioner

Christopher L. Brooks, Assistant Deputy Commissioner

(803) 744-5838

(803) 744-5847

March 10, 1995

LTC George H. Hazel
District Engineer
U. S. Army Corps of Engineers
Post Office Box 919
Charleston, South Carolina 29402-0919

Re: Charleston Harbor Deepening/
Widening Project
Charleston County
P/N# 94-1R-498
Federal Consistency

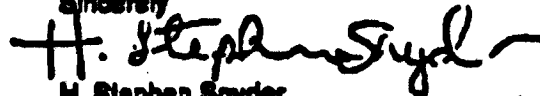
Dear Col. Hazel:

The Office of Ocean and Coastal Resource Management concurs with the recommendations of the U. S. Fish and Wildlife Service.

The staff of the Office of Ocean and Coastal Resource Management (OCRM) certifies that the above referenced project is consistent with the Coastal Zone Management Program to the maximum extent practicable. This certification shall serve as the final approval by the OCRM.

Interested parties are provided ten days from receipt of this letter to appeal the action of the OCRM. The action approved herein shall become final ten days from receipt of this letter provided no appeal is received.

Sincerely



H. Stephen Snyder
Director of Coastal Zone
Management Division

JHA
JHA/21231/AS/jk
cc:

Dr. H. Wayne Beam
Mr. Christopher L. Brooks
Mr. Robert D. Mikell
Mr. Ed Duncan
Ms. Sally Knowles
U. S. Environmental Protection Agency

Planning Branch

FEB 14 1995

Mr. Roger L. Banks
U.S. Fish and Wildlife Service
P.O. Box 12559
Charleston, South Carolina 29422-2559

Dear Mr. Banks:

The U.S. Army Corps of Engineers, Charleston District has reviewed the Draft Fish and Wildlife Coordination Act Report on the Charleston Harbor Deepening Study and offers the following comments on the report:

1. Page iii, second paragraph - The channel in the Cooper River to Goose Creek is generally 600 feet in width and the channel in the Wando River to the Wando terminal is 400 feet in width.

2. Page iii & iv - Service Recommendations

a. "Review through interagency committee (i.e., Corps, Service, SCDNR, NMFS) the necessity and particulars of a dredging window for the "throat" of the harbor entrance between the jetties. This process should start by utilizing the methodology described in LaSalle (1991) and concentrate on important windows for ingress and egress of key resources such as penaeid shrimp and red drum."

The deepening work in the entrance channel may be conducted in conjunction with maintenance contracts involving hopper or hydraulic dredges depending on the type of material that is scheduled to be dredged. Our office will review the LaSalle methodology in consideration of the recommended species.

b. "Prepare an analysis of the effect of the project on the provided endangered and threatened species list for Service and National Marine Fisheries Service concurrence."

Correspondence to complete the above is underway.

c. "Establish a dredging window for hopper dredge work based on seasonally restricting work to periods when the water temperature is below 16 degrees Celsius. Coordinate with the National Marine Fisheries Service to implement this and any other necessary measures avoiding hopper dredging impacts to endangered sea turtles."

FEB 15

A dredging window of December 1 to March 31 for avoidance of sea turtles is presently in place for hopper dredging and is adhered to by the Corps of Engineers (COE). However, the COE has spent \$3.5 million on a turtle research program. A draghead that will prevent or significantly reduce entrainment of sea turtles by hopper dredges was developed. If these dragheads continue to function as expected and become available, they may be used in lieu of a dredging window, following coordination with state and federal resource agencies.

d. "Dispose of suitable materials at the ODMDS in accordance with the signed management plan agreement. Also, in accordance with this plan, coordinate with appropriate agencies to plan for detailed monitoring of disposal operations which track the fate of the materials and their ecological effects (especially for large volumes of fine sediments)."

A contract is presently underway to start testing the proposed dredged material to determine suitability for ocean disposal. This information will be available prior to any deepening. Because of the quantity of the material, it is expected that the deepening work will be conducted in conjunction with maintenance dredging contracts over a period of years. The Charleston District has a monitoring and management plan in place for the Charleston ODMDS that was written through coordination with a resource agency "task force". Intensive monitoring of the site has been conducted for the last two years and is continuing. Monitoring will continue as agreed upon in the management plan but will probably be modified with consideration given to the dredging project scope of work and the recommendations of the task force.

e. "Develop, in association with water quality agencies and resource agencies, a water quality management/monitoring plan. The plan should address potential harbor deepening water quality impacts, control measures, and monitoring both at the dredge sites and at disposal areas."

The 404(b)(1) for this project addresses impacts, minimization measures and discusses the monitoring of upland disposal sites as per agreement with the South Carolina Department of Health and Environmental Control (SCDHEC). Contracts for dredging activities address environmental issues as required by law, and COE Quality Assurance Personnel oversee the dredging contracts and inspect/monitor the dredging operations to ensure compliance. Monitoring/testing of effluent at the disposal areas will continue as per the agreement with SCDHEC.

f. "Avoid deepening any areas for which modeling indicates a high sedimentation rate."

The channel realignment was proposed in order to eliminate a navigation hazard - the sharp turn at Horse Reach and Shutes/Folly Reach, and to accommodate larger shipping traffic. It is possible that the realignment may cause additional shoaling which cannot be avoided, but unusually high sedimentation rates are not expected.

g. "Bulk sediment sampling should be conducted in accordance with the Ocean/Inland Testing Manuals for all areas with the exception of those which meet the exclusion criteria based on sediment grain size. The results of all sediment testing including the completed elutriate tests should be provided to the Service for review."

Total and dissolved modified elutriate tests have been performed in accordance with the Inland Testing Manual and using the methods developed by WES. These tests have been performed on material identified for placement in existing upland disposal areas as required by SCDHEC for Section 401 Water Quality Certification. Results of these analyses are enclosed. As noted in item 4. above, physical, chemical and biological testing of the proposed dredged sediments began in mid-January 1995, with initial results expected in March 1995. Results will be made available to anyone or any agency who requests the information.

3. Page 2 - Change 3000 cfs to 4500 cfs in the second full paragraph. Prior to implementation of the redirection project in 1986, WES investigated various flow releases from Pinopolis Dam. The amount of 4500 cfs weekly average was recommended and has been in practice ever since the beginning of the project.

4. Page 3, Figure 1 - Label Morris Island and Mt. Pleasant.

5. Page 4, Existing Navigation Project - It should be noted that some changes were made to the authorized project as discussed below:

a. The turning basin diameter at the head of the Cooper River was enlarged to 1,400 feet.

b. The first tangent and the lower turning basin in Shipyard River were deepened to 38 feet. Deepening of the upper Shipyard River channel was deferred.

c. Widening about 2,000 feet of the upper Shipyard River Channel to 250 feet was deferred.

d. Enlargement of the two Shipyard River turning basins was deferred.

e. Enlarging and deepening the anchorage basin at the junction of the Cooper and Ashley Rivers to 40 feet was deferred.

f. The Columbus Street turning basin was relocated and enlarged to 1,400 feet.

6. Page 4, second to the last paragraph - Advance maintenance dredging is conducted prior to overdepth dredging. Please list advance maintenance before overdepth dredging in the report.

7. Page 6, last paragraph (3) - Models conducted by WES indicate that the deepening project will not cause any affects to the salinity distribution in the harbor.

8. Page 7, third paragraph (6) - As described in the public notice for 401 Water Quality Certification and in the 404(b)(1) Evaluation, this project does not address the impacts associated with new or expanded port facilities because the COE is not responsible for construction of port facilities. The South Carolina State Ports Authority will address impacts related to additional port facilities when the facility(s) and proposed location(s) are determined.

9. Page 8, middle of the third paragraph - The contractors are not "disposal" contractors, they are "dredging" contractors.

10. Page 8, last paragraph - The COE does not intend to develop any new upland disposal sites in the foreseeable future.

11. Page 9, first paragraph - Why would there be an increase in ocean derived sediments introduced into the harbor following the deepening project? Please explain.

12. Page 10, #4 - The COE has spent \$3.5 million over the last few years on a turtle research study. A new draghead has been developed in an attempt to reduce/eliminate the impacts to sea turtles from hopper dredging. Additionally, the Charleston District has cooperated with the National Marine Fisheries Service in trawling prior to dredging, and in dredging only during the turtle "window". Other "measures" are not referenced in the report. What additional measures are needed?

13. Page 15, last paragraph -

a. The entrance channel will slope to the 47 foot contour (for the 45 foot project depth). No advance maintenance or overdepth will be applied.

b. Advance maintenance dredging is conducted prior to overdepth dredging. Please list advance maintenance before overdepth dredging in the report on pages 15 and 16.

c. Some minor changes in the project include:

(1). The channel approaching the jetties from the ocean is 800 feet in width. Just outside the jetties, the channel will widen to 1000 feet, returning to 800 feet within the jetties and further reducing in width to 600 feet near Sullivan's Island.

(2). There are no further changes in the channel width for the remainder of the project. The channel ranges from 500 to 800 feet in width with two exceptions. The Daniel Island Reach will vary from approximately 600 feet to 875 feet in width for proposed terminal access, and the Horse Reach and Shutes/Folly Reach, where realignment is proposed, will be 900 feet to 1000 feet in width.

14. Page 16, first paragraph - Upland disposal for the dredged material include the Navy Weapons Station Disposal Area and Drum Island Disposal Area.

15. Page 16, third paragraph - It should be noted that the entire channel is not dredged during maintenance dredging. Maintenance dredging is relatively site specific with dredging being conducted in the same locations where shoals reoccur. As a result, benthic organisms throughout the entire channel are not impacted.

16. Page 20, Recommendations - these are addressed at the beginning of this comment letter.

17. As a general comment, project depths considered for the study range from 42 feet mlw to 45 feet mlw at one foot increments. A 42 foot channel and a 45 foot channel are not the only two designs considered, they are the limits of depths being considered for this study.

18. Lastly, the correspondence from your office dated December 20, 1994 was in response to public notice 94-1R-498 for the deepening project. Your correspondence was apparently copied to the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management and to the Office of Water Quality Certification. My office has received telephone calls from both offices requesting our response to your correspondence. A letter response for a federal project is unnecessary when a Fish and Wildlife Coordination Act Report from your office is required by law. The Coordination Act Report provides the required response to the public notice. Furthermore, a draft report should be received by our office with sufficient time to review, comment and receive a final document prior to issuance of information within the document to other agencies. We would appreciate your consideration of this in the future.

19. We appreciate the effort involved in the development of the Coordination Act Report for this project and look forward to receiving the final document. If you have any further questions, please contact Robin Collier-Socha at 803/727-4696.

Respectfully,

GEORGE H. HAZEL
Lieutenant Colonel, U.S. Army
District Engineer

Enclosure

C-SOCHA/4696/K

PREACHER/EN-PR

JACKSON/EN-F

KYZER/PM-

HERNDON/DI

WATERS/EN

HAZEL/D

February 5, 1996

Planning Branch

Mr. Roger L. Banks
U.S. Fish and Wildlife Service
P.O. Box 12559
Charleston, South Carolina 29422-2559

Dear Mr. Banks:

The U.S. Army Corps of Engineers, Charleston District has reviewed the Fish and Wildlife Coordination Act Report on the Charleston Harbor Deepening Study and offers the following responses to your recommendations on page 21:

1. Review through interagency committee (i.e., Corps, Service, SCDNR, NMFS) the necessity and particulars of a dredging window for the "throat" of the harbor entrance between the jetties. This process should start by utilizing the methodology described in LaSalle (1991) and concentrate on important windows for ingress and egress of key resources such as penaeid shrimp, blue crab, flounder, and red drum.

Response - Dredging in Charleston Harbor is currently restricted to a winter window for hopper dredging which is in accordance with a NMFS Biological Opinion to protect endangered sea turtles. Hydraulic dredging has never been restricted to a window because the impacts are insignificant and short-term. Consequently, the Charleston Harbor channel deepening and turning basin excavation will be conducted in conjunction with standard dredging maintenance protocol. Dredging between the jetties will continue to be accomplished with a hopper dredge, and therefore, would be restricted to a winter window.

2. Establish a dredging window for hopper dredge work based on seasonally restricting work to periods when the water temperature is below 16 degrees Celsius. Coordinate with the National Marine Fisheries Service to implement this and any other necessary measures avoiding hopper dredging impacts to endangered sea turtles.

Response - The Corps South Atlantic Division has recently completed Section 7 coordination with the NMFS to protect endangered sea turtles from the effect of hopper dredging. This coordination included several years of specific studies to determine the most effective method/methods to protect sea turtles. An incidental take limit was established by the NMFS with Reasonable and Prudent Measures to insure that the take is not exceeded. The Reasonable and Prudent Measures include a winter season window

(when the water temperature is most often below 16 degrees Celsius), a newly designed drag arm head, and an observer program to monitor the dredge overflow screens.

3. Dispose of suitable materials at the ODMDS in accordance with the signed management plan agreement. Also, in accordance with this plan, coordinate with appropriate agencies to plan for detailed monitoring of disposal operations which track the fate of the material and their ecological effects (especially for large volumes of fine sediments).

Response - All dredged material will be tested to determine suitability for ocean disposal prior to any deepening work. The Charleston District has a monitoring and management plan in place for the Charleston ODMDS that was written through coordination with a resource agency "task force". Intensive monitoring of the site has been conducted for the last two years and is continuing. Monitoring will continue as agreed upon in the management plan but will probably be modified with consideration given to the dredging project scope of work and the recommendations of the task force.

4. Develop, in association with water quality agencies and resource agencies, a water quality management/ monitoring plan. The plan should address potential harbor deepening water quality impacts, control measures, and monitoring both at the dredged sites and at disposal areas.

Response - The 404(b)(1) for this project addresses impacts, minimization measures and discusses the monitoring of upland disposal sites as per agreement with the South Carolina Department of Health and Environmental Control (SCDHEC). Contracts for dredging activities address environmental issues as required by law, and COE Quality Assurance personnel oversee the dredging contracts and inspect/monitor the dredging contracts and inspect/monitor the dredging operations to insure compliance. Monitoring /testing of effluent at the disposal area will continue as per the agreement with SCDHEC.

5. Avoid deepening any area for which modeling indicates a high sedimentation rate.

Response - Channel realignment at Horse Reach and Shutes/Folly Reach were proposed in order to eliminate navigation hazards and to accommodate larger shipping. The turning basin is necessary to allow ships a safe area to turn around. The proposed location of the contraction dike will reduce shoaling in the Daniel Island reach by almost 50%. It is possible that the realignment may cause additional shoaling which cannot be avoided, but unusually high sedimentation rates are not expected in either the realignments or the turning basin.

6. Bulk sediment sampling should be conducted in accordance with the Ocean/ Inland Testing Manuals for all areas with the exception of those which meet the exclusion criteria based on sediment grain size. The results of all sediment testing including the completed elutriate tests should be provided to the Service for review.

Response - Total and dissolved modified elutriate tests have been performed in accordance with the Inland Testing Manual and using the methods developed by The Waterways Experiment Station (the turning basin area is currently being tested). These tests have been or are being performed on material identified for placement in existing upland disposal areas as required by SCDHEC for Section 401 Water Quality Certification. Result from testing is available or will be available to any agency who requests the information.

7. Conduct an alternative analysis for the new contraction dike in the Cooper River. The analysis should, within engineering efficiency constraints, evaluate location, alignment, and construction alternatives consistent with reduction in impact on intertidal habitat, especially those vegetated with emergent marsh.

Response - A model of this project including the location of the contraction dike was prepared by The Waterways Experiment Station (WES). The contraction dike was located by WES with consideration given to navigation safety, location of the proposed turning basin, and location of an existing degaussing pier. However, shoaling reduction was the prime purpose for the location. The proposed location of the contraction dike located as it is will reduce shoaling in the Daniel Island reach by almost 50 %. All marsh effected will, upon completion of the dike, be restored to its natural productive state (this is addressed in the Project Environmental Assessment).

I appreciate the effort involved in the development of the Coordination Act Report for this project. If you have any further questions, please contact Mr. Jim Woody of my staff at (803) 727-4759.

Respectfully,

Richard M. Jackson, P.E.
Acting Chief, Engineering and Planning
Division

WOODY/4759/KH

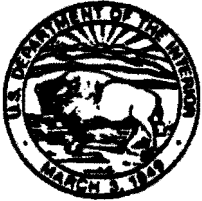
K.HARRIS/EN-P

PREACHER/EN-PR

DENN/EN-PH

CASBEER/EN-PÉ

JACKSON/A-EN



United States Department of the Interior



FISH AND WILDLIFE SERVICE
P.O. Box 12559
217 Fort Johnson Road
Charleston, South Carolina 29422-2559

February 5, 1996

Lt. Colonel Thomas F. Julich
District Engineer
U.S. Army Corps of Engineers
P.O. Box 919
Charleston, S.C. 29402-0919

Re: Charleston Harbor Deepening Project, FWS Log No. 4-6-96-116

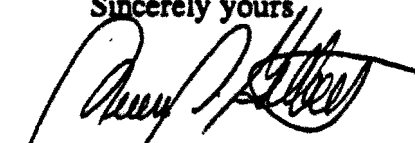
Dear Colonel Julich:

The U.S. Fish and Wildlife Service has reviewed planned modifications to the above-referenced project relative to potential effects on endangered species. The modifications include refurbishment of two existing contraction dikes and construction of a new contraction dike and turning basin all in association with a proposed new Daniel Island ports terminal.

We have reviewed the January 31, 1996 letter from Mr. Richard M. Jackson of your Planning Branch wherein the District's Biological Assessment that none of the listed species potentially occurring in the project area would be effected by the deepening project is expanded to include the above project modifications. Based on our review of the modifications, we will concur with a determination that this action is not likely to adversely affect federally listed endangered and threatened species. In view of this, we believe that the requirements of Section 7 of the Endangered Species Act have been satisfied. However, obligations under Section 7 of the Act must be reconsidered if (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered, (2) this action is subsequently modified in a manner which was not considered in this assessment, or (3) a new species is listed or critical habitat determined that may be affected by the identified action.

Your interest in ensuring the protection of endangered and threatened species is appreciated.

Sincerely yours,



Steven S. Gilbert
Acting Field Supervisor

January 31, 1996

Planning Branch

Mr. Roger L. Banks, Field Supervisor
US Fish and Wildlife Service
PO Box 12559
Charleston, South Carolina 29412

Dear Mr. Banks:

The purpose of this letter is to advise you of modifications being planned for the Charleston Harbor deepening project. The modifications include refurbishment of two existing contraction dikes and construction of a new contraction dike and turning basin. The refurbishment of existing dikes and construction of the new contraction dike are necessary to reducing shoaling in the Daniel Island reach by 50% (See figures 1 and 2).

The existing contraction dikes proposed for refurbishment lie on the west side of the Cooper River, downstream of Shipyard River and upstream of the U.S. Navy degaussing pier. The proposed new contraction dike will be located approximately 150 feet upstream of the U.S. Navy degaussing pier, between the two existing contraction dikes. Marl from the deepening project will be used to provide a foundation base for the proposed dike. Approximately 180,000 cubic yards of marl will be placed as a base with a 12-inch foundation blanket equaling 4000 cubic yards of 6-inch to 12-inch stone. Sheet piling will be sunk into the base marl and foundation stone. The dike will be approximately 1000 feet in length, 300 feet of which is vegetated wetlands on the shoreward end. After excavation and construction of the dike is completed, the effected marsh will be restored on each side of the dike to its original elevation so that marsh grasses will reestablish. The extreme shoreward end of the dike, where it ties into upland will require riprap to prevent scouring. Approximately 800 sq. ft. of emergent wetland will be covered over by this riprap tie-back. Repairs to the two existing dikes will take place within their existing footprint. In addition to the contraction dikes, a turning basin located north of Shipyard River and south of the existing contraction dike (see figure 2) is proposed for construction. The turning basin will be deepened to the same depth as Charleston Harbor which is 49 feet including maintenance and overdepth. Material from the turning basin (3 million cubic yards) will be placed in a diked disposal area. The total area of benthic impact will be approximately 80 acres.

A list of endangered and threatened species which could be impacted by the Charleston Harbor deepening project was received from your office on January 23, 1995. It is assumed that this list has not changed. On January 30, 1995, you concurred with the District's Biological Assessment that none of the listed species would be effected by the deepening project if "standard manatee conditions for use during construction of a project" would be implemented. We believe that the modifications described above also would not affect any of the listed species and further believe that reinitiating consultation under the Endangered Species Act for the modifications is unnecessary, provided all conditions of the original concurrence are met.

We request your concurrence with this letter. Should you have any additional questions regarding the project, please contact Mr. Jim Woody of my staff at (803) 727-4759.

Respectfully,

Richard M. Jackson, P.E.
Chief, Planning Branch

Enclosures

WOODY/4759/KH

K.HARRIS/EN-P

PREACHER/EN-PR

JACKSON/EN-P

February 2, 1996

Planning Branch

Mr. Andreas Mager, Jr.
Assistant Regional Director
National Marine Fisheries Service
9721 Executive Center Drive N.
St. Petersburg, Florida 33702

Dear Mr. Mager:

This is in response to your letters dated 5 December 1995, commenting on the Draft Feasibility Report and Draft Environmental Assessment for the Charleston Harbor Deepening Project, and another dated 18 January 1996, commenting on a District Public Notice (95-1R- 406). The Public Notice was issued as an amendment to the original plan described in the Draft Feasibility Report. These letters identified several areas of concern to the NMFS which I am responding to.

December 5, 1995 Letter

Comment 1. - Atlantic Sturgeon and Shortnose Sturgeon should be added to the final Report.

Response - Agree, these sturgeon will be included in the final report.

Comment 2. - Details are needed concerning the composition of benthic communities to be affected by contraction dike repairs and construction, and construction of the Danial Island turning basin. If sampling of these communities is not planned, then relevant data and conclusions used in your analysis should be provided.

Response - The most recent study conducted on Charleston Harbor benthos was conducted in 1990 by the Marine Resources Division of the South Carolina Department of Natural Resources (A Physical and Ecological Characterization of the Charleston Harbor Estuarine System). This study included benthic sampling at several stations near the proposed turning basin and contraction dike and indicates that water quality and toxic sediments have a greater effect on benthic organisms than dredging. Additional studies conducted over the years by the Army Corps of Engineers, Charleston District and Waterway Experiment Station have specifically shown that the most significant impacts of hydraulic dredging is the destruction of benthic invertebrates in the path of the dredge

cutterhead. These studies have also shown that channel dredging has very little long term effects on the health, number and diversity of Harbor benthic resources.

The greatest concentration of benthic invertebrates in the Charleston Harbor estuary occur in and around salt marshes in lieu of the deeper channel. The specific areas identified for the new contraction dike and turning basin, however, contain no shellfish beds or communities. Common invertebrates in the vicinity of the proposed contraction dike include fiddler crabs and the common marsh periwinkle snails. Construction of the turning basin will cause destruction of benthos in the immediate vicinity of the cutterhead. Benthos not trapped by the cutterhead will be displaced to shallow bottoms. Deepening in the present navigation channel, where maintenance of recurring shoals are dredged on a 12 to 18 month rotation, is not expected to significantly effect Harbor benthic resources. Scientific studies have repeatedly shown a short-term rate for recovery of benthos following dredging operations, provided water quality and bottom sediment are free of pollutants.

Comment 3. - " details regarding proposed creation of regularly flooded wetlands, as needed to offset areas affected by the proposed contraction dike are needed. For example, the approximate size, location, and work completion date for the mitigation".

Response - The new contraction dike which was originally designed with a causeway filling approximately 2 acres of salt marsh has been redesigned. The new design does not include a causeway or subsequent wetland fill, but will allow the effected salt marsh to be restored to its original elevation and productivity. This new design will be clarified in the final report and EA.

Comment 4. - Coordinate the present plan with NMFS Protected Species Branch.

Response - Coordination of the final report with NMFS Protected Species Branch was initiated on January 31, 1996.

January 18, 1996 Letter

Comment 1. - Restriction of all work involving excavation and filling of aquatic habitats to periods of low biological activity. This would limit such work to December 1 through March 15 of any year.

Response - Dredging in Charleston Harbor is currently restricted to a winter window for hopper dredging which is in accordance with a NMFS Biological Opinion to protect endangered sea turtles. Hydraulic dredging has never been restricted to a window because the impacts are insignificant and short-term. Consequently, the Charleston Harbor channel deepening and turning basin excavation will be conducted in conjunction with maintenance contracts. The U.S. Fish And Wildlife Service Coordination Act report recommended "a review through interagency committee the necessity and particulars of a dredging window

for the "throat" of the harbor entrance between the jetties". Dredging between the jetties would be accomplished with a hopper dredge and, therefore, restricted to a winter window.

Comment 2. - Assessment of the location and size of shellfish beds (if any) in the vicinity of all proposed excavation and fill activities.

Response - There are no identified shellfish beds in areas of the harbor proposed for this project.

Comment 3. - Avoidance to the extent practicable, of the loss and degradation of productive shellfish (hard clam) beds, intertidal habitats, and emergent wetlands.

Response - This project will be designed in its final phase to employ "avoidance techniques" where practicable.

Comment 4. - Development of remedial measures needed to off set unavoidable wetland and aquatic resource impacts.

Response - See comment 3 and response under the December 5 letter above.

Thank you for your willingness to cooperate with the Charleston District in the design of this project to insure that project purposes are met and South Carolina's natural resources are sufficiently protected. If you should have questions, please contact Mr. Jim Woody of my staff at (803) 727-4759.

Respectfully,

Richard M. Jackson, P.E.
Chief, Planning Branch

WOODY/4759/KH

K.HARRIS/EN-P

DENN/EN-PH

PREACHER/EN-PR

CASBEER/EN-PE

JACKSON/EN-P



EN
UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive N.
St. Petersburg, Florida 33702

December 5, 1995

Lt. Colonel Thomas F. Julich
District Engineer, Charleston District
U.S. Army Corps of Engineers
P.O. Box 919
Charleston, South Carolina 29402-0919

Dear Colonel Julich:

The National Marine Fisheries Service has reviewed the Draft Feasibility Report and Draft Environmental Assessment (DEA) for the Charleston Harbor Deepening Project, Charleston County, South Carolina. Based on the information contained in these documents, we generally concur with your determination that long-term adverse impacts to living marine resources are unlikely. In making this determination, we note that planned improvement of existing contraction dikes; construction of a third contraction dike; and excavation of the Daniel Island turning basin have been recently proposed and are only briefly addressed in the DEA. Since details regarding the environmental consequences of these additional features will be provided in the final environmental document, additional comments may be forthcoming.

Specific comments

Draft Feasibility Report

Page 15, Paragraph 1. Atlantic sturgeon (*Acipenser oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*) have been reported from the Cooper and Ashley Rivers and should be included in the list of anadromous fish provided in this section.

Draft Environmental Assessment

Page 6, first paragraph. Details are needed concerning the composition of benthic communities to be affected by constriction dike repairs and construction, and construction of the Daniel Island turning basin. If sampling of these communities is not planned, then relevant data and conclusions used in your analysis should be provided.

Page 7, last paragraph. Details regarding proposed creation of regularly flooded wetlands, as needed to offset areas affected by the proposed constriction dike, are needed. For example, the approximate size, location, and work completion date for the mitigation should be provided.



Finally, we note that while coordination with our Protected Species Branch has been performed, it preceded the present plan of action. As appropriate, you should inform the Branch of changes that may affect endangered or threatened species or their habitat.

We appreciate the opportunity to provide these comments.

Sincerely,



Andreas Mager, Jr.

Assistant Regional Director
Habitat Conservation Division



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702-2432

January 18, 1996

Lt. Colonel Thomas F. Julich
District Engineer, Charleston District
Department of the Army, Corps of Engineers
P.O. Box 919
Charleston, South Carolina 29402-0919

Dear Colonel Julich:

The National Marine Fisheries Service (NMFS) has reviewed Public Notice 95-1R-406 which announces addition of components to the Corps of Engineers' Charleston Harbor Deepening Project, Charleston County, South Carolina. The NMFS provided comments on the overall project and the Draft Environmental Assessment in our letter dated December 5, 1995. Planned additional work includes refurbishing of two existing contraction dikes; construction of a third contraction dike; and excavation of a ship turning basin. Planned activities would occur in waters of the Cooper River (Charleston Harbor) and involve:

- o Construction of a 300-foot-long solid-fill marl causeway and 700-foot-long sheet-pile dike covering approximately 2 acres of regularly flooded wetlands and 4 acres of intertidal and subtidal unconsolidated estuarine bottom.
- o Construction of an 80-acre (approximate) by 49-foot-deep ship turning basin in submerged bottom.
- o Placement of 3 million cubic yards of dredged material in the Clouter Island diked disposal site.

Three distinct aquatic zones -- unconsolidated deepwater bottom, intertidal flats, and emergent wetlands would be affected by the additional work. Unconsolidated deep-water bottoms in the vicinity of Charleston Harbor generally do not support large populations of commercially or ecologically important benthic organisms. Possible exceptions include bivalves such as hard clams (Merценaria mercenaria); transitory invertebrates such as blue crabs (Callinectes sapidus) and shrimp (Penaeus spp.); and demersal fish such as summer flounder (Paralichthys dentatus).

Intertidal sand and mud flats generally provide more suitable habitat for living marine resources. Conditions such as shallow water depth and exposure to sunlight favor fish nursery functions and increased food production. The intertidal flats of the Cooper



River are recognized as important sites for the growth and maturation of a large and diverse group of fish and invertebrates that are of ecological and economic importance.

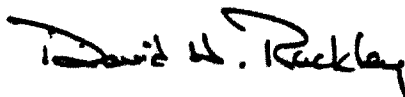
The regularly flooded smooth cordgrass (Spartina alterniflora) marsh is a highly productive resource. Its use as forage, cover, and reproductive sites for a variety of living marine resources is also well established. The tidal marsh also has considerable value with regard to estuarine food production and water quality enhancement as provided through erosion abatement, sediment retention, and assimilation of excess nutrients and pollutants.

Based on the ecological and economic value of the aquatic areas that will be affected by the proposed action, impact avoidance, minimization, and mitigation are needed to preclude significant degradation of living marine resources. Needed measures, which are hereby provided in accordance with provisions specified the Fish and Wildlife Coordination Act, include:

1. Restriction of all work involving excavation and filling of aquatic habitats to periods of low biological activity. This would limit such work to December 1 through March 15 of any year;
2. Assessment of the location and size of shellfish beds (if any) in the vicinity of all proposed excavation and fill activities;
3. Avoidance, to the extent practicable, of the loss and degradation of productive shellfish (hard clam) beds, intertidal habitats, and emergent wetlands; and
4. Development of remedial measures needed to offset unavoidable wetland and aquatic resource impacts.

In the absence of these measures we conclude that a significant and unacceptable loss of high quality public trust resources will occur and these elements of the overall Charleston Harbor Deepening Project should not be implemented. The NMFS is willing to cooperate with the Charleston District in the design of project features needed to ensure that project purposes are met and South Carolina's aquatic resources are sufficiently protected. Mr. David Rackley of my staff is available to assist you in this regard. He may be reached at P.O. Box 12607, Charleston, South Carolina 29412, or at (803) 762-8574.

Sincerely,



for Andreas Mager, Jr.
Assistant Regional Director
Habitat Conservation Division



12 10 3 1994
UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702-2432

December 29, 1994

Lt. Colonel George H. Hazel
District Engineer, Charleston District
Department of the Army, Corps of Engineers
P.O. Box 919
Charleston, South Carolina 29402-0919

Dear Colonel Hazel:

The National Marine Fisheries Service (NMFS) has reviewed Public Notice 94-1R-498 which advertises new work by the Charleston District, Corps of Engineers, in association with the Charleston Harbor Deepening and Widening Project in Charleston and vicinity, South Carolina.

Comments provided in the U.S. Fish and Wildlife Service's December 20, 1994, response to the Public Notice and in their detailed Fish and Wildlife Coordination Act report were prepared in close coordination with the NMFS. A copy of their December 20, 1994, report is enclosed. We fully concur with the enclosed comments and recommendations and we request that they also be considered as the views and recommendations of the NMFS.

We appreciate the opportunity to provide these comments. Related questions should be directed to the attention of David Rackley at (803) 762-8574.

Sincerely,

David A. Rackley

for Andreas Mager, Jr.
Assistant Regional Director
Habitat Conservation Division



EN-PR



C.1 DEC 27 1994

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive, North
St. Petersburg, Florida 33702-2432

December 20, 1994

Mr. Roger Banks
Supervisor
Charleston Field Office
U.S. Fish and Wildlife Service
P.O. Box 12559
Charleston, South Carolina 29412

Dear Mr. Banks:

The National Marine Fisheries Service has reviewed the Draft Fish and Wildlife Coordination Act Report on the Charleston Harbor Deepening Study. The report describes fish and wildlife resources in the study area, identifies potential effects on those resources, and provides recommendations for reducing possible impacts.

We concur with the findings made in your agency's report and we endorse implementation of the recommendations provided. By copy of this correspondence we hereby notify the Charleston District of their need to coordinate with our Protected Species Branch personnel concerning possible impacts to shortnose sturgeon and sea turtles. Related correspondence should be addressed to Mr. Charles Oravetz at the letterhead address.

We appreciate the opportunity to review the subject document and we request that our comments be compiled into your final report to the Charleston District. Related questions should be directed to the attention of David Rackley at (803) 762-8574.

Sincerely,

David B. Rackley

for

Andreas Mager, Jr.
Assistant Regional Director
Habitat Conservation Division



January 31, 1996

Planning Branch

Mr. Charles A. Oravetz
Chief, Protected Species Management Branch
National Marine Fisheries Service
9450 Koger Boulevard
St. Petersburg, Florida 33702

Dear Mr. Oravetz:

The purpose of this letter is to advise you of modifications being planned for the Charleston Harbor deepening project. The modifications include refurbishment of two existing contraction dikes and construction of a new contraction dike and turning basin. The refurbishment of existing dikes and construction of the new contraction dike are necessary to reducing shoaling in the Daniel Island reach by 50% (See figures 1 and 2).

The existing contraction dikes proposed for refurbishment lie on the west side of the Cooper River, downstream of Shipyard River and upstream of the U.S. Navy degaussing pier. The proposed new contraction dike will be located approximately 150 feet upstream of the U.S. Navy degaussing pier, between the two existing contraction dikes. Marl from the deepening project will be used to provide a foundation base for the proposed dike. Approximately 180,000 cubic yards of marl will be placed as a base with a 12-inch foundation blanket equaling 4000 cubic yards of 6-inch to 12-inch stone. Sheet piling will be sunk into the base marl and foundation stone. The dike will be approximately 1000 feet in length, 300 feet of which is vegetated wetlands on the shoreward end. After excavation and construction of the dike is completed, the effected marsh will be restored on each side of the dike to its original elevation so that marsh grasses will reestablish. The extreme shoreward end of the dike, where it ties into upland will require riprap to prevent scouring. Approximately 800 sq. ft. of emergent wetland will be covered over by this riprap tie-back. Repairs to the two existing dikes will take place within their existing footprint. In addition to the contraction dikes, a turning basin located north of Shipyard River and south of the existing contraction dike (see figure 2) is proposed for construction. The turning basin will be deepened to the same depth as Charleston Harbor which is 49 feet including maintenance and overdepth. Material from the turning basin (3 million cubic yards) will be placed in a diked disposal area. The total area of benthic impact will be approximately 80 acres.

A list of endangered and threatened species which could be impacted by the Charleston Harbor deepening project was received from your office on January 11, 1995. It is assumed that this list has not changed. On March 6, 1995, you concurred with the District's Biological Assessment that none of the listed species would be effected by the deepening project if it was constructed in accordance with a previously coordinated Biological Opinion prepared by your office for hopper dredging. We believe that the modifications described above also would not affect any of the listed species and further believe that reinitiating consultation under the Endangered Species Act for the modifications is unnecessary.

We request your concurrence with this letter. Should you have any additional questions regarding this project, please contact Mr. Jim Woody of my staff at (803) 727-4759.

Respectfully,

Richard M. Jackson, P.E.
Chief, Planning Branch

Enclosures

WOODY/4759/KH

K.HARRIS/EN-P

PREACHER/EN-PR

JACKSON/EN-P



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE**

Southeast Regional Office
9721 Executive Center Drive N.
St. Petersburg, FL 33702

FEB 7 1996

F/SEO13:JEB

Mr. Richard M. Jackson
Chief, Planning Branch
Charleston District
U.S. Army Corps of Engineers
P.O. Box 919
Charleston, SC 29402-0919

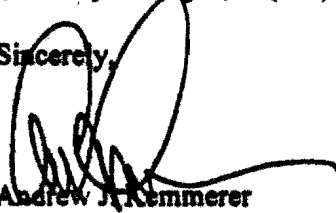
Dear Mr. Jackson:

This responds to your letter dated January 31, 1996, regarding a modification to the deepening project for the Charleston Harbor channel and the Shipyard River entrance channel. The original project was determined to not adversely affect threatened or endangered species, if carried out in accordance with the generic opinion with the Corps of Engineers on dredging in the Southeast United States. The modifications to the project include refurbishment of two existing contraction dikes and construction of a new contraction dike and turning basin. A biological assessment was submitted pursuant to Section 7 of the Endangered Species Act of 1973 (ESA).

We have reviewed the modifications to this project and concur with your determination that populations of threatened or endangered species under our purview would not be adversely affected by the proposed action or the modifications provided that all dredging is carried out in accordance with the August 25, 1995 generic biological opinion on dredging in the Southeast U.S. along the Atlantic coast.

This concludes consultation responsibilities under Section 7 of the ESA. However, consultation should be reinitiated if new information reveals impacts of the identified activity that may affect listed species or their critical habitat, a new species is listed, the identified activity is subsequently modified, or critical habitat is determined that may be affected by the proposed activity.

If you have any questions please contact Jeffrey Brown, Fishery Biologist, at (813) 570-5312.

Sincerely,

Andrew J. Kemmerer
Regional Director

cc: F/PR2
F/SEO2





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive N.
St. Petersburg, FL 33702

March 6, 1995

F/SEO13:JEB

Thomas W. Waters
Chief
Engineering and Planning Division
U.S. Army Corps of Engineers
P.O. Box 919
Charleston, SC 29402-0919

Dear Mr. Waters:

This responds to your letter dated January 25, 1995, regarding deepening the Charleston Harbor channel and Shipyard River entrance channel, from 40 and 38 feet respectively, to 42 feet below mean low water with 2 feet of allowable depth and 2 feet of advance maintenance. A biological assessment was submitted pursuant to Section 7 of the Endangered Species Act of 1973 (ESA) in 1991 prior to the issuance of a generic biological opinion on channel dredging along the Atlantic coast of the Southeast United States.

We have reviewed this project and concur with your determination that populations of threatened or endangered species under our purview would not be adversely affected by the proposed action provided that all dredging is carried out in accordance with the November 1991 biological opinion.

This concludes consultation responsibilities under Section 7 of the ESA. However, consultation should be reinitiated if new information reveals impacts of the identified activity that may affect listed species or their critical habitat, a new species is listed, the identified activity is subsequently modified, or critical habitat is determined that may be affected by the proposed activity.

If you have any questions please contact Jeffrey Brown, Fishery Biologist, at (813) 570-5312.

Sincerely,

Andrew J. Kemmerer
Regional Director

cc: F/PR2
F/SEO2



Endangered and Threatened Species and Critical Habitats Under
MOTS Jurisdiction

South Carolina

<u>Listed Species</u>	<u>Scientific Name</u>	<u>Status</u>	<u>Date Listed</u>
finback whale	<u>Balaenoptera physalus</u>	E	12/02/70
humpback whale	<u>Megaptera novaeangliae</u>	E	12/02/70
right whale	<u>Eubalaena glacialis</u>	E	12/02/70
sei whale	<u>Balaenoptera borealis</u>	E	12/02/70
sperm whale	<u>Physeter catodon</u>	E	12/02/70
green sea turtle	<u>Chelonia mydas</u>	Th	07/28/78
hawksbill sea turtle	<u>Eretmochelys imbricata</u>	E	06/02/70
Kemp's (Atlantic) ridley sea turtle	<u>Lepidochelys kempi</u>	E	12/02/70
leatherback sea turtle	<u>Dermochelys coriacea</u>	E	06/02/70
loggerhead sea turtle	<u>Caretta caretta</u>	Th	07/27/78
shortnose sturgeon	<u>Acipenser brevirostrum</u>	E	03/11/67

SP - PROPOSED FOR LISTING

1.

LISTED CRITICAL HABITAT

None

PROPOSED CRITICAL HABITAT

None



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

NOV 14 1995

Mr. Richard M. Jackson, P.E.
Chief, Planning Branch
Charleston District, Corps of Engineers
PO Box 919
Charleston, South Carolina 29402-0919

Dear Mr. Jackson:

This letter is in response to your request of October 20, 1995 to Mr. Gary Collins concerning a 103 Evaluation of sediments from the Charleston Harbor Deepening Project. We are giving concurrence for the ocean disposal of dredged material from those portions of the project associated with the following test stations: CH-4, CH-5, CH-6, CH-7, CH-9, CH-11, CH-12 and CH-13.

We appreciate the efforts in coordination throughout this evaluation process. Should you have any questions concerning this letter or wish to discuss any of the data, please contact Mr. Gary Collins at 706/546-2294 or Mr. Doug Johnson at 404/347-1740 ext. 4286.

Sincerely,

Wesley B. Crum
Chief, Coastal Programs Section

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

of pages 1

To <i>Robin Socha</i>	From <i>Doug Johnson</i>
Dept./Agency <i>USCOE - Charleston</i>	Phone # <i>404-347-1740 X4286</i>
Fax # <i>803-727-4260</i>	Fax # <i>404-347-1797</i>

NON 7540-01-317-7308

5089-101

GENERAL SERVICES ADMINISTRATION

October 20, 1995

Planning Branch

Mr. Gary Collins
United States Environmental
Protection Agency
Coastal Programs
345 Courtland Stree, N.E.
Atlanta, Georgia 30365

Dear Mr. Collins:

This letter is in reference to the sediment testing results for the Charleston Harbor Deepening Project. Initial results were submitted to your office in late April 1995. Following your review of the data, bioaccumulation testing for PAH's at two sites, CH-3, located in Shipyard River and CH-4, located adjacent to the proposed Terminal X was required prior to a final 103 Evaluation being conducted by your agency. The bioaccumulation data has been received by this office and is enclosed as requested.

Our review of the bioaccumulation data indicates that the material from site CH-3 is not suitable for ocean disposal and should be disposed of at an upland location.

By copy of this letter, the Charleston District is requesting that your office complete the 103 Evaluation of all the testing results, and provide concurrence that all other sites are suitable for ocean disposal. Please provide a response to the Charleston District by November 15, 1995.

We appreciate your review and assistance. If you have questions, please call Robin Coller-Socha at 803/727-4696.

Respectfully,

RICHARD M. JACKSON, P.E.
Chief, Planning Branch

HARRIS/EN-P

C-SOCHA/EN-PR/4696
PREACHER/EN-PR

JACKSON / EN-P

Enclosure