FINAL

ENVIRONMENTAL STATEMENT

MAINTENANCE DREDGING OF GEORGETOWN HARBOR,

GEORGETOWN COUNTY,

SOUTH CAROLINA

Prepared by

U. S. ARMY ENGINEER DISTRICT, CHARLESTON, SOUTH CAROLINA

March 1976

SUMMARY

Maintenance Dredging of Georgetown Harbor, Georgetown County, S. C.

( ) Draft (X) Final Environmental Statement

Responsible Office: U. S. Army Engineer District
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Charleston, South Carolina 29402
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1. Name of Action: (X) Administrative ( ) Legislative

2. Description of Action: Maintenance of a channel 27 feet deep with varying widths of 600 to 400 feet from the Atlantic Ocean to and including a turning basin in Sampit River, with a side channel 2,400 feet long and not less than 200 feet wide leading to a turning basin at the upper end of the built-up portion of the city waterfront. Maintenance of a depth of 18 feet for a width of 400 feet of the bypassed portion of Sampit River opposite the City of Georgetown. Dredging for above maintenance, and disposal of dredged material at selected sites.

3. a. Environmental Impacts: Short-term increase in turbidity and sedimentation; smothering of plant and animal communities in disposal areas; temporary frightening of birds and mammals in the area; temporary reduction of phytoplankton and zooplankton; short-term reduction of benthic organism populations in the path of the cutterhead and in the offshore disposal area; increase in the local mosquito population; possible adverse effect on fish larvae due to increased turbidity; possible reduction in dissolved oxygen levels as a result of the dredge disturbing organic materials undergoing anaerobic decomposition; minor increase in air pollution during dredging operations; and stimulation of the local, State and national economy.

b. Adverse Environmental Effects: Temporary increase in turbidity and siltation in the vicinity of the dredge and disposal areas; temporary decrease in primary production resulting from turbid waters; possible reduction in dissolved oxygen levels as a result of the dredge disturbing organic materials undergoing anaerobic decomposition; possible displacement of wildlife species; alteration of existing vegetation in disposal areas; destruction of some benthic organisms by the cutterhead; and increase in the local mosquito population.

4. Alternatives: Dredging and conveyance of material to an offshore disposal area by hopper dredge, alternate upland disposal sites, conveyance of material to an offshore disposal area by barges, use of all dredged material in a marsh building program, no action.

5. Comments received from:

U. S. Environmental Protection Agency
U. S. Department of Commerce
U. S. Department of the Interior
U. S. Department of Agriculture, Forest Service
U. S. Coast Guard
U. S. Department of Health, Education, and Welfare
Federal Power Commission
U. S. Department of Transportation, Federal Highway Administration
S. C. Department of Health and Environmental Control
State Planning and Grants Division, Office of the Governor
Honorable Wm. J. Bryan Dorn

6. Draft Statement to CEQ 23 May 1975 .

Final Statement to CEQ 8 March 1976

Final
Environmental Statement
Maintenance Dredging of Georgetown Harbor
Georgetown County,
South Carolina

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1.0 Project Description

1.01 The Georgetown Harbor Project (Plate 1) provides for a channel 27 feet deep with varying widths of 600 to 400 feet from the Atlantic Ocean to and including a turning basin in Sampit River, with a side channel 2,400 feet long and not less than 200 feet wide leading to a turning basin at the upper end of the built-up portion of the city waterfront. The channel is widened at the bends, secured and maintained by two jetties of stone on brush mattresses leading respectively from North and South Islands. The north jetty is 11,139 feet long and the south jetty is 21,051 feet long. The project also provides for maintenance to a depth of 18 feet for a width of 400 feet of the bypassed portion of Sampit River opposite the City of Georgetown. The existing project was authorized by the following River and Harbor Acts: 5 Aug 1886 - H. Ex. Doc. 258, 48th Cong., 2d sess.; H. Ex. Doc. 117, 50th Cong., 2d sess.; H. Doc. 298, 58th Cong., 2d sess.; H. Doc. 211, 76th Cong., 1st sess.; 30 June 1948 - S. Doc. 21, 81st Cong., 1st sess. Project authorization requires that the project sponsor, the State of South Carolina, select and provide all areas needed for the disposal of dredged material.

1.02 The project was completed in 1952 but maintenance continues to be performed on an annual basis. The total cost of the project to date is $22,434,000. Annual maintenance of the harbor costs approximately $1,195,000. The current practice of dredging to a depth of 29 feet (27 feet plus two feet overdepth) has not provided year-round project depth. Controlling depths of 18 feet have been experienced between the annual maintenance efforts. Accordingly, approval has been obtained for performing maintenance dredging to a depth of 29 feet at 6-month intervals for the reach between Station 720+00 to 790+00 and to a depth of 31 feet at 6-month intervals for the reach between Station 890+00 to the Georgetown turning basin including the side channel. This plan would increase dredging by 462,000 C.Y./yr. and increase annual maintenance costs by $309,000. Its implementation is conditional on the provision of 400 acres of suitable disposal areas by the project sponsor. This condition has not been satisfied at this time.

1.03 Dredging of the inner portions of the harbor is accomplished with a hydraulic dredge and a pipeline leading to disposal areas. Dredging of the entrance portion of the harbor is accomplished by a hopper dredge and the dredged material is deposited in an offshore disposal area of approximately 580 acres located approximately 3.5 miles offshore (see Plate 1). Except for a marsh-building experiment, the material dredged from the inner harbor is disposed of in diked disposal areas (see Plate 1) located on Waccamaw Point (approx. 220 acres), Waccamaw Neck (approx. 320 acres), and the Sampit River (approx. 260 acres). An average of 2,024,000 C.Y. of material are deposited in these three areas per year. Approximately 186,000 C.Y./year of material are removed by hopper dredge. When the three diked disposal areas have been used to capacity, new disposal areas will be selected and acquired by the project sponsor, the State of South Carolina, on upland sites adjacent to the harbor. A capacity of 9,900,000 C.Y. still remains in the three diked disposal sites. A modified method of using existing disposal areas will extend the time beyond that stated in the draft EIS

when the capacity of these areas will be reached. By alternately using one site while dredged material in the other sites is settling and water is evaporating, the date when capacities of the three existing disposal areas is reached can be extended to 1985.

1.04 Creation of marsh with dredged material

1.04.1 As part of a continuing effort to find alternate methods of disposing of dredged material, an attempt to create new marsh was made during the 1974 dredging operation. In 1974, 165,000 C.Y. and in 1975, 440,000 C.Y. of dredged material was pumped into a shallow open-water area of about 16 acres adjacent to Middle Ground. A silt barrier was used to trap small suspended particles that would increase the turbidity of adjacent areas. It appears that buildup to a higher elevation is needed before marsh vegetation can become established. Some buildup was accomplished in 1975. Project features are shown on Plate 1.

1.04.2 The creation of new salt marsh will include a case by case examination of the need for new marsh in each particular area and the value of the open water, bottoms and mudflats that would be replaced. The effect of building marsh on a large scale will also be examined. A marsh/shoal water area ratio of about 2:1 is given for the State of South Carolina. At this time the feasibility of this method has not been demonstrated sufficiently to consider it as a major method of spoil disposal. As discussed in Section 1.06 below, a cooperative effort between EPA, U. S. Fish and Wildlife Service, the State of South Carolina and other cognizant agencies will take place before final selection of new disposal sites.

1.05 As an alternative to depositing dredged material on marsh, uplands or in shallow open areas, the use of offshore sites has been suggested by EPA and other agencies as a preferred disposal method, provided the dredged material meets applicable criteria. At present, the only offshore disposal is via hopper dredges which maintain the entrance portion of the harbor. Operation of hopper dredges for similar purposes in the inner portion of the harbor is limited by the operating draft of the dredge when fully loaded, the difficulty of maneuvering such a large vessel in confined spaces, and the economics of moving long distances to offshore sites and interruption of dredging during such periods of travel.

1.05.1 A 1970 interim report on a long-range spoil disposal study by the U. S. Army Engineer District, Charleston Corps of Engineers recommended the use of a special dredge and barges to move spoil to offshore sites. This study was prepared for maintenance of Charleston Harbor, but the similar problems in Georgetown Harbor make the method equally applicable to Georgetown. As described in the report, "Maintenance of the navigation features by this plan would be in three steps as follows: (1) initial removal of the in situ shoal material by a special dredge; (2) direct pumping of the dredged material into hopper barges located along side the dredge, and (3) conveying the material to sea by barges for disposal. The following major items of equipment will be required for continuous operation: special dredge, eight barges, two tenders, and two tugs".

1.05.2 The cost of dredging by this method was calculated in 1970 to be $0.42/C.Y. This cost was updated in "Interim Review of Reports, Charleston Harbor, S.C.", October, 1974 to $0.68/C.Y., based on the following assumptions:

(1) Special dredge can handle 7,000,000 C.Y. of in situ material (equivalent to 11,600,000 C.Y. of dredged mixture) in 7,000 hours (2.8 C.Y./Min)

(2) Average density of in situ shoal material = 1300 gm/liter

(3) Average density of dredged mixture = 1150 gm/liter

(4) Average haul distance = 17 miles (one way)

(5) Average speed of tow and barges = 5 mi/hr

(6) Dumping time of barges = 10 min

The special dredge referred to above is one which pumps shoal material with a much lower water content than conventional hydraulic dredges. This makes the conveyance of dredged material to disposal sites economical without temporary storage for drying and without consequent additional costs. The special equipment needed, although in use in Holland, is not currently available from Government plant or commercial companies. The equipment could be made available well within the 50-year project life of this plan. Diked disposal areas, upland sites or marsh building sites could be used in the interim period as discussed in Sections 1.06.3 and 1.06.4 below.

1.06 Disposal of dredged materials. Under existing authority, the local sponsor provides easements for disposal sites. These easements are provided on an as-needed basis. No authority exists to require the local sponsor to obtain easements or to define alternate sites any faster than the need for these disposal areas arises.

1.06.1 The Corps recognizes the advantages of a long-term (50-year) plan to define future disposal areas, but is constrained by the lack of authority to require such a plan and several disadvantages:

(1) At any time after the adoption of such a plan, some or all of the prospective disposal sites may become developed or used for some purpose which would be incompatible with their proposed use for disposal of dredged material.

(2) To announce in advance the location of all proposed disposal sites needed for fifty years of maintenance dredging would invite speculation and escalation of costs.

(3) If the local sponsor were to acquire disposal sites far in advance of actual need, and if the disposal of dredged material as planned were precluded by economic, ecological or any other considerations, the local sponsor would have a great deal of capital invested in unneeded property.

1.06.2 The Corps can reject sites proposed by the local sponsor which it considers inadequate based on current needs and policy. The Draft EIS stated in several places (1.03, 4.01, 4.04, and 6.02.1) the desire of the Corps to use upland disposal sites and to discontinue use of marshlands after the sites now being used are filled to capacity. Federal Projects Involving the Disposal of Dredged Material in Navigable Waters, 39 FR 26635-26641, further states the Corps' intention to discourage the use of wetlands and marsh as future disposal sites.

1.06.3 Interagency coordination meetings and field trips as necessary prior to the selection of disposal sites are anticipated, similar to cooperative efforts on the Atlantic Intracoastal Waterway. These meetings would include EPA, U. S. Fish and Wildlife Service, South Carolina Wildlife and Marine Resources, and other cognizant agencies.

1.06.4 A combination of the following sites is therefore proposed during the life of the maintenance project; the specific site to be chosen on a case-by-case basis through the cooperative selection process described in 1.06.3 above:

(1) Existing diked disposal areas at Waccamaw Point, Waccamaw Neck and Sampit River.

(2) New upland disposal areas as provided by the local sponsor.

(3) Shallow, open water areas for the creation of new marsh.

(4) Deeper, offshore disposal sites as needed for use by hopper dredge and as proves feasible for barging spoil from the inner harbor.

2.0 Existing Environmental Setting

2.01 General. The project area is a 40-square mile expanse of tidal water and land located near the southern tip of Georgetown County, approximately halfway between the North Carolina state line and Charleston, South Carolina. The main body of water, Winyah Bay, is a coastal estuary fed by watersheds of the Sampit, Pee Dee and Waccamaw Rivers. The bay is "S" shaped, about a mile wide at either end and approximately four miles wide in the curving center. It is dotted with islands (Marsh, Big Marsh, Pumpkinseed, Rabbit, Hare and Middle Ground) of natural and artificial origin. Pumpkin Island is a long established rookery and supports approximately 8,000 pairs of nesting egrets, herons and ibis. In addition to the ships docking at Georgetown, the upper half of Winyah Bay is used by traffic on the Atlantic Intracoastal Waterway (AIWW). Georgetown Harbor freight traffic for 1974 is shown in Table 2, page 19.

2.01.1 Peripheral land within the boundaries of the project area includes parts of South Island, Cat Island, North Island, a

broad peninsula referred to as Waccamaw Neck and the mainland south of Georgetown. The only municipality located within the project area is Georgetown with a 1970 population of 10,449.

2.02 Hydrology. Georgetown Harbor is located in the protected waters of Winyah Bay, specifically in the Sampit River tributary. Winyah Bay is composed of the mouths of several major streams arising in South Carolina and North Carolina. The Great Pee Dee and Little Pee Dee Rivers merge north of Georgetown and with the Waccamaw form the headwaters of Winyah Bay. The Little Pee Dee and Waccamaw Rivers, with a combined drainage area of about 16,340 square miles, drain extensive swamp areas in northeastern South Carolina and southeastern North Carolina as evidenced by the "black water" nature of the streams. The Black River contributes water from another major South Carolina watershed. Sampit River, a small stream confined mainly to Georgetown County, flows into the bay south of Georgetown. The South Carolina State Ports Authority docks are located on the Sampit River near its confluence with Winyah Bay.

2.02.1 Winyah Bay is designated as Class SC waters by the South Carolina Department of Health and Environmental Control: waters suitable for crabbing, commercial fishing and other uses except bathing or shellfishing for market purposes or for uses requiring water of lesser quality. This classification extends from Winyah Bay entrance to the U. S. 17 bridge on the Waccamaw River arm, and in the Pee Dee River arm to near the mouth of the Black River and is the lowest water quality classification for saline waters. Saline waters of the Sampit River are also designated as Class SC. The Pee Dee upstream and the Black River (saline reaches only) are designated as Class SB: waters suitable for bathing and any other usages except shellfishing for market purposes, and for uses requiring water of lesser quality.

2.02.2 The saline waters of the Waccamaw upstream of the U. S. Highway 17 bridge are designated as Class SA, the highest classification of saline waters in South Carolina: waters suitable for shellfishing for market purposes and any other usages and for uses requiring water of lesser quality.

2.02.3 Georgetown Harbor receives treated municipal wastes from Georgetown's oxidation-pond treatment facilities and treated industrial wastes from the International Paper Corporation and Georgetown Steel Company.

2.02.4 In August 1971, the Environmental Protection Agency analyzed sediment samples taken from Georgetown Harbor. Chemical analyses of the samples were performed to determine total organics, volatile solids, trace metals, etc. Results of these analyses are presented in Appendix A. Zinc and lead concentrations often exceeded EPA standards; at two locations both pollutants were present in concentrations several hundred times the standards. However, recent

work at Texas A&M University indicates little or no relationship between the bulk heavy metal content of a sediment and its impact on water quality during dredging and disposal. Oil and grease concentrations were close to or in excess of standards at several sites. New chemical analyses are being conducted to determine if the more stringent effluent controls since 1971 have caused a corresponding decrease in sediment pollutants.

2.03 Geology. The geologic history of the Coastal Plain of South Carolina has been marked by uplift and erosion of the land and a rise and fall of the sea. Obscured by surface sands, the underlying rock formations consist of sands, clays, marls and limestones formed by sedimentation in shallow marine environments. The basal stratum overlying older crystalline rock is the Tuscaloosa formation. The Tuscaloosa formation is overlain by the younger Black Creek formation consisting of gray to black clays and thin beds of gray to white slightly glauconitic sand. The Black Creek formation is overlain by the Pee Dee formation consisting chiefly of dark green or gray, glauconitic and argillaceous sands and impure limestones. Sediments which cover the Pee Dee formation are marine in origin and the line of demarcation between the Cretaceous Period and the Tertiary Period is largely based on the paleontological evidence of fossils. The eastern half of Georgetown County is covered by deposits of Pleistocene and recent age, consisting of sand, clay, shell and marl material.

2.04 Soils. Soil associations found in the area around Georgetown Harbor are quite varied. The major associations are as follows:

2.04.1 Capers Association: These soils are found on South Island, Cat Island, the North Island tidal marsh and the brackish marsh boundary of Waccamaw Neck. Capers soils have very dark grayish-brown to dark gray silt loam to clay surface layers and gray to greenish-gray silt clay loam to clay subsoils and contain a high percentage of organic material.

2.04.2 Lynchburg-Coxville Association: These soils are found in the extreme northwest part of the project area in the vicinity of Georgetown. Lynchburg soils are somewhat poorly drained and have gray to dark gray loamy sand surface layers and mottled pale yellow and gray clay loam subsoils. Coxville soils are poorly drained and are found on broad nearly level or depressed areas. They have dark gray to very dark gray sandy loam or loam surface layers and gray sandy clay subsoils with strong brown and red mottles.

2.04.3 Troup-Wagram-Rutledge Association: These soils are located on the western side of Winyah Bay, northwest of the Atlantic Intracoastal Waterway. These are deep, well-drained to very poorly drained, gently sloping and nearly level soils. Troup soils have grayish-brown sandy surface layers over 40 inches thick

and yellowish-brown to red sandy loam to sandy clay loam subsoils. Wagram soils have grayish-brown loamy sand surface layers 20 to 40 inches thick and yellowish-brown sandy clay loam subsoils. Troup and Wagram are well to excessively drained. Rutledge soils are very poorly drained and occupy the lowest drainage position. They have black sand or loamy sand surface layers over 10 inches thick and gray sandy subsoils.

2.04.4 Wando-Coastal Beach Association: These soils are found only on North Island and are deep, excessively to well-drained, gently sloping to nearly level soils. Wando soils are excessively drained and occupy a long narrow strip of land paralleling the coast just behind the sand dunes along the beaches. They have dark grayish-brown fine sand surface layers and strong brown fine sand subsoils. Coastal beach consists of sands and sand dunes occupying a narrow strip of land bordering the Atlantic Ocean.

2.04.5 Lakeland-Chipley Association: These soils occur in a narrow area adjacent to the Capers Association on Waccamaw Neck. These are deep, excessively and moderately well-drained, gently sloping and nearly level soils. Lakeland soils are excessively drained and have grayish-brown loose sand surface layers and yellowish-brown to red sand subsoils. Chipley soils are moderately well-drained and have grayish-brown or dark gray sandy surface layers and pale yellow or yellowish-brown sand or loamy sand subsoils.

2.04.6 Leon-Rutledge Association: These soils are located on the highest parts of Cat Island, Waccamaw Neck and the mainland near the Atlantic Intracoastal Waterway. This association consists of deep, somewhat poorly and very poorly drained nearly level soils. Leon soils are somewhat poorly drained and have dark gray to black sandy surface layers less than 10 inches thick and black to dark brown slightly cemented sandy subsoils. Below this is light gray to brown sand. Rutledge soils occupy the very poorly drained positions. They have black sand or loamy sand surface layers over 10 inches thick and gray sandy subsoils.

2.05 Climate. The climate of the Georgetown area is mild, partly as a result of the moderating effect of the nearby Atlantic Ocean. The mean annual temperature in the basin is about 63°F. The frost-free growing season averages 230 days. The first freeze occurs around the first of December and the last freeze near the end of March. Precipitation is well distributed throughout the year with an average amount of 50 inches. Percentage of precipitation by season is as follows: 21% winter, 25% spring, 37% summer and 17% autumn. Low pressure areas moving northeast along the coast bring heavy amounts of rain and rarely snow during the winter months. During the late summer or fall months, hurricanes occasionally reach the South Carolina coast. Heavy precipitation usually occurs in the Georgetown area during these storms. More than 8 inches of rainfall associated with the hurricanes of September 1924 and October 1964 was recorded at the Georgetown weather station.

2.06 Biological resources. To facilitate a discussion of biological resources, the project area will be classified as follows: (1) Open water, (2) Beach and dune, (3) Marsh, (4) Woodlands, (5) Agricultural, and (6) Urbanized.

2.06.1 Open water. The open water community, as defined here, includes all marine and estuarine waters together with all underlying bottoms below the intertidal zone. The open water biota includes the plankton and nekton inhabiting the water column and the benthos living on or in the substrata. The plankton is mainly composed of unicellular algae, larval stages of many fish and invertebrates and the adult stages of several microscopic invertebrates. Larger forms, such as jellyfish and comb jellies which are carried by currents and tides are also included in the plankton.

2.06.1.1 Fish are the principal nektonic species although some crustaceans such as portunid crabs, amphipods and isopods and some mollusks, such as the squid spend at least a portion of their life as nekton. A number of the fish species including many of importance to the sport and commercial fishery, are considered to be estuarine dependent and utilize the estuary for at least a portion of their life cycle. Included are menhaden, anchovy, spot, croaker, spotted seatrout, red drum, mullet, flounder, striped bass, herring, shad, black sea bass, and others. In addition, many species commonly associated with the open ocean such as sharks, mackerels, tunas, and bluefish occur around the entrance channel.

2.06.1.2 The benthic environment includes a number of communities largely correlated with substratum type. Macroscopic algae and angiosperms are found wherever there is suitable substrate, however, because of the predominately sandy substrate along the South Carolina coast, habitat for these species is not abundant. Sea lettuce (Ulva sp.) is common to the area. The occasional occurrence on beaches of marine algae such as sargassum, Enteromorpha, Codium, Dasya, Chondria, Porphyra, Gracilaria, and Ectocarpus is due to the activity of storm waves on offshore areas.

2.06.1.3 The benthic invertebrate diversity in the area does not vary to any significant degree within the boundaries of the project area. Distribution of these organisms is, however, affected by bottom types, salinity, and degree of pollution. Benthic invertebrates present in the open water community include pelecypod and gastropod mollusks, crabs, amphipods, polychaete worms, flat worms, round worms, shrimp, isopods, and others. Many of these organisms are preyed upon by animals harvested in the commercial and sport fishery.

2.06.1.4 Commercial and sport fisheries in the upper reaches of Winyah Bay are marginal from the Sampit Channel to Frazier Point due to domestic and industrial pollution originating in the Georgetown area. The areas below Frazier Point are heavily utilized for recreation, and sport and commercial fisheries. Although oysters are present,

the project area is Class SC water and is, therefore, closed to shellfish harvesting. Oysters and clams are harvested from North Inlet; however, investigations published July 1973 by the Department of Geology, University of South Carolina show that North Inlet does not receive water from Winyah Bay except under an unusual combination of weather conditions. The main commercial species landed are the penaeid shrimps. A summary of commercial landings for the period 1969-1974 is presented in Table 1. The main sport fishes taken from the inshore waters are trout, red and black drum, sheepshead, spot, and croaker. Above the turning basin in the Sampit Channel, largemouth bass, bream, crappie, catfish, and carp contribute to the sport fishery (Reference 1).

2.06.1.5 The bottle-nosed dolphin, and the diamondback terrapin may be found in Winyah Bay throughout the year. The loggerhead turtle is most likely to be found in limited numbers in the harbor area during the spring and summer. There are a variety of birds frequently seen in the harbor area, including some that are also common to other environments. The brown pelican, black skimmer, royal tern, red breasted merganser, and scoters are normally found only in the ocean or in connecting marine areas such as Georgetown Harbor. The herring gull, laughing gull, ringbill gull, osprey, double crested cormorant, lesser scaup, and the common loon are commonly seen in the harbor area as well as various freshwater habitats.

2.06.2 Beach and dune. Most of the coast is bordered by a narrow beach and dune comprised mainly of sand and shell fragments. This habitat is dry because of rapid percolation and contains salts derived from the ocean. This type of habitat is represented in the project area by the two sand bars obstructing the mouth of Winyah Bay and by relictual beach on the eastern side of South Island. The characteristic vegetation of this community is sea oats, but other plants commonly found include salt meadow cordgrass, pennywort, sandspurs, marsh elder, sea rocket, yaupon, red cedar, and live oak. In the Georgetown area, red cedar is abundant on the more protected sides of the dunes. On the old beach on South Island, most of the grasses have been replaced by red cedar, loblolly pine, and wax myrtle which appear to be pioneering in this community. Succession by tree species in the area fronting on the ocean is checked by the influence of salt spray, occasional flooding, and shifting sands.

2.06.2.1 The seemingly barren beach community supports a wide variety of animal life. Macroinvertebrates, the predominant faunal organisms inhabiting this zone, live beneath the sand surface where salinities and temperatures are more constant. Most of these organisms are filter or deposit feeders and the greatest concentrations are found in the intertidal zones where there is a concentration of particulate organic matter brought in by the tides or supplied by the decomposition of animals on the beach. Typical inhabitants of the beach community are beach fleas and ghost crabs in the beach berm;

Table 1

Commercial Fishery Landings, 1969-1974[1/]

	1974		1973		1972		1971		1970		1969	
FINFISH	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Alewives	--	--	--	--	--	--	150,000	3,000	20,000	300	--	--
Bluefish	150	30	3,100	643	--	--	12,875	2,331	8,350	1,251	5,300	848
Croaker	36,000	3,600	450	54	83	16	400	40	2,050	183	--	--
Drum, Black	--	--	141	21	158	32	200	34	1,000	100	1,000	120
Drum, Red	125	50	--	--	--	--	100	20	--	--	--	--
Eels, Common	--	--	2,300	345	--	--	--	--	--	--	--	--
Flounders unclassified	7,402	2,113	9,487	2,417	5,890	1,181	6,310	1,387	1,500	240	--	--
Groupers	60,856	31,255	66,433	24,067	9,547	2,015	3,920	552	3,200	314	3,500	435
Grunts	--	--	3,500	530	775	1,591	1,250	125	3,200	260	3,700	490
Hickory shad	--	--	--	--	3,186	637	--	--	1,100	203	--	--
King mackerel	4,069	2,287	10,455	4,482	778	357	6,350	1,108	--	--	1,250	178
King whiting or "kingfish"	11,445	1,754	24,245	4,081	15,935	1,814	22,800	2,628	8,000	845	16,275	1,628
Menhaden	--	--	--	--	--	--	12,000	240	10,000	100	245,000	3,675
Mullet	840,693	--	239,935	26,690	508,900	22,794	673,750	44,739	859,000	17,180	842,000	76,285
Pompano	--	--	632	143	--	--	--	--	--	--	--	--
Scup or porgy, unclassified	2,819	727	18,459	3,757	15,107	3,338	121,500	12,300	239,118	24,442	9,215	922
Sea bass, unclassified	21,857	7,233	120,154	38,211	290,786	100,654	329,030	77,216	497,381	104,622	645,893	153,090
Seatrout, gray	1,800	696	1,823	469	--	--	--	--	3,700	308	5,000	375
Seatrout, spotted	1,322	566	2,060	674	7,995	2,390	19,923	4,944	4,700	1,175	7,935	2,451
Shad	21,799	10,925	25,318	11,312	116,223	34,195	80,086	31,328	93,626	26,269	86,596	28,939
Sharks	--	--	4,258	421	--	--	400	32	--	--	--	--
Sheepshead, saltwater	--	--	--	--	--	--	--	--	--	--	500	69
Snapper, Red	8,289	8,698	11,091	10,194	7,060	5,713	3,500	2,415	8,500	5,950	4,213	2,610
Snapper, Vermillion	1,750	918	4,878	2,302	11,221	4,521	9,850	3,188	--	--	--	--
Spanish mackerel	1,142	263	2,300	331	910	215	2,950	369	--	--	2,750	435
Spot	338,493	37,821	1,403,592	227,000	2,223,855	201,988	1,239,090	78,411	342,400	34,422	430,900	41,113
Sturgeon	46,837	19,780	44,365	13,178	68,019	18,208	76,499	14,672	3,808	762	35,172	6,396
Total finfish	1,406,848	128,716	1,998,976	371,322	3,286,428	401,659	2,772,783	281,079	2,110,633	218,926	2,346,199	320,059
SHELLFISH												
Crabs, Blue, hard	22,440	3,970	92,499	12,701	7,505	931	2,675	253	4,400	308	14,503	1,305
Shrimp, saltwater(heads-on)	888,821	533,906	1,193,533	1,352,225	745,296	475,466	955,220	496,428	476,672	262,213	339,851	187,348
Clams, Hard (meats)	9,481	8,951	14,769	7,347	16,730	7,360	256,210	118,533	23,600	10,620	69,313	27,509
Octopus	--	--	1,000	150	--	--	--	--	--	--	--	--
Oysters (meats)	62,876	33,506	56,137	29,662	38,675	19,180	39,299	19,420	32,542	16,573	27,877	14,447
Squid	712	221	1,347	202	--	--	--	--	--	--	--	--
Total Shellfish	984,330	587,462	1,359,285	1,402,287	808,206	502,937	1,253,404	634,634	537,214	289,714	451,544	230,609
Grand Total	2,391,178	716,178	3,358,261	1,773,609	4,094,634	904,596	4,026,187	915,713	2,647,847	508,640	2,797,743	550,668

1/ Includes Georgetown, Horry, and Marion Counties

wedge shells, mole crabs, and various burrowing polychaete worms in the intertidal zone; and blue crabs, horseshoe crabs, sand dollars, and numerous pelecypod and gastropod mollusks in the beach subtidal areas. The beach zone is utilized by numerous shore birds for nesting and feeding. Species commonly observed are the American oystercatcher, plovers, willet, sandpipers, lesser and greater yellowlegs, and gulls and terns.

2.06.2.2 The dune community is somewhat limited in importance to wildlife due to its rather sparse vegetative cover and insufficient food supply. Ghost crabs, tiger beetles, dragonflies, seaside and Ipswich sparrows, barn swallows, six-lined racerunners, Eastern glass lizards, and Eastern slender glass lizards are characteristic inhabitants. Visiting mammals such as raccoons, opossums, and rabbits may also be found in this area.

2.06.3 Marsh. Most of the intertidal area of Winyah Bay including most of South Island, the landward portions of North Island, and the banks of the lower reaches of the tributaries to Winyah Bay is comprised of marsh. The vegetation in these marshlands varies with elevation and salinity but is generally dominated by emergent, narrow-leaved rushes, sedges and grasses. Soils are generally poorly drained peats and mucks and anaerobic conditions are usually present beneath the ground surface. The tidal marshes in the project area can generally be separated into low marsh and high marsh. There is also an area of fresh marsh located on the northern side of Winyah Bay.

2.06.3.1 Low marsh is the lowest, topographically, and occurs from mean sea level to about mean high water. This region is regularly flooded by lunar tides and is vegetated primarily with smooth cordgrass throughout most of Winyah Bay. In areas of lower salinity the smooth cordgrass becomes less abundant and is replaced by less salt-tolerant species such as big cordgrass, bulrush, cattail, wild rice, and duck potato. In the higher reaches of this zone, black needlerush and glasswort can be found with or instead of the cordgrass.

2.06.3.2 High marshes are those marshes situated at elevations above the normal high tide level but within the area flooded by spring tides. In Winyah Bay, this community consists of a rather narrow fringe above the low marsh and rather large areas of South and North Islands and other islands within the bay. Black needlerush is the principal plant found in the high marsh areas of Winyah Bay. Sea ox-eye, salt meadow cordgrass, and silverling tree are locally abundant in this type of marsh. Further upstream in Winyah Bay, black needle rush gives way to other plants such as salt reed-grass, giant reed, duck potato, and bulrush. Especially conspicuous is salt reed-grass which is abundant on several of the small islands and on Middle Ground near the junction of the bay with the AIWW. Giant reed occurs in stands reaching a height of 20 to 30 feet along

the south margin of the bay especially in the vicinity of the AIWW. High marsh also occurs in sites previously used for the cultivation of rice. The principal species of plant life in these former rice fields are wild rice, reed, bulrush, cattail and duck potato.

2.06.3.3 Winyah Bay also has several islands and upland areas which were created when material dredged during the construction and subsequent maintenance dredging of the harbor was deposited on adjacent marshes or in open water areas. The marsh disposal sites have been diked in recent years to prevent the spread of dredged material beyond the disposal area. Silverling tree and poke berry are usually the first plants to appear after each use of these diked areas and they quickly form a dense ground cover. These plants are killed if covered to a sufficient depth during subsequent dredging operations but quickly become re-established. Open water disposal is no longer used in the harbor, except for the marsh building field trial at Middle Ground. The old circular deposits built up during former open water disposal operations have been washed and leached by rains, leaving medium-grained sands on the highest portions which are essentially bare of vegetation. The first vegetation encountered while moving away from the center of these mounds is a sparse covering of grasses, which gradually gives way to shrubs and vines, then a circle of pines or red cedar, surrounded by marshland along the intertidal portions.

2.06.3.4 The fresh water marsh is represented by a small community located on the northern side of Winyah Bay within an oak-pine forest on the wide peninsula of land comprising the major portion of the Baruch Plantation. The origin of this marsh is unknown, but it may be the remnants of a Carolina bay, which is a geologic formation peculiar to and very abundant in Georgia and North and South Carolina. The surrounding forest vegetation is invading the marsh site with cypress trees and seedlings as well as mesophytic species such as sweetgum, black gum, and red maple. Shrubs are also present around the border with the most common species being hollies, blueberries, fetterbush, wax myrtle, titi, and catbrier. Vegetation within this marsh includes herbs such as lizard's-tail, cattail, golden club, arrowhead, manna grass, false loosestrife and many other species of annual plants.

2.06.3.5 Estuarine marsh communities. These communities have been well documented in terms of productivity, animal diversity and importance to the marine system (and to man). The basis of the importance of these associated marsh communities involves the basic high productivity of the marsh itself, and its function of trapping nutrients from the upland communities. The detritus deposited each year when the Spartina dies and decomposes provides a food base upon which the estuarine organisms thrive. The dense plant growth in the marsh provides excellent cover for many species of birds, aquatic and semi-aquatic mammals, reptiles and amphibians. Substrates in

these communities are inhabited by a myriad of foraminiferans, nematodes, annelids, arthropods, and mollusks. The marsh community provides a nursery ground for the principal commercial marine organisms of the state; white and brown shrimp and blue crabs. These and the young of many other sport and commercial species move in the out with the tide to feed around the stems of the marsh grass.

2.06.3.5.1 Throughout these marsh communities numerous shorebirds, waterfowl, gulls, herons, and egrets will be found. Birds such as plovers, dowitchers and sandpipers thrive on the benthic invertebrate population around the shoreline and on open flats. In the open water bordering these communities, waterfowl will be found feeding on vegetation or small marine fishes and free swimming invertebrates. Another game bird to be found is the clapper rail, a permanent resident of of these marshes. The herons and egrets feed on fish, invertebrates, reptiles, amphibians, and small mammals in the marsh. They also are found nesting and roosting during the summer months. Many gulls will be found the year around utilizing these communities for resting and scavenging. Other birds such as the red-winged blackbird, common and boat-tailed grackles, sparrows, and warblers will be found nesting and feeding on insects and grains. Birds of prey such as osprey, bald eagle, and marsh hawk will also be found utilizing these communities to some degree.

2.06.3.5.2 Mammals of the marshes typically include the raccoon, otter, rice rat, opossum and marsh rabbit. The raccoon and opossum are ubiquitous animals and opportunistic feeders. The otter thrives on crustaceans and fish while the rice rat and marsh rabbit are herbivores. On occasion, other mammals such as the bobcat and fox will visit these communities.

2.06.4 Woodlands. Woodlands within the project area consist of cypress swamp in the lowest, wettest areas and oak-pine forest on higher sites.

2.06.4.1 Cypress swamps are scattered throughout the area adjacent to Winyah Bay, especially along fresh water tributaries, the headwaters of fresh water ponds, and in the depressions between former beach dunes. Other trees found in cypress swamps are sweetgum, tupelo gum, black gum, and red maple. Within the fringe of the cypress swamp community there may be a very thick shrub ecotone which contains small trees such as red bay, sweet bay, and shrubs such as fetterbush, wax myrtle, bitter gallberry, titi, sweet pepperbush, and highbush blueberry.

2.06.4.2 The oak-pine forest which occupies the higher sites varies considerably in the project area. A mature live oak forest is located on the west side of Winyah Bay across from the Coast Guard Lighthouse. Interspersed among these live oaks are cabbage palms and magnolia. The narrow forest zone which occurs along the beach and dune communities on the east side of Winyah Bay is comprised of live

oaks and shrubs which are sheared by salt spray into a sloping, undulating canopy. Landward of this area the forest is composed primarily of loblolly and longleaf pine. The ridges of former dunes found on the southwest side of Winyah Bay and west of the AIWW are occupied by forests consisting mainly of longleaf pine and turkey oak, with some loblolly pine and blackjack oak. On the north side of Winyah Bay, the terrain is low and is covered by a forest of cypress and sweetgum in addition to live oak, loblolly pine, and longleaf pine. The understory of the oak-pine forests includes wild black cherry, sassafras, persimmon, wax myrtle, various blueberries, laurel cherry, and herbs such as broomsedge, goldenrod, wiregrass, golden aster, partridge berry, Spanish moss, mistletoe, poison ivy, and catbrier.

2.06.4.3 The oak-pine forest, cypress, and freshwater marsh communities are integrated with cypress and freshwater marsh communities appearing as pockets within the oak-pine forest. Similarities between the animal composition of the cypress and freshwater marsh, with few exceptions, are great. The majority of the terrestrial animals in the project area will utilize these communities as a whole, especially the larger game animals and predators.

2.06.4.4 Game animals such as the white-tailed deer range throughout the community feeding on acorns, fungi, grasses, twigs, and shrubs. Smaller game animals such as the fox squirrel and bobwhite use the more open pine areas, the former feeds on pine seeds, acorns, and fungi; the latter on grass seeds, berries, and insects. Gray squirrels inhabit the oak-pine and cypress communities and they feed on acorns, nuts, berries, and fungi. Black bear, feral hogs, and turkey could be found ranging throughout these communities. Predators such as the fox, bobcat, owls, hawks, and snakes range through all of these communities.

2.06.4.5 The edges of the cypress swamp and freshwater marsh are utilized by mammals such as the marsh rabbit, rice rat, and star-nosed mole which are typical of these communities. Reptiles and amphibians utilizing these two communities are the alligator, black swamp snake, water snakes, eastern cottonmouth, bullfrog, and leopard frog. The cypress swamp and freshwater marsh will attract birds such as the great blue heron, cattle egret, wood ibis, and white ibis. Not only will these birds feed in and around these communities, but they also roost in the cypress swamp. The wood duck, a permanent resident and game species, will be found in both of these communities. The blending of these communities provides a variety of habitat, cover, and food which promotes a high species diversity of animals, thereby making this area highly attractive for wildlife habitat. In addition, it provides an important recreation area for man.

2.06.5 Agricultural. Several cleared tracts of land around Winyah Bay are planted to either truck crops or wildlife food and

cover plantings. Rice was formerly an important crop and a large area of marshland on South Island and the east side of Winyah Bay was diked for the culture of rice. Maintenance of the peripheral dikes of some of these rice fields has been discontinued and the fields have reverted to marsh and/or cypress swamp. However, many dikes around old rice fields on the Belle Baruch Plantation, which includes most of the project area on the east side on Winyah Bay, continue to be maintained to provide waterfowl habitat.

2.06.5.1 Fields that are left fallow after harvest provide habitat for small mammals, birds, reptiles, and amphibians, and hunting grounds for birds of prey. The cotton rat, house mouse, and opossum, for instance, are permanent residents, while the eastern kingbird, indigo bunting, and palm warbler are temporary foragers.

2.06.6 Urbanized. Urbanized areas in the vicinity of the project include parts of Georgetown and Maryville. Live oaks and loblolly pine are the most abundant trees and many varieties of domesticated plants such as azaleas and camellias are cultivated.

2.06.6.1 The man-dominated community provides habitat to those animals that easily adapt to man's habit and habitations. The gray squirrel, flying squirrel, opossum, and many birds easily adapt to man's presence. The black rat, the Norway rat, and the house mouse live in close association with man. Lizards and amphibians which are capable of using habitats with either natural and/or introduced vegetation are also found.

2.06.7 Rare and endangered species, threatened species, peripheral species, and status undetermined species. One rare and endangered species, nine threatened species, one peripheral species and three status undetermined species occur or possibly occur in the project area (Reference 2).

2.06.7.1 Rare and endangered species. The southern bald eagle (Haliaeetus l. leucocephalus) is a permanent resident of the state and is usually found around lakes, rivers and coastal bays. There are three active eagle nests within five miles of the project; two on South Island and one on North Island.

2.06.7.2 Threatened species. Threatened species can be defined as those "whose prospects for survival and reproduction are in immediate jeopardy. Their peril may result from one or more causes--loss of habitat or change in habitat, overexploitation, predation, competition or disease." Threatened species are:

Fish

Shortnose sturgeon	Acipenser brevirostrum

Reptiles and amphibians	
American alligator	Alligator mississipiensis
Green turtle	Chelonia mydas
Birds	
Eastern brown pelican	Pelecanus occidentalis carolinensis
Peregrine falcon	Falco peregrinus
Kirtland's warbler	Dendroica kirtlandii
Eskimo curlew	Numenius borealis

The brown pelican is commonly observed in coastal areas of South Carolina. The green turtle is a resident of the open sea and may occasionally be observed when it comes onto coastal beaches at night to lay eggs. The alligator is commonly observed in fresh water lakes and rivers. The peregrine falcon, Kirtland's warbler, and Eskimo curlew are transient species.

2.06.7.3 Peripheral species. A peripheral species--"is one whose occurence in the United States is at the edge of its natural range and which is threatened with extinction within the United States although not in its range as a whole." The only peripheral species known to occur in the project area is the roseate spoonbill (Ajaia ajaja) which is a transient.

2.06.7.4 Status undetermined species. A status undetermined species--"is one that has been suggested as possibly being rare or endangered, but about which there is not enough information to determine its status." The following species are in this category:

American osprey	Pandion haliaetus carolinensis
Wood Ibis	Mycteris americana
Eastern pigeon hawk	Falco c. columbarius

The osprey is locally common and the other species have been seen in the area.

2.06.8 Community relationships. The biotic communities of the Georgetown Harbor project area, when viewed together, present a mosaic of ecosystems which are interrelated and highly dependent on each other. Because the environmental factors in these communities

are particularly stringent (high salinities, frequent storms, shifting substrates, changing landforms, salt spray, sand blasting, broad temperature and moisture fluctuations, generally low soil nutrients, etc.) the ecotones between communities are often narrow. Plates 1 A and B graphically illustrate this ecological observation. The terrain drops abruptly from the oak-pine forest shown in Plate 1A to the salt water of Winyah Bay. A narrow fringe of low marsh exists in the salt water, but cannot successfully compete with the high marsh vegetation. The forest itself is dominated by pine which is better adapted to the well-drained beach sands but less adapted to salt spray than the live oaks (not seen) which occur behind the pine forest zone. An old beach and dune community with a forest dominated by live oak, cabbage palm, and magnolia to the rear is seen in Plate 1B. Transformation of the topography by erosion and construction of jetties (Plate 2A) has diminished the effects of salt spray; consequently, the beach and dune community similar to the one shown in Plate 2B has been replaced by low marsh and an ecotone of shrubs.

2.06.8.1 In most areas, the transition between certain communities is difficult to ascertain. Plate 3A illustrates the seemingly uniform aspect of a low marsh community on Cat Island. However, closer inspection (Plate 3B) reveals remnants of several communities with indistinct ecotones. Analysis of such a community usually indicates a successional transition, in this case, a low marsh community has been filled with sediments and will become a high marsh.

2.07 Economic Developments. Economic development in the project area centers around agriculture and the heavy industries in Georgetown. The major crops of Georgetown County are corn, soybeans, and tobacco. Industries in Georgetown include paper and steel mills and chemical plants, commercial fishing and lumber and pulpwood yards. Data on employment is presented in the following table.

Labor Breakdown for Georgetown County 1/

Civilian labor force	12,750
Unemployment	7.5%
Employment	11,800
Agriculture	800
Non-agriculture	11,000
Manufacturing	4,450
Wholesale and retail trade	1,500
Self-employed, unpaid family workers and domestics	1,950

1/ Data extracted from South Carolina Manpower in Industry, Annual Averages for 1970-1971. S. C. Employment Securities Commission, May 1972.

2.07.1 Port of Georgetown. In 1973, the port handled over 1.4 million short tons of waterborne commerce with 152,231 being export tonnage. Commerce moved by barge traffic over the Atlantic Intracoastal Waterway or between points within the harbor accounted for 64 percent (957,570 short tons) of the total commerce. The remaining 36 percent (528,161 short tons) was transported by ocean-going vessels. The principal commodities passing through the port are pulpwood logs, iron ore and concentrates, residual fuel oil, paper and paperboard, and various iron products. Table 2 breaks down movement of goods by type of commodity.

3.0 Relationship of the Proposed Action To Land Use Plans

3.01 There are no existing Federal, State or local land use plans, policies or controls which would be affected by the continued maintenance of the Georgetown Harbor project.

4.0 The Probable Impact Of The Proposed Action On The Environment

4.01 General. Material dredged from the inner harbor is now deposited in diked disposal areas located on former marsh and contiguous uplands (See Plate 1). The State of South Carolina is required to furnish disposal areas for this and other similar projects, and it has been the practice of the State to select and acquire disposal areas only as the need for new areas develops. Although the exact location of the disposal areas to be used in maintenance dredging of the inner harbor when existing areas are used to capacity is not now known, it appears certain that the high priority placed on marsh preservation in the interest of wildlife and estuarine productivity will prevent the further use of marsh for disposal of dredged material. Consequently, the discussion of impacts will be based on the assumption that material dredged from the inner harbor channels will be deposited in diked disposal areas currently being used until these areas are filled to capacity. New disposal areas to replace those currently used will be located on upland areas adjacent to the harbor. Dredging of the entrance portion of the harbor will continue to be accomplished by a hopper dredge and the dredged material will be deposited in the currently used offshore disposal area. Additional use of offshore areas for disposal of material dredged from the inner harbor depends on the possible future availability of a specialized dredge and hopper barges. The expanded use of dredged material to build new marsh is contingent upon finding that such use of dredged material would be preferable from an environmental viewpoint to other methods.

4.01.1 A major impact of this maintenance dredging is related to effects on water quality and on the ecosystems within the harbor and disposal areas. Water quality is affected mainly by local short-term increases in turbidity and sedimentation of adjacent water areas because of the bottom disturbance by the dredge cutterhead and the suspended and

Table 2
Georgetown Harbor Freight Traffic, 1974
(Short Tons)

Commodity	Total	Foreign		Domestic			
				Coastwise		Internal	
		Imports	Exports	Receipts	Shipments	Receipts	Shipments
Fresh fish, except shellfish	10	-	-	-	-	10	-
Shellfish, except prepared	864	-	-	530	-	334	-
Iron ore and concentrates	339,602	71,602	-	10,000	-	258,000	-
Aluminum ores, concentrates	8,060	8,060	-	-	-	-	-
Manganese ores, concentrates	2,797	-	-	2,797	-	-	-
Grain mill products, nec	2	-	2	-	-	-	-
Alcoholic beverages	3	3	-	-	-	-	-
Tobacco manufactures	52	-	52	-	-	-	-
Basic textile products	12	-	12	-	-	-	-
Pulpwood, log	574,567	-	-	-	-	574,567	-
Wood chips, staves, moldings	31	31	-	-	-	-	-
Lumber	182	-	-	-	-	-	182
Furniture and fixtures	1	1	-	-	-	-	-
Paper and paperboard	88,662	-	88,662	-	-	-	-
Pulp and paper products, nec	4,583	-	1	-	-	-	4,582
Basic chemicals and prod, nec	143	-	143	-	-	-	-
Drugs	5	-	5	-	-	-	-
Paints	5,440	-	-	-	5,440	-	-
Miscellaneous chemical prod	6	-	6	-	-	-	-
Distillate fuel oil	13,783	-	-	12,415	-	1,368	-
Residual fuel oil	378,089	89,410	-	286,064	-	2,615	-
Iron and steel primary forms	81,864	-	78,264	-	-	-	3,600
Iron, steel shapes, exc sheet	108,308	-	91,136	-	14,392	-	2,780
Iron and steel pipe and tube	2	-	2	-	-	-	-
Ferroalloys	1,344	1,344	-	-	-	-	-
Iron and steel products, nec	697	-	697	-	-	-	-
Aluminum and alloys, unworked	73	-	73	-	-	-	-
Machinery, except electrical	439	-	179	-	-	230	30
Electrical mach and equip	104	71	33	-	-	-	-
Motor vehicles, parts, equip	25	-	25	-	-	-	-
Ships and boats	67	-	-	-	-	67	-
Iron and steel scrap	6,568	-	1,058	5,510	-	-	-
Paper waste and scrap	3,356	-	3,356	-	-	-	-
Commodities, nec	245	-	-	-	-	245	-
Total	1,619,986	170,522	263,706	317,316	19,832	837,436	11,174

Total Ton-Miles 18,446,224

dissolved material in the effluent from the disposal areas. The effects on disposal areas include the smothering or displacement of plants and animal communities and the prevention of any substantial regrowth or colonization as long as the area continues to be used as a disposal area.

4.02 Open water.

4.02.1 General. It is characteristic of any hydraulic dredging project that water turbidity in the vicinity of the dredge will increase as a result of the mechanical action of the dredge cutterhead. Observations of maintenance dredging in the harbor indicate there will be a temporary increase in turbidity in the area of dredging and although visible at the surface only in the immediate vicinity of the cutterhead, the plume may extend several hundred feet upstream or downstream as determined by tidal currents. Some increase in turbidity can also be expected adjacent to the upland disposal areas, although the use of dikes and weirs greatly reduces the sediment content of the disposal area effluent. The water turbidity in the offshore disposal area will also increase during and for a short time after the disposal of dredged material. The temporary and localized effects on resident biota of increased water turbidity are not considered to be of a magnitude to affect long-term productivity.

4.02.1.1 In addition to increased turbidities, the disturbance of bottom sediments by the dredge may resuspend chemical substances, possibly increase levels of nutrients, toxic substances and B.O.D. Such effects would be most noticeable in the immediate vicinity of the dredge. Samples for elutriate tests and new chemical analyses of bottom sediment will be collected before the next dredging operation. All regulations for disposal of spoil in open waters will be followed. Selection of sites for any badly polluted material will be accomplished by the interagency efforts described in Section 1.06.

4.02.2 Phytoplankton. From research conducted in areas similar to Georgetown Harbor, it appears that the effect of dredging on the primary production of phytoplankton is initially inhibitory due to increased turbidity. Recovery, however, takes place downstream.

4.02.3 Zooplankton. Research conducted on the survival of zooplankton (Reference 5) indicates that water which comes from the disposal site is more toxic than the water at the dredge site or downstream. It appears that zooplankton populations may be reduced during actual dredging operations, but the area affected is comparatively small and effects decrease rapidly with distance from the dredging operation.

4.02.4 Invertebrates. In most dredging projects, one of the most significant short-term impacts in the channel area is the physical destruction of benthic invertebrates by the dredge cutterhead. This gross effect has been well documented in many studies and field investigations conducted along both the Atlantic and Gulf

coasts and can be expected to some extent during maintenance of Georgetown Harbor. In addition, some smothering of benthic organisms may occur in areas immediately adjacent to the channel as stirred up sediments settle to the bottom.

4.02.4.1 The greatest concentrations of benthic invertebrates in the Georgetown Harbor estuary occur in the shallower portions in and around the salt marshes, not in the deeper channelized areas. Although some minor silting may occur in these areas, the area of greatest impact will be in the immediate vicinity of the dredge. The overall long-term impact on benthic invertebrates will be insignificant as repopulation of disturbed areas by recruitment from adjacent areas will begin shortly after dredging is completed.

4.02.4.2 Many benthic organisms inhabiting the offshore disposal area will probably be smothered as materials dredged from the entrance channel are deposited. This again will be a short-term impact as organisms destroyed will be replaced by recruitment from surrounding areas.

4.02.5 Fish and commercial and sport fisheries. The Georgetown Harbor estuarine system supports a diverse array of fishes. Although many of these species are occasionally found in deeper portions of the estuary, the majority are usually associated with salt marshes and shallower water areas which will not be significantly affected by the proposed project.

4.02.5.1 Available data indicate that fish populations, unlike benthic invertebrates which are relatively immobile and may undergo population reductions that may be locally severe, are less likely to be adversely affected by dredging operations. In some areas, dredging could even be considered to be beneficial to certain species of fish. As a dredge works its way along a channel, benthic animals which would normally be buried in the sediments are dislodged and become susceptible to predation. This sudden availability of food quite often results in higher than normal concentrations of fishes near the dredge. Ocean disposal could create a similar situation.

4.02.5.2 Although it would appear that fish are relatively unaffected by dredging, there has been some concern in the last few years over the possible effects of increased turbidities and siltation associated with dredging. As a dredge moves along the channel, it invariably creates some type of turbidity plume, the size of which will vary considerably depending on the type of sediment being dredged, strength of currents and other factors. The magnitude of the impact of suspended particles on fishes will, in most cases, be dependent on the concentration, composition, absorbed minerals or toxins and the tolerance of particular species. In general, bottom-dwelling species are the most tolerant of suspended solids, filter feeders are most sensitive and juvenile forms are more sensitive than adults.

4.02.5.3 Under experimental conditions, fish subjected to extremely high concentrations of suspended soils have died from suffocation due to clogging of the gills and opercular cavities. However, under normal circumstances, fish avoid turbid waters and have the ability to clear gill membranes of accumulated silt upon entering undisturbed water. However, not all species are equally susceptible to suspended solids and different suspended solids vary in their effect. As a general rule, it has been found that fish can tolerate high turbidities except when they are accompanied by low levels of dissolved oxygen, acids, alkalies, or other substances which interfere with respiration, injure gills or prevent their normal function, and they are quite capable of leaving the immediate dredging area.

4.02.5.4 Turbidity plumes created by the proposed project will primarily be restricted to the channel area with some adjacent shading, depending on wind and tidal velocities. Fish species which would have the highest probability of being affected are the filter feeders (primarily menhaden, herring, and shad) and juvenile forms. Estimates of the relative abundance of these species in the channel area at any given time varies so that it is not practical to attempt a quantitative determination of the impact on these species. In addition, some larval fishes will be destroyed either as a result of the mechanical action of the dredge, being exposed to turbid water, or being exposed to toxic substances in sediments. However, based on research which has been accomplished in other areas and available information on the effects of current dredging practices in the harbor, it is felt that any impact resulting from the proposed maintenance will be of a short-term, localized nature and will not significantly affect the fish stocks in the Georgetown estuarine system.

4.02.5.5 Principal commercial species marketed in Georgetown are shrimp, blue crabs, oysters, clams, alewives, American eels, flounder, whiting, black sea bass and spot. A majority of these species are captured in offshore fisheries which will not be directly affected by maintenance dredging. Oysters and clams are found in shallower areas of the harbor and will not be affected by the project. The clams and oysters marketed in Georgetown come from other areas along the coast. Shrimp and blue crabs are found throughout the estuary and there is a definite possibility that some will be killed if they come in contact with the dredge cutterhead. Although numbers destroyed could be quite large, the impact will be temporary and will not significantly affect recruitment to the offshore fishery Many of the commercial and sport fish species spend a portion of their life cycle in the estuary and could be adversely affected by turbidities or could be picked up and destroyed by the cutterhead. The impact on these fish is expected to be temporary and insignificant.

4.02.6 Ocean disposal site. The impact of offshore disposal is difficult to quantify, however, it appears that this

method for disposal has fewer adverse effects if the dredged material does not contain highly toxic substances. In some cases, disposal may be beneficial. The accumulation of mud deposits in adjacent areas could create habitat for valuable species such as Penaeid shrimp. This in turn, could generate potential for increases or, at least, more productive commercial fisheries.

4.02.6.1 Porpoises, turtles, and birds rely on the open water area only for feeding and resting. Since the proposed dredging is not expected to significantly affect invertebrate and fish population, it should also not affect the value of the open water area as habitat for these animals.

4.03 Beach and dune. Within the Georgetown Harbor area, the beach and dune community is a narrow zone bordered on one side by water and on the other by marsh. Because of the high value now placed on estuarine marshes, it is considered unlikely that new disposal areas in the marsh zone will be acquired when existing areas are depleted. Since it is not practical from an engineering and economic viewpoint to build diked disposal areas that are totally confined to beach and dune zone, this type of community will not be affected by future maintenance operations.

4.04 Marsh. Because of the high premium now placed on estuarine marshes, it is considered unlikely that new disposal areas in the marsh zone will be acquired when existing areas are depleted.

4.04.1 Marshes previously diked and currently used as disposal areas become progressively altered until the ground elevation exceeds the height reached by spring tides. When the ground surface is no longer subject to tidal overflow as a result of the deposition of dredged material, the disposal area begins to take on the characteristics of an upland area. Plants such as smooth cordgrass, black needle rush, salt reed-grass, cattail, wild rice, and bulrush are eventually replaced by other grasses, poke berry, silverling, and wax myrtle. This conversion to an upland environment represents a permanent loss of the marsh involved in the disposal operation.

4.04.2 The loss of marsh also represents a reduction in the habitat available to marine forms. Some species of fish such as the speckled trout spend their entire lives in estuaries. Others, including white and brown shrimp, blue crabs, croakers, spot, and red drum spend part of their juvenile life in marshes and adjacent water areas. Consequently, the functional importance of marsh extends beyond its intrinsic potential biological productivity. While it is recognized that these marshes play an important role as a nursery area in the life cycle of many species, this role has not been quantified to the extent that its effect can be described

on a per acre basis. However, any further diking of marsh for the disposal of dredged material would represent an additional loss of important habitat for these species.

4.04.3 Shorebirds, waterfowl, gulls, herons, plovers, dowitchers, sandpipers, clapper rails, red-winged blackbirds, grackles, sparrows, and marsh hawks will be displaced to a large extent from marshes during their conversion to an upland environment. Mammals such as the raccoon, opossum, marsh rabbit, and various rodents will continue to use disposal areas although its habitat value may be reduced. After shrubs and small trees become established, small birds such as sparrows, red-winged blackbirds, grackles, small rodents and marsh hawks will return. Occasional uses of disposal areas include the establishment by herons, egrets, and ibises of rookeries such as those on each end of Drum Island in Charleston Harbor. Other ground nesting birds such as certain species of tern, black skimmers, and gulls nest on islands created by open water disposal operations.

4.05 Woodlands. Woodlands now appear to be one of the two most likely areas to be selected for disposal of dredged material when the currently used disposal areas are used to capacity. Woodlands are one of the largest environmental types in the Georgetown Harbor area, and the rationale for preservation of individual tracts of marsh does not apply to these woodlands. Woodlands are also less expensive than urbanized areas and would, therefore, be more suitable from the project sponsor's viewpoint.

4.05.1 Prior to the use of any wooded tract of land, the owner would probably remove merchantable timber. In any event, dense stands would be removed to permit a more even distribution throughout the disposal area of the hydraulically dredged material. Any trees not removed and all understory plants would be killed when their roots become covered to a sufficient depth. Vegetation regrowth would consist probably of poke berry and other herbs and shrubs such as silverling and wax myrtle, and trees of most of the same species growing prior to dredging.

4.05.2 Practically all significant animal life except for some small birds would be displaced during and shortly after the use of a wooded disposal area. Raccoons, opossum, and some small rodents might continue to forage without interruption in the disposal area. As vegetative regrowth begins, foraging by the other species that were displaced during the preparation and clearing and subsequent use of the area will increase. Plant and animal life will fluctuate from a low during and shortly after deposition of dredged material to a high just before a dredging operation. When capacity has been reached, a reversion to a wooded state by sweetgum, pines, hackberry, oaks and other upland species will occur unless man's activities intervene through use of the area for cultivation or residential or other development. Material dredged from Winyah Bay is well suited for farming.

4.06 Agricultural land. Agricultural lands, along with woodlands, appear to be one of the most likely areas to be selected for the disposal of dredged material when the currently used disposal areas are used to capacity. Agricultural lands are one of the small categories of land use but some of the basic restrictions operating against the selection of marsh and urbanized areas referred to earlier do not apply.

4.06.1 The impact on wildlife of using cultivated land for the disposal of dredged material depends on the length of time since the land was last cultivated. Recently cultivated land usually has very little utility for wildlife because of the common practice of clean farming, and the use of such an area for disposal would have little impact on wildlife. Fields that are left fallow for some time provide habitat for a number of small animals as discussed in Section 2.06.5.2. Most of these would be displaced by dredged material. Vegetative regrowth would begin shortly after the area dries with pioneer species such as poke berry, and other herbs and grasses being the first to appear. Shrubs such as silverling and wax myrtle and trees such as sweetgum and sassafras would appear shortly afterwards. As vegetative regrowth progresses, foraging by animals displaced during dredging will increase. The extent of this foraging will also depend on the quality of adjacent habitat. If such a disposal area were bordered by woods, a greater diversity of animal life might forage in the disposal area than if it were bordered by cultivated fields. Plant and animal life will fluctuate from a low during and shortly after deposition of dredged material to a high just before a dredging operation. When capacity has been reached, a reversion to a wooded state by sweetgum, pines, hackberry, oaks, and other upland species will occur unless cultivation is resumed or the area is placed into residential or other development. The dredged material is very well suited for farming and has been so used on Cat Island and South Island and this land could be used as productive farm land once capacity has been reached.

4.07 Urbanized land. The use of urbanized areas does not appear practical because such a use would be incompatible with human use of adjacent areas. The cost of urbanized property also would deter its use for this purpose.

4.08 Rare and endangered species, threatened species, peripheral species, and status undetermined species. Several of the above species are known to be present, at various times, in the harbor area. To the extent that upland disposal sites are used in lieu of marshlands, those birds using uplands near rivers and coastal bays could experience some loss of habitat. The cooperative interagency efforts described in Section 1.06.3 should prevent excessive loss of this habitat where crucial to endangered species.

4.09 Archaeological and historical sites. The continued maintenance of Georgetown Harbor would have no impact on archaeological or historical resources. Since the completion of the harbor

in 1949, maintenance dredging has been accomplished annually and it is highly unlikely that continued maintenance would disturb anything of historic value. The National Register of Historic Places has been consulted and no Register properties will be affected by the proposed project. Bellefield Plantation has been determined eligible for inclusion in the National Register. The area eligible for inclusion is described in a Department of Interior brief as four marsh areas whose chief value is its potential as a sanctuary and for study of marine biology and forestry. Disposal site "A" on Waccamaw Neck lies within one of these areas. Discouragement of the use of marsh for future disposal sites and the interagency selection process should prevent further adverse impacts on this area.

4.10 Aesthetics. Prior to the actual dredging, the dikes inclosing the disposal areas must be raised by use of material from within the diked disposal area. These dikes will consist mainly of barren earth which will contrast in an unfavorable manner with surrounding areas that are fully vegetated. A barren appearance within the disposal area will also prevail for some time after dredging. Natural vegetative regrowth on the dikes and within the disposal areas will commence soon after dredging is completed and a relatively full vegetative cover of grasses and herbs may be achieved within a few months. The attainment of a full vegetative cover will present a more natural appearance to the diked disposal areas, and will restore to some extent the aesthetic values that were lost during the dredging operation. The presence of the dredge boat and pipelines and associated equipment in the harbor will represent an intrusion upon the view of the harbor during the period of dredging. This impact would exist only during dredging and is considered of lesser magnitude than the aesthetic impact associated with the disposal of dredged material in diked disposal areas.

4.11 Air quality. There will be a very minor increase in air pollution as a result of operation of the dredge; however, the effects will be temporary as well as insignificant and probably not measurable at existing air quality stations.

4.12 Noise. In view of the large expanse of open water, noise levels from dredge operations will not be raised objectionably above present levels.

4.13 Economic impact. The continued maintenance of Georgetown Harbor would continue to have a favorable economic impact on the area. Ships serving the area now will help and even expand the industrial base now being established in Georgetown. This will directly and indirectly have a beneficial affect on the local, state and national economy.

4.13.1 The cessation of maintenance dredging would require that all freight be transported to Georgetown by means other than deepwater vessels. Assuming an average additional cost of $3.00/ton if all freight were shipped by barge from nearby deepwater ports, the economic value of maintenance dredging of Georgetown Harbor once per year would be $2,314,128, based on 1974 traffic (Table 2). The benefits would be $3,088,128 if the dredging of rapidly shoaling areas were done twice per year, again based on 1974 traffic.

4.13.2 The cost of maintenance dredging only once per year is $1,195,000; the cost including dredging of rapidly shoaling areas twice yearly is $1,504,000 per year. This rough estimate yields B/C ratios of 1.93 and 2.05, respectively.

4.14 Mosquitoes. The use of diked disposal areas to avoid adverse effects on estuarine values has an adverse effect in that diking in the coastal zone creates ideal habitat for the salt marsh mosquito. Because of the present impracticality of natural control techniques in these disposal areas, mosquito control requires frequent inspection and spraying. The most commonly used insecticide is Flit M.L.O. which dissipates quickly and has little adverse side effects, but the necessity of frequent treatment of disposal areas is expensive. The Federal responsibility in this project does not include mosquito control, which is the responsibility of the State of South Carolina as the sponsor of the Georgetown Harbor Navigation Project.

4.15 Mitigation. In an attempt to mitigate the loss of some fish and wildlife habitat which may occur from the disposal of dredged material, a marsh building field trial was attempted adjacent to Middle Ground in Winyah Bay. During the 1974 maintenance dredging, 165,000 C.Y. of material were deposited in an area of approximately 16 acres in an attempt to create an artificial marsh. In 1975, 440,000 C.Y. were added. Some area has been filled to an elevation suitable for the establishment of marsh grasses during this initial trial. It is anticipated that this area, as well as possibly other suitable sites, may be used during future maintenance dredging operations. When marsh grasses become established on these areas, they will contribute to the total productivity of the Georgetown Harbor estuary.

5.0 Any Probable Adverse Environmental Effects Which Cannot Be Avoided

5.01 A detailed discussion of all environmental impacts expected to result from the project is contained in Section 4.0. Some of these impacts are considered unfavorable, but cannot be avoided by any practical means within the authority and scope of the proposed project.

5.02 The principal adverse impact will be related to temporary changes in water quality and its effect on the harbor and disposal areas ecosystems. These effects include: increased turbidities and siltation in the vicinity of the dredge and disposal areas; a temporary decrease in primary productivity resulting from turbid waters reducing the euphotic zone; a possible loss of organisms through the leaching of toxic substances from the disposal areas; and a possible reduction in dissolved oxygen levels as a result of the dredge disturbing organic materials undergoing anaerobic decomposition.

5.03 In addition, some benthic organisms may be destroyed by the dredge cutterhead and others may be covered in the offshore disposal area. Vegetation and wildlife species inhabiting the diked or upland disposal areas will be displaced by deposition of dredged materials. Although the grasses on the disposal area seem to be relatively unaffected by the dredged material, some of the woody vegetation may be killed. Regrowth usually begins soon after dredging is completed. Diking in the coastal area creates ideal mosquito habitat, so diked disposal areas must be sprayed frequently.

6.0 Alternatives To The Proposed Action

6.01 Dredging alternatives.

6.01.1 Dredging and conveyance of material to an offshore disposal area by hopper dredge. The use of a hopper dredge throughout the Georgetown Harbor area is impractical because of restricted channel widths and sharp turns in the harbor proper and the higher costs of such an operation. The environmental impacts of this plan on the offshore dumping area would be similar to the impacts discussed in Section 4.0. The use of hopper dredges in the outer part of Georgetown Harbor and the dumping of shoal material in an offshore dumping area has not been found to have significant adverse effect on the dumping area. The use of hopper dredges throughout the harbor area would require that a much greater volume of material be dumped in the ocean. Based on observations of similar operations, it is not believed that the greater volume of material would result in significant adverse effects on ocean bottoms.

6.02 Relocation of disposal areas.

6.02.1 Alternate upland sites. Alternate upland disposal areas will be used when existing areas are used to their capacity. The project sponsor, the State of South Carolina, is responsible for providing disposal areas. Since all designated disposal areas have already been used, the major environmental impacts associated with their continued use have also already occurred. The overall

environmental impact of the project is less if these designated disposal areas are used to their capacity before new areas are selected than if further use of existing disposal areas was discontinued and new disposal areas acquired.

6.02.2 Use of all the dredged material in a marsh building program. This alternative method of disposal is still in the experimental stage at this time. Under the proper conditions, this could be a highly desirable method for the disposal of dredged material, and it will continue to be used and evaluated on a trial basis with consideration and limitations expressed in Section 1.04.

6.03 No action. This alternative would involve discontinuation of maintenance dredging in Georgetown Harbor. Siltation would then continue until the harbor would be too shallow to accommodate ships which now utilize the harbor. This alternative would forego the economic benefits derived from shipping and industrial development which is essential to local and regional growth and prosperity. All adverse effects of dredging would be prevented.

7.0 The Relationship Between Local Short-Term Uses of Man's Environment And The Maintenance And Enhancement of Long-Term Productivity

7.01.1 A major long-term effect of continued maintenance of Georgetown Harbor relates to its stimulus of the local and regional economy. The continued maintenance would permit the continued use of the harbor by ships which otherwise would have to go to other ports and which supply the local and regional industries with goods and a means of transporting their products.

7.01.2 The disposal of dredged material on upland sites would temporarily alter the area and reduce the biological productivity. Long-term effects are considerably less than continued use of marshlands, and may aid productivity.

7.01.3 The formation of marsh would enhance the productivity of marshlands at the expense of some loss of open water and bottom. Efforts to maximize benefits are described in Section 1.04 and 1.05.

7.02 The principal short-term effect of the project relates to the actual maintenance dredging of Georgetown Harbor by hydraulic dredge and the disposal of the material so dredged in upland and offshore disposal areas. Since the dredging involves the removal of recently deposited and unconsolidated fine sediments having little utility to any important life forms, the maintenance of the harbor would not conflict with other long-term uses. The action of the cutterhead dredge would have temporary and localized effects on water quality which are not considered to be of a magnitude to affect long-term productivity. The use of the upland disposal areas would cause a temporary and localized change in water quality from the effluent coming from these areas.

7.03 The disposal of the material in the offshore areas has little potential for affecting any long-term uses. All EPA regulations for open water disposal of dredged material will be followed. The use of other upland disposal areas would result in long-term losses of natural areas and the utility these areas may have for wildlife. However, no areas that are unique or have outstanding value in any particular resource will be used for the disposal of dredged material.

8.0 Any Irreversible And Irretrievable Commitmemts Of Resources Which Would Be Involved In The Proposed Action Should It Be Implemented

8.01 The project will not cause any known significant curtailment of the diversity and range of beneficial uses of the local environment. Certain resource commitments will be required for the disposal of material dredged from the harbor. Upland disposal areas will undergo a change from a vegetated condition to a non-vegetated state which will persist during the period they are used for disposal of dredged material. When used to capacity, these disposal areas will go through a vegetative succession beginning with grasses and herbs and ending with tree growth that will probably consist of pine and mixed hardwoods. There would be no permanent commitment of resources in the offshore disposal area.

8.02 The proposed project will involve a total commitment of the gasoline and oil required for dredge operations.

9.0 Coordination and Comment and Response

9.01 A draft EIS was distributed for review on 23 May 1975. All letters of comments are attached to this EIS. A circled number follows each comment which requires a response. A corresponding number was assigned to the appropriate response. Responses to these letters of comment are contained in the following two sections.

9.02 Government Agencies

U. S. Environmental Protection Agency

(1) We acknowledge EPA's choice of offshore disposal sites as the most desirable method for disposal of dredged material from Georgetown Harbor. We have added to the list of alternate plans of disposal a method for barging spoil from the inner harbor (Section 1.05). In addition to the discussions which were contained in the Draft EIS on offshore disposal, revisions pertinent to this plan have been made in Sections 1.06.3, 1.06.4, 2.02.4, 4.01, 4.02.1.1 and elsewhere throughout the Final EIS.

(2) See revisions to Sections 1.04, 1.06.3, 1.06.4, 6.02.2 and 7.01.3.

U. S. Department of Commerce

(1) See revisions to Sections 1.06, 1.06.1, 1.06.2, 1.06.3 and 1.06.4.

(2) The proposed project involves only maintenance dredging of the existing channel. No survey monuments or tidal bench marks should be disturbed.

U. S. Department of the Interior

(1) See revisions to Sections 1.03 and 1.04. The uncertainty as to whether dredging in areas of rapid shoaling will be yearly or twice yearly is due to the local sponsor not having provided the additional 400 acres necessary for disposal of dredged material. The Corps of Engineers has approved this work and will implement it if the required 400 acres are provided.

(2) A fringe of vegetation exists between the river and the dikes of both areas. The width of fringe varies roughly between 20 and 50 feet. The scale of Plate 1 obviously make precise graphical representation of this distance impossible. The area of fringe vegetation is not of significant size, and, though containing some original vegetation, is modified by construction and dredged materials.

(3) The map referred to in Appendix A serves only to locate sediment sample sites and is deliberately kept simple for this purpose. An insert, however, clearly shows the location of disposal areas. These areas, as noted, have already been described as containing no marsh.

(4) See revision to Section 2.01.

(5) See revision to Section 2.06.7, 2.06.7.1, and 2.06.7.2.

(6) See addition to Section 4.09. As stated in this section, no further use of marsh is anticipated after the filling of sites now in use. The interagency approach to selection of disposal sites should prevent the selection of any upland sites on Bellefield Plantation or other areas which are used for biological research purposes or wildlife sanctuaries.

U. S. Department of Agriculture, Forest Service

(1) See revisions to Sections 1.03, 1.04, 1.05, 1.06, 1.06.1, 1.06.2, 1.06.3 and 1.06.4

S. C. Department of Health and Environmental Control

(1) Investigations published July, 1973 by the Department of Geology, University of South Carolina show no permanent freshwater influx into North Inlet. Flow of water from Winyah Bay into North Inlet takes

place only under a combination of unusual runoff and wind conditions. No increased turbidity and siltation from the project can be expected in North Inlet.

S. C. State Clearinghouse

(1) See revision to Section 2.06.1.2.

(2) See revision to Section 2.06.3.1.

(3) The addition of Table 1 indicates the catch of shad and sturgeon.

(4) See revisions to Sections 2.02.4, 4.02.1.1, 4.02.6, 5.02 and 7.03. As stated, elutriate tests will be conducted before the next dredging operation, and all EPA regulations for open water disposal of spoil will be followed. Further, studies by Skidaway Institute of Oceanography and more recent work at Texas A&M University indicates little or no relationship between the bulk heavy metal content of a sediment and its impact on water quality during dredging and disposal.

(5) In response to this and other comments as to the value of such extensive biotic lists, Appendix B has been deleted. Descriptions of the more common and important species of flora and fauna can be found in Section 2.06.

(6) See revisions to Sections 1.04, 1.06.3, 1.06.4, 6.02.2 and 7.01.3.

References

1. South Carolina Water Resources Commission, 1970. South Carolina Tidelands Report. Columbia. 178 pp.

2. Anonymous. Threatened Wildlife of the United States, USDI, Bur. Sport Fisheries and Wildlife, Commission of Rare and Endangered Species, Res. Pub. No. 114, 1973.

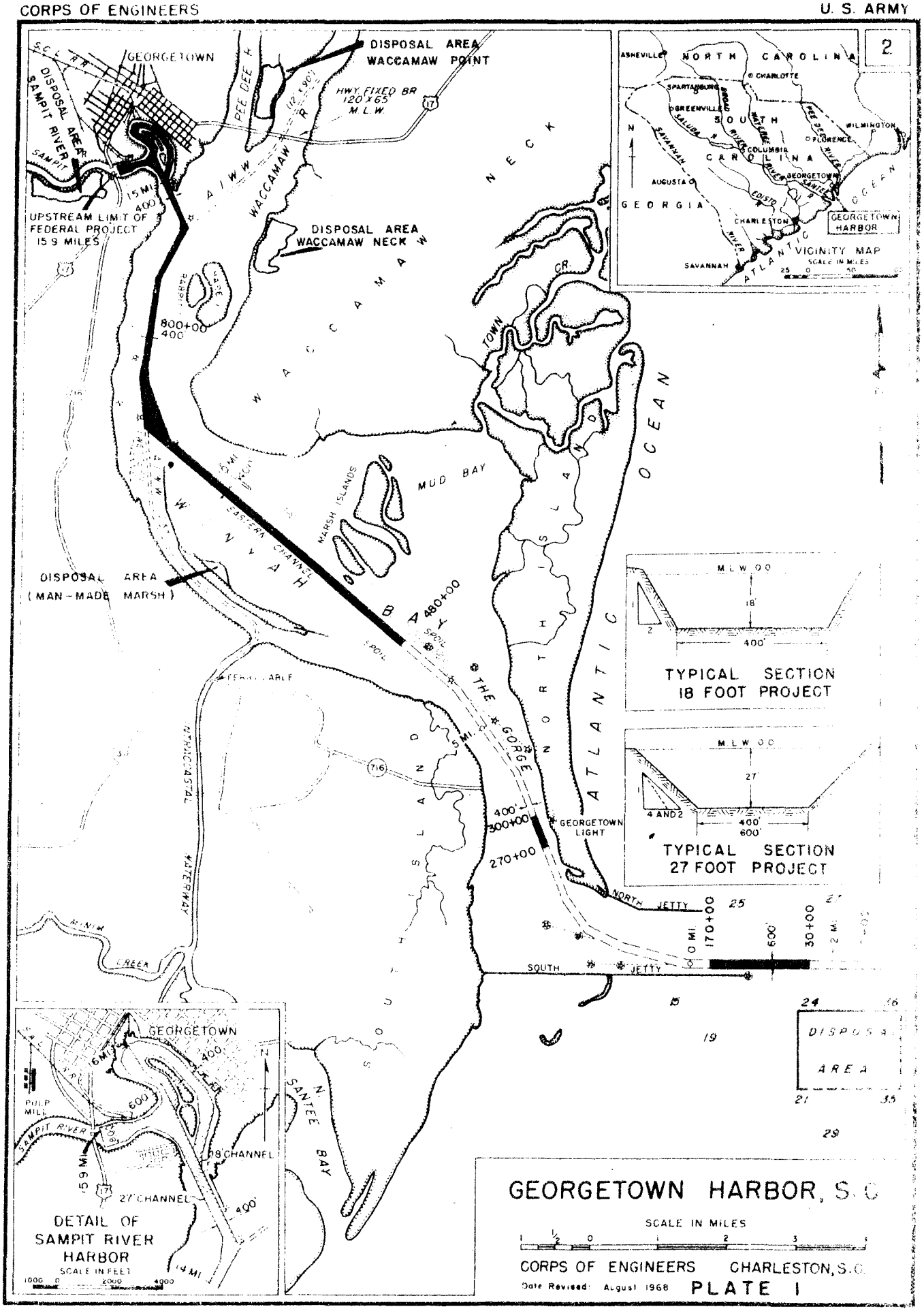
3. Anonymous. 1972. Stream classification for the State of South Carolina. South Carolina Pollution Control Authority.

4. Sherk, J. Albert, Jr. 1971. The effects of suspended and deposited sediments of estuarine organisms. Chesapeake Biol. Lab. Contrib. 443, 73 p.

5. Belle W. Baruch Coastal Research Institute, 1973. Bioassay studies, Charleston Harbor, South Carolina, the effects of dredging harbor sediments on plankton. Final report submitted to the United States Army Corps of Engineers, Charleston District. University of South Carolina, Columbia. Contract No. DACW 60-71-C-0009, April, 1973.

CORPS OF ENGINEERS

U. S. ARMY



GEORGETOWN HARBOR, S. C.

SCALE IN MILES

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CORPS OF ENGINEERS CHARLESTON, S.C.

Date Revised: August 1968 PLATE 1

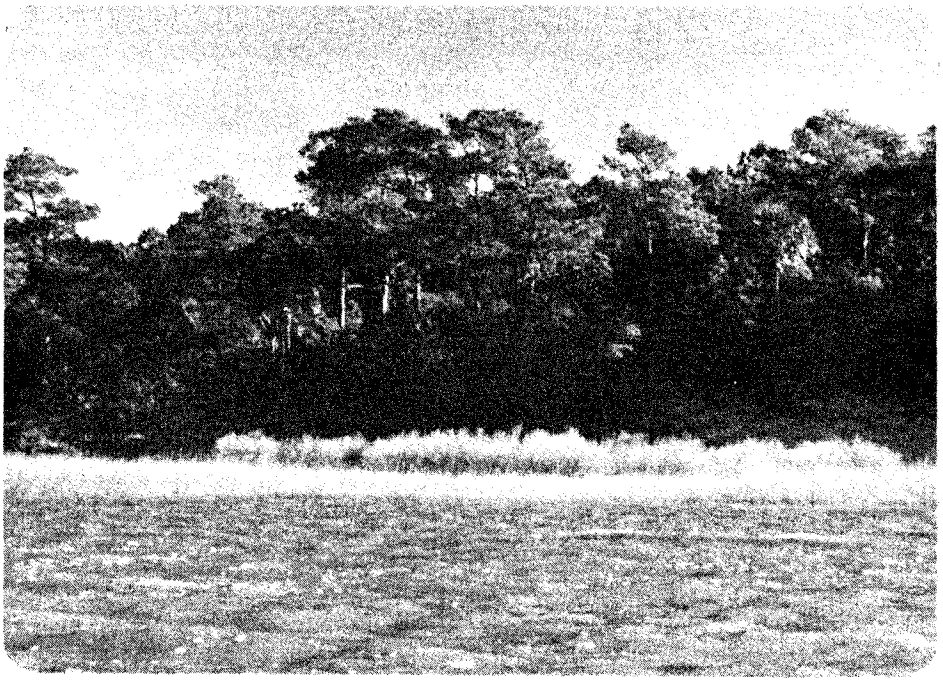


Plate 1A. Oak-pine forest, dominated by pine on North Island adjacent to Winyah Bay (foreground). Note low marsh and high marsh vegetation in the narrow fringe between open water and forest.

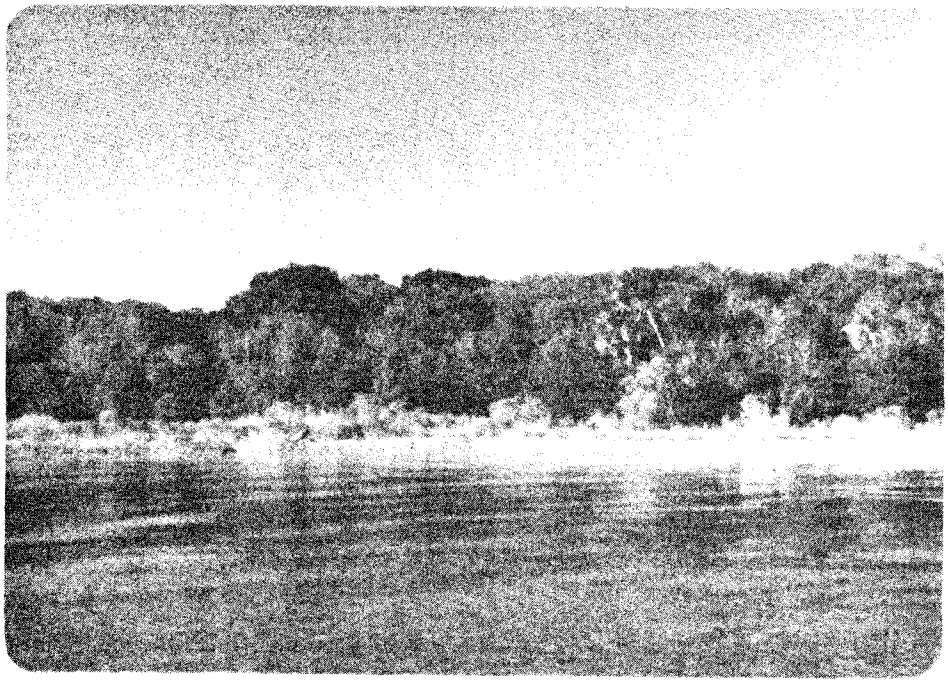


Plate 1B. Oak-pine forest, dominated by live oak, palm, and magnolia on South Island.

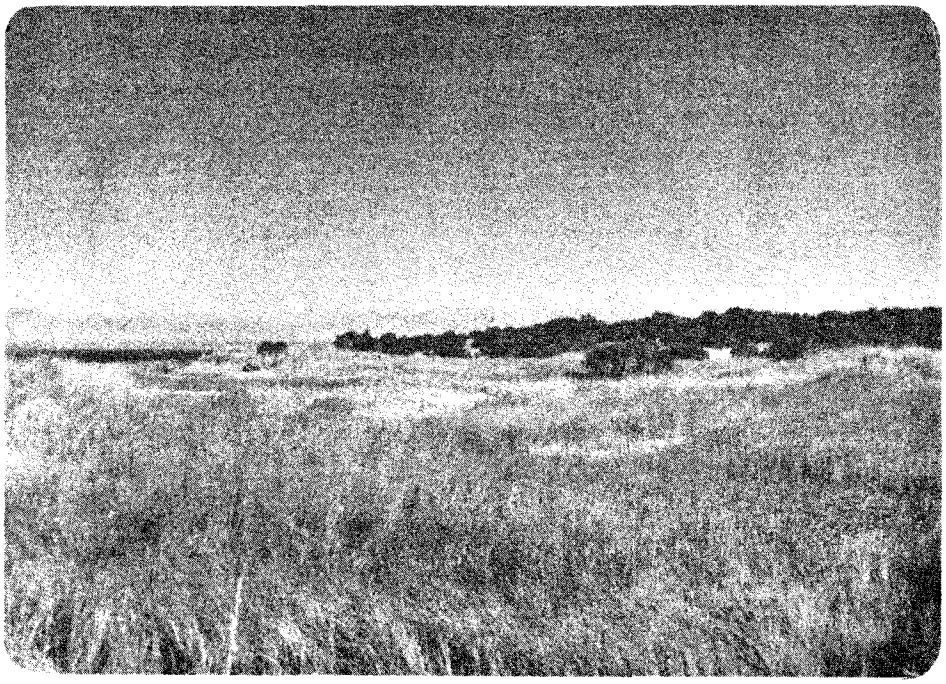


Plate 2A. North Island beach and dune community in foreground, oak-pine forest in background, and water-vapor-smoke cloud from a Georgetown paper mill on distant horizon.

Plate 2B. Low marsh, left, formed after rock jetty was constructed at the mouth of Winyah Bay, right. Oak-pine forest is seen in background on South Island.

Plate 3A. High marsh, foreground, low marsh, center, and oak-pine forest in distant background. The view is toward the west of Cat Island.

Plate 3B. Difficulty with community delineation is shown in this view of Cat Island marsh - Salt flat, foreground; high marsh, right center, and low marsh left center blend into one community.

APPENDIX A

Letters of Comment

on Draft EIS

APPENDIX A

LETTERS OF COMMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

July 21, 1975

Colonel Harry S. Wilson, Jr., USA
Corps of Engineers, District Engineer
Charleston District
P. O. Box 919
Charleston, South Carolina 20402

Dear Colonel Wilson:

We have reviewed the Georgetown Harbor Maintenance Dredging in Georgetown County, South Carolina, and find that to the extent possible, dredging and conveyance of material to the offshore disposal area is most desirable. Precautions to control erosion (1) and water pollution should be identified.

Furthermore, it is noted that the capacities of the spoil sites are limited and in the future new sites must be acquired. In order that pressure is taken off of filling additional marsh area, we believe that the long-range plans should include ocean disposal of more material from the inner channel. (1) The formation of marsh islands is acceptable from an environmental standpoint, but their capacity for spoil is limited. (2) The use of self-propelled shallow draft barges in conjunction with hydraulic dredge and ocean disposal should be investigated. (1)

In view of the foregoing, we have assigned a rating of LO- (lack of objection) to the proposed action and 1 (adequate) to the impact statement.

If we can be of further assistance, please let us know.

Sincerely,

David R. Hopkins
Chief, EIS Branch

A-1

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230

July 21, 1975

Colonel Harry S. Wilson, Jr.
District Engineer - Charleston District
Corps of Engineers
U. S. Department of the Army
P. O. Box 919
Charleston, S. C. 29402

Dear Colonel Wilson:

The draft environmental impact statement "Maintenance Dredging of Georgetown Harbor, Georgetown County, South Carolina," which accompanied your letter of May 23, 1975, has been received by the Department of Commerce for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

The proposal does not commit the Corps to avoid estuarine, wetland, or marsh areas as spoil disposal sites. A clear commitment for this policy, which is in keeping with the Corps guidelines, would help allay misgivings about the proposal and should be included. (1)

Geodetic control survey monuments and tidal bench marks are located in the immediate vicinity of the proposed project area. If there is any planned activity which will disturb or destroy these monuments, National Ocean Survey (NOS) requires not less than 90 days notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project include the cost of any relocation required for NOS monuments. (2)

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving eight copies of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

United States Department of the Interior

OFFICE OF THE SECRETARY

Southeast Region / 148 Cain St., N.E. / Atlanta, Ga. 30303

ER-75/494

July 24, 1975

District Engineer
U.S. Army Corps of Engineers
Post Office Box 919
Charleston, South Carolina 29402

Dear Sir:

As requested in your May 23, 1975, letter we have reviewed the draft environmental statement for the proposed maintenance dredging of Georgetown Harbor project for project effects on national park areas and historic sites, outdoor recreation, hydrology, geology, and fish and wildlife resources.

We offer the following comments for your consideration:

General Comments

Information has not been found in the environmental statement on either the approximate volume of sediment to be dredged or on the physical properties of the sediment. The only indications of probable volumes are the dimensions of channels to be maintained and the acreage of disposal areas required. However, this information is incomplete because of several uncertain aspects of the proposed action, including: (1) uncertainty as to whether dredging would be to depths of 31 feet in certain areas of rapid shoaling (p. 2, paragraph 1); (2) uncertainty as to availability of funds and of 400 acres of new disposal areas required for the deeper dredging that has been proposed; and (3) uncertainty as to the extent of artificial marsh creation that would be attempted during future maintenance dredging operations (p. 43, paragraph 2). (1)

Disposal areas A and B, situated on Waccamaw Neck and Waccamaw Point, extend to the water's edge as delineated on the largest-scale map (inset in upper right of map in App. A). The more generalized map of disposal areas (Plate 1) shows them confined within perimeter dikes that appear to be situated about 100 yards inland, on the average. Although the perimeter dikes have been discussed briefly in the text, their location with respect to the shoreline does not appear to have been mentioned. (2)

Since it has been stated that the former marsh has already been destroyed within the three diked land disposal areas, the distribution of marsh as shown on the map in Appendix A should be corrected accordingly. (3)

Specific Comments

Page 3, Paragraph 2.01

Pumpkinseed Island is a wading bird rookery, located in Mud Bay and is less than 2 miles from Station 480+00 off the channel. This rookery is long established and supports approximately 8,000 pairs of nesting egrets, herons, and ibis. Pumpkinseed Island is not shown on the Plate 1 Map and although it is referred to once in this section no mention is made of its significance as a rookery. This should be addressed in the final environmental statement. (4)

Page 24, Birds

The bald eagle is listed improperly with the threatened species on page 24. This should be corrected and shown in the final statement under rare and endangered species, paragraph 2.06.7 The draft statement does not show that there are three active eagle nests within 5 miles of the project; two on South Island and one on North Island. This inadequacy should be addressed in the final statement. (5)

Page 41, Paragraph 4.09

Pursuant to the authority contained in the Act of August 21, 1935 (49 Stat. 666, 16 U.S.C. 461) the National Park Service, U.S. Department of the Interior, is administering and implementing a natural areas program, including the National Registry of Natural Landmarks. All Federal agencies should take cognizance of the sites included in the National Registry of Natural Landmarks. We are enclosing a Natural Landmark brief on the Bellefield Plantation, Georgetown County, which has been determined eligible for inclusion in the National Registry of Natural Landmarks. We suggest that this section be expanded to include a discussion of any impact the proposed action will have on the Bellefield Plantation. (6)

We hope these comments will be useful in preparing the final statement.

Sincerely yours,

(Miss) Jane Whelan
Special Assistant to the Secretary
Southeast Region

Enclosure

PRIORITY RATING: P = 2

NAME OF SITE: BELLEFIELD PLANTATION (Belle W. Baruch Research Foundation)

ONE-LINE DESCRIPTION: One of the very few relatively undisturbed and unpolluted estuaries and marshlands on east coast.

THEME/SUBTHEME CLASSIFICATION: 8, 24, 29, 30/A, M, Nd

LOCATION: Georgetown County, SOUTH CAROLINA

LATITUDE - LONGITUDE: 33° 20' North/ 79° 10' West
Georgetown, SC 1:250,000

USGS QUADRANGLE REFERENCE:

SIZE: 17,500 acres

OWNERSHIP: Private foundation-Belle W. Baruch Research Foundation. University of South Carolina has responsibility of marshland management except S.E. portion of East marsh owned by Mr. T. F. Yawkey.

ADMINISTERING AGENCY:

CURRENT LAND USE: Management of forests, marshlands, research on ecology, oyster fishery. New permanent lab facility (5,000 sq.ft.) at Oyster Landing.

DANGERS TO AREA OR VULNERABILITY:

Immediate landowner to north wants to develop land for exclusive homes and marinas. If permitted to dredge, this could have adverse effects on what is now a pristine estuary.

SENSITIVITY OF AREA: None

SIGNIFICANCE OF AREA:

Former property of Mr. Bernard Baruch. The North Inlet estuary and adjacent salt marshlands are an ideal location for an estuarine sanctuary. The Foundation is dedicated to conservation, marine biology, and forestry. Estuary is quite unpolluted and undisturbed.

PHYSICAL CHARACTERISTICS:

Estuary fringes Waccamaw Neck, including marsh facing Winyah Bay and Rabbit and Hare Islands. Depth variable with tidal stages from few centimeters to 7 meters.

OUTSTANDING GEOLOGICAL FEATURES:

Holocene sediments of silt, clay, fine sand and organic debris overlaying Pleistocene sediments.

ECOLOGICAL DESCRIPTION:

There are four major marsh areas: East Marsh (approx. 7432 hectares); Polyhaline-mesohaline tidal salt marsh bounded on the west by Waccamaw Neck and Winyah Bay, to the east by Debidue Beach, the Atlantic Ocean and North Island, to the north by the Baruch Foundation property line (approx. 33° 21' North lat.), to the south by North Island. West Marsh (approx. 787 hectares); Oligohaline-mesohaline tidal salt marsh bounded on the west by Winyah Bay, to the east and south by Waccamaw Neck to the north by U.S. 17. South Marsh (approx. 509 hectares); Mesohaline salt marsh bounded on the west, north and east by Waccamaw Neck, on the south by Winyah Bay. Rabbit and Hare Islands (approx. 135 Hectares); Oligohaline-mesohaline tidal salt marsh surrounded by Winyah Bay.

DOMINANT SPECIES OF PLANTS: Not Known

DOMINANT SPECIES OF WILDLIFE: Not Known

RARE OR ENDANGERED SPECIES OF PLANTS OR WILDLIFE: Not Known

SCIENTIFIC REFERENCES ON AREA:

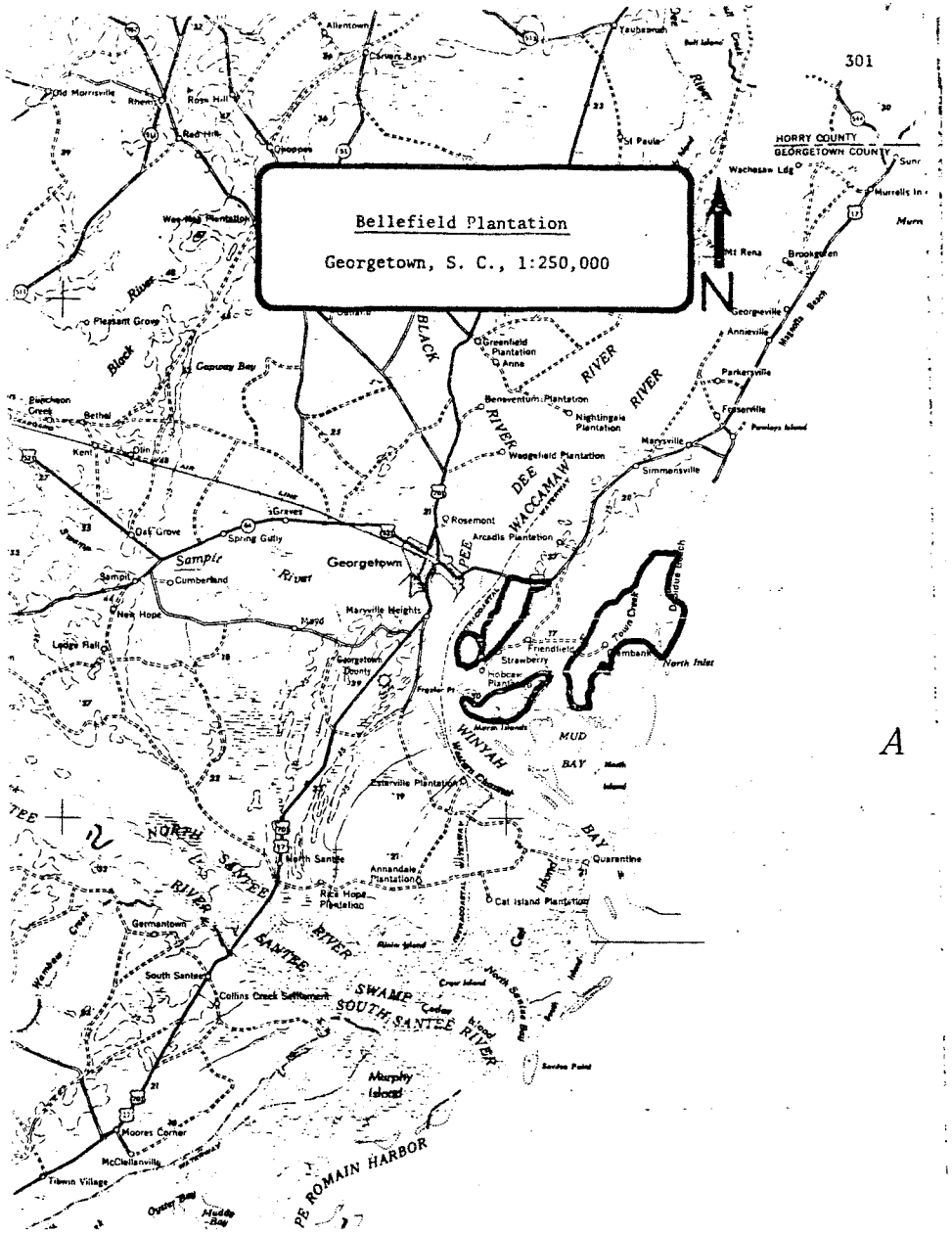
At least 30+ publications on area available from Belle W. Baruch, Coastal Research Institute, University of South Carolina, Columbia, South Carolina.

CONTACTS KNOWLEDGEABLE ABOUT AREA:

Dr. F. John Vernberg, Director, Belle W. Baruch Institute for Marine Biology and Coastal Research Institute, University of South Carolina, Columbia, South Caroline 29208 (803) 775-5288 or 777-5289.

RECOMMENDATION:

Recommended as potential Natural Landmark, however, more information is needed.



A-4

A

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Southeastern Area, State and Private Forestry
1720 Peachtree Road, N.W.
Atlanta, Georgia 30309

July 15, 1975

Col. Harry S. Wilson, Jr.
Corps of Engineers
Charleston District
P. O. Box 919
Charleston, S. C. 29402

Dear Col. Wilson:

Here are U. S. Forest Service, State and Private Forestry comments on the draft environmental statement covering Maintenance Dredging of Georgetown Harbor, South Carolina."

As the Sampit River disposal area will be filled in 1976, the replacement disposal site for this section of the harbor should be designated and the environmental impacts evaluated as a part of this statement.

We also recommend that the statement contain an assessment of potential harbor disposal sites including but not limited to availability, acreage, locations, archeological and historical resources, measures required to stabilize filled sites and the conformance of filled areas to local land use plans. (1)

Thank you for the opportunity to review and comment on this draft environmental impact statement.

Sincerely,

For PAUL E. BUFFAM
Area Environmental Coordinator

6200 - 11b (4/74)

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
COMMANDER (mep)
Seventh Coast Guard District
51 S.W. 1st Avenue
Miami, Fla. 33130
Phone: (305) 350 5276

5922/19
30 June 1975

Colonel H. S. Wilson Jr.
District Engineer
Department of the Army
Charleston District, Corps of Engineers
P. O. Box 919
Charleston, SC 29402

Re: Draft EIS for the Maintenance Dredging of Georgetown Harbor, South Carolina

Dear Sir:

As requested in your letter of 23 May 1975, the referenced Draft EIS has been reviewed by this office and no conflicts within Coast Guard mission areas were noted.

Sincerely,

W. A. MONTGOMERY
Captain, U. S. Coast Guard
Chief, Marine Safety Division
By direction of the District Commander

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION IV
50 7TH STREET, N.E.
ATLANTA, GEORGIA 30323

July 16, 1975

OFFICE OF THE
REGIONAL DIRECTOR

HEW-5296-75

Harry S. Wilson
Colonel, Corps of Engineers
Department of the Army
Charleston District Corps of Engineers
P. O. Box 919
Charleston, S.C. 29402

Georgetown Harbor

Dear Mr. Wilson:

We have reviewed the subject draft Environmental Impact Statement. Based upon the data contained in the draft, it is our opinion that the proposed action will have only a minor impact upon the human environment within the scope of this Department's review. The impact statements have been adequately addressed for our comments.

We appreciate the opportunity to review this impact statement.

Sincerely yours,

Philip P. Sayre
Regional Environmental Officer
DHEW - Region IV

FEDERAL POWER COMMISSION
REGIONAL OFFICE
730 Peachtree Building
Atlanta, Georgia 30308
June 6, 1975

District Engineer
Corps of Engineers
Department of the Army
Post Office Box 919
Charleston, S. C. 29402

Dear Sir:

We have reviewed your draft environmental impact statement for the maintenance dredging of Georgetown Harbor, Georgetown County, South Carolina, your file SANGR, which was received with your letter of May 23, 1975.

The Commission's responsibilities relate to the construction and operation of natural gas pipelines under the Natural Gas Act, and the reliability and adequacy of electric service and the development of hydroelectric power under the Federal Power Act.

In reviewing this plan we noted nothing that should interfere with any licensed hydroelectric project under the Commission's jurisdiction.

We appreciate the opportunity to comment on this proposed project.

Very truly yours,

C. L. Fishburne

C. L. Fishburne
Regional Engineer

2cc: Div. Engr.
Atlanta, Ga.

A-6

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
2001 Assembly Street, Suite 203
Columbia, South Carolina 29201

June 2, 1975

Colonel Harry S. Wilson, Jr.
Corps of Engineers
District Engineer
Post Office Box 919
Charleston, South Carolina 29402

Dear Colonel Wilson:

Thank you for giving this agency the opportunity to review the draft environmental statement for maintenance dredging of Georgetown Harbor, Georgetown County, South Carolina.

We have reviewed the statement, and no conflicts within FHWA mission areas were noted.

Sincerely yours,

W. H. Rice, Jr.

W. H. Rice, Jr.
District Engineer

For W. N. Dulin
Division Engineer

AUG 1975

BOARD MEMBERS

Lachlan L. Hyatt, Chairman
William M. Wilson, Vice-Chairman
I. DeQuincey Newman, Secretary
W. A. Barnette, Jr.
Leonard W. Douglas, M.D.
J. Lorin Mason, Jr., M.D.
Caroline G. Newhall

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

E. KENNETH AYCOCK, M.D., M.P.H., COMMISSIONER
J. MARION SIMS BUILDING — 2600 BULL STREET
COLUMBIA, SOUTH CAROLINA 29201

August 6, 1975

U. S. Army Corps of Engineers
Post Office Box 919
Charleston, South Carolina 29402

Gentlemen:

I have reviewed the draft environmental statement pertaining to maintenance dredging of Georgetown Harbor, South Carolina, and believe that further consideration should be given to the possible impact of such activities upon the North Inlet Estuary. Current research indicates that there is an interchange of waters between the two estuaries, particularly during periods of increased fresh water inflow. Thus, increased turbidities and siltation resulting from dredging operations within the Middle Ground area of Winyah Bay could adversely affect oysters and clams indigenous to the North Inlet Estuary. (1)

The feasibility of pumping dredge spoils from inner harbor areas to barges for conveyance to offshore disposal sites (assuming these spoils to be suitable for open water disposal) should also be addressed. Utilization of this procedure would eliminate the requirement for condemnation of upland disposal areas upon expenditure of available lowland sites. (2)

Sincerely yours,

Chester E. Sansbury
Manager, Environmental Analysis
Programs Section
Programs Development Division
Bureau of Wastewater & Stream Quality
Control

CES:CBS:bc

A-7

State of South Carolina

Office of the Governor

JAMES B. EDWARDS
GOVERNOR

DIVISION OF ADMINISTRATION
Edgar A. Brown Building
Columbia, South Carolina 29201

July 10, 1975

Mr. Harry S. Wilson, Jr.
Department of the Army
Charleston District, Corps of Engineers
P. O. Box 919
Charleston, S. C. 29402

Dear Sir:

The State Clearinghouse has completed its review of the draft environmental impact statement for the maintenance dredging of Georgetown Harbor. Enclosed are comments made by the South Carolina Wildlife and Marine Resources Department and the State Archeologist.

Thank you for the opportunity to review the statement. If I can be of any further assistance please let me know.

Sincerely,

Elmer C. Whitten, Jr. (a.s.)

Elmer C. Whitten, Jr.
State Clearinghouse

/cs

Enclosures

South Carolina
Project Notification & Review System

PROJECT NOTIFICATION REFERRAL

STATE APPLICATION IDENTIFIER

Clearinghouse Use Only
CONTROL NUMBER
DIST. NO. FY
08 2003 5

SUSPENSE DATE
6/20

TO:

Wildlife and Marine Resources
P. O. Box 167
Columbia, SC 29202

RECEIVED
MAY 29 1975
S. C. WILDLIFE & MARINE RESOURCES DEPARTMENT

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This System coordinates the review of proposed Federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. All comments will be reviewed and compiled by the State Clearinghouse. Any questions may be directed to this office by phone at 758-2946. Please return this form prior to the above suspense date to:

State Clearinghouse
Division of Administration
1205 Pendleton Street
Columbia, South Carolina 29201

Signature_____

Name Elmer C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

RECEIVED
JUN 09 1975
DIVISION OF ADMINISTRATION

☐ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES

☐ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS

☒ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

The following comments are with reference to the draft environmental statement for maintenance dredging of Georgetown Harbor, prepared by the U. S. Army Corps of Engineer.

(1) In the section on Biological Resources 2.06.12, eelgrass is mentioned as being found in the area, which is not to our knowledge factual. Sea lettuce (Ulva sp.) a common form is not mentioned. (1)

(2) On page 15, no mention is made of big cordgrass (Spartina cynosuroides), one of the dominant plant species in the area. (2)

(3) Under commercial and sport fisheries section 2.06.1.4, no mention is made of gill netting for shad and sturgeon. (3)

(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY:
SIGNATURE: [signature] DATE: June 6, 1975
TITLE: EXECUTIVE DIRECTOR PHONE: 758-6536

DOA Form 7 (4/15/74)

A-8

(4) The effects of toxic materials and metals on estuarine productivity as stated in 4.02.1.1 on page 30 seems over-simplified. High concentration of metals and other pollutants are present in the sediments in some areas of Winyah Bay, and the long term effects of continuous resuspension of such materials on estuarine organisms is probably not known. (4)

(5) In Appendix B, a number of important estuarine species are not included, such as the hooked mussel, Carolina marsh clam, squid, common killifish, silversides, etc. while some species rarely found in the area (slippery dick, electric ray) or only well offshore (wahoo, blue shark, skipjack tuna) are listed. American eel and hogchoker are listed twice. (5)

The biotic list presented for fishes is not well organized in a systematic manner, and freshwater species are intermixed with saltwater species. (5)

The value of extensive biotic lists such as those presented in Appendix B is questionable. If included at all, such "inventories" should be limited to more common and important species of flora and fauna occurring in the project vicinity. (5)

(6) On pages 45, 46, 6.02.2, the alternative of using all dredged material for marsh building is discussed. While limited disposal of this type may be desirable, it should be pointed out that extensive marsh building can result in the loss of open water shoal habitat. South Carolina presently has a marsh/shoal water area ratio of about 2:1, and although marshes are very valuable in terms of productivity, open waters, bottoms, and mud flats are significant estuarine resources also. (6)

(7) Although EPA bottom sediment sample analysis data is included in tabular form, no disucssion as to the significance of this information is presented, insofar as open water spoil disposal, both offshore and within Winyah Bay (marsh creation, etc.). (4)

It is encouraging to not that plans call for upland disposal areas to be used for future disposal of dredged materials from the inner harbor when present disposal areas have been fully utilized (P. 28, 4.01.1). Upland disposal of dredged material on cleared land or pine forest would be preferable to mixed pine-hardwood areas, as indicated. The statement on P. 48, 7.03 that no areas have unique or outstanding value in any particular resource will be used for disposal of dredged material is also to be commended.

We appreciate the opportunity to comment on the above statements and will look forward to reviewing the final EIS when available.

South Carolina
Project Notification & Review System

PROJECT NOTIFICATION REFERRAL

TO: St. Archeologist

JUL 9 1975
DIVISION OF
ADMINISTRATION

STATE APPLICATION IDENTIFIER
Clearinghouse Use Only
CONTROL NUMBER
DIST. 03 NO. 2003 FY 5
SUSPENSE DATE 6/20

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This System coordinates the review of proposed Federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. All comments will be reviewed and compiled by the State Clearinghouse. Any questions may be directed to this office by phone at 758-2946. Please return this form prior to the above suspense date to:

State Clearinghouse
Division of Administration
1205 Pendleton Street
Columbia, South Carolina 29201

Signature ______________________

Name Elmer C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

☐ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES

☐ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS

☒ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

The Institute of Archeology and Anthropology, University of South Carolina, has not made a thorough archeological examination of this project area. A careful search of Institute files reveals no archeological or historical sites presently on record, but this reflects no more than that an on-the-ground search has not been made.

The size and general nature of the affected area suggest that the probability of archeological or historical sites in the area is very limited or that if sites were there that they have already been disturbed to such extent that this project will not damage them further.

The Institute requests that, if any antiquities such as prehistoric or historic artifacts, building foundations, or other evidence of archeological remains are discovered during construction, the Institute be notified immediately so that a record can be made. This will be done in such a manner as not to jeopardize the project construction schedule.

The South Carolina Department of Archives and History should be consulted as to the potential locations of historic buildings in the project area.

(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY:
SIGNATURE: [signature] DATE: July 7, 1975

TITLE: Director and State Archeologist PHONE: 777-8170

DOA Form 7 (4/15/74)

Wm. Jennings Bryan Dorn

July 2, 1975

Colonel Harry S. Wilson, Jr.
District Engineer
Corps of Engineers
P. O. Box 919
Charleston, S. C. 29402

Dear Colonel Wilson:

Many thanks for sending me the copy of the impact environmental statement of the Corps of Engineers for the maintenance dredging of Georgetown Harbor.

This is an outstanding statement. It is very timely and outlines perfectly the needs in Georgetown Harbor. I appreciate and endorse the conclusions reached by the Corps concerning this important project.

With warmest personal regards and high esteem, I am

Sincerely,

Wm. J. Bryan Dorn

Wm. Jennings Bryan Dorn

D/j

BARRATT HOUSE GREENWOOD, SOUTH CAROLINA 29646

APPENDIX B

Bottom Sediments Analysis of

Georgetown Harbor

Georgetown Harbor

Date: August 31, 1971 **EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET #** 1 of 2

Bottom Sediments Analysis received in lab April 5, 1971

Lab No.	Sample No.	Date Sampled	Time	Radio Activity pCi/gm	% Total Volatile Solids	COD mg/g	TKN mg/g	NH_3-N mg/g	Oil & Grease mg/g	Total P mg/g	Pb µg/g	Zn µg/g	Cu µg/g	Cr µg/g	Merphos µg/kg	DEF µg/kg
				←					Dry Basis							→
71-347	EC - 1	4-1-71	1205		1.9	3.8	0.1		76.3	0.2	5	77.	4	4		
71-348	SIB - 1	"	1225		1.1	3.4	< 0.1		11.6	0.6	6	12	5	4		
71-349	RC - 1	"	1240		3.8	12	0.6		19.2	0.5	21	25	17	7		
71-350	RE - 1	"	1315		3.9	16	0.6		947	0.4	10	30	13	13		
71-351	RE - 2	"	1330		7.1	5.7	0.2	< 0.01	687	0.1	5	19	4	6		
71-352	RE -3	"	1345		7.2	55	1.2		984	0.7	13	120	12	33		
71-353	FPB - 1	"	1355		16	130	3.5	0.25	836	1.1	68	250	25	72		
71-354	RIC - 1	"	1405		14	110	2.9		807	0.3	48	220	20	65		
71-355	SPC - 1	"	1450		15	130	3.3		2110	0.5	46	130	14	71		
													.076%			
71-356	SPC - 2	4/2/71	0805		18	160	3.1		1420	0.2	40	360	760	56		
													.0065%	.011%		
71-357	NBSR - 1	"	0815		17	160	3.4		4820	1.4	1100	5100	65	110		
														.01%		
71-358	NBSR - 2	4/1/71	-		17	160	3.7		1870	1.4	900	6300	60	100		
71-359	NBSR - 3	"	1500		15	120	3.2		950	1.1	62	150	46	62		
71-360	TBSR - 1	4/2/71	0830		16	160	2.8		1720	1.3	88	310	29	96		
71-361	TBSR - 2	"	0840		2.5	34	0.1	0.04	1800	0.5	32	98	16	22		
71-362	SR - 1	"	0855		13	170	2.2		3010	0.7	55	320	62	21		
71-363	SR - 2	"	0900		4.2	43	0.9		270	< 0.1	22	45	8	21		

Georgetown Harbor
Bottom Sediments Analysis
received in lab April 5, 1971

Date August 31, 1971 EPA, REGION III, TECHNICAL SUPPORT LABORATORY DATA SHEET # 2 of 2

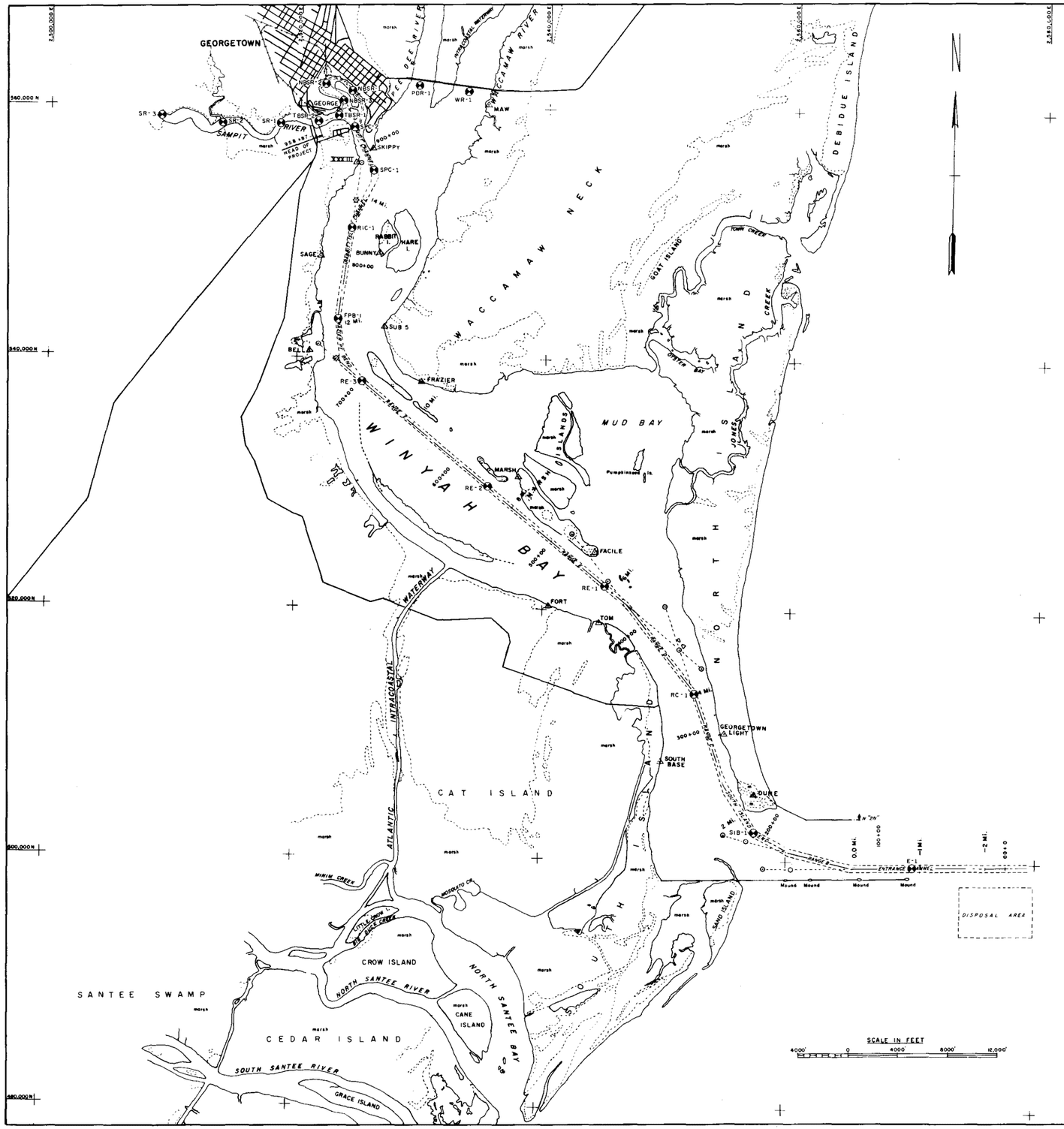
Lab No.	Sample No.	Date Sampled	Time	Radio Activity pCi/gm	% Total Volatile Solids	COD mg/g	TKN mg/g	NH_3-N mg/g	Oil & Grease mg/g	Total P mg/g	Pb µg/g	Zn µg/g	Cu µg/g	Cr µg/g	Merphos µg/kg	DEF µg/kg
				←				Dry Basis								→
71-364	SR - 3	4-2-71	0915		0.5	6.6	0.0		749	0.1	7	50	17	6		
71-365	SR - 4	"	0930		0.9	11	< 0.1		142	0.1	12	44	4	11		
71-366	PDR - 1	4/1/71	1440		0.9	9.3	0.0		188	< 0.1	21	52	6	10		
71-367	WR - 1	"	1420		0.2	1.6	0.1		244	< 0.1	8	15	3	49		

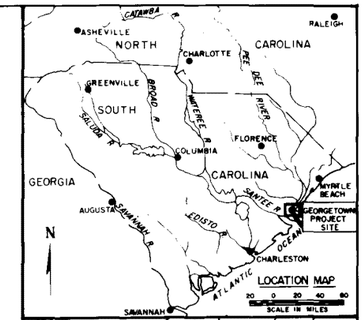
EPA Limits for Open Water Disposal

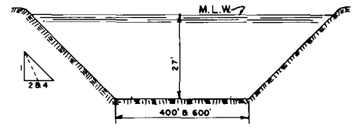
Sediments in Fresh and Marine Waters	Conc. % (dry wt. basis)
Volatile Solids	6.0
Chemical Oxygen Demand (C.O.D.)	5.0
Total Kjeldahl Nitrogen	0.10
Oil-Grease	0.15
Mercury	0.0001
Lead	0.005
Zinc	0.005

CORPS OF ENGINEERS

U. S. ARMY







TYPICAL SECTIONS

SAMPLING STATIONS

DRAWN BY	CORPS OF ENGINEERS, U.S. ARMY
CHECKED BY	OFFICE OF THE DISTRICT ENGINEER
SURVEYED BY	CHARLESTON, SOUTH CAROLINA
DATE: SUBMITTED BY	GEORGETOWN HARBOR, S.C.
DATE OF DRAWING	27 FOOT PROJECT
APPROVAL RECOMMENDED	EPA SEDIMENT SAMPLING STATIONS
APPROVED: CHIEF ENGINEERING DIVISION	CODE IDENT NO. SANGS; SIZE F; DRAWING NO.
COL. CORPS OF ENGINEERS, DISTRICT ENGINEER	SCALE: 1:40,000; SHEET 1 OF