

US EPA ARCHIVE DOCUMENT

SITE MANAGEMENT PLAN

FOR THE

BRUNSWICK HARBOR

OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS)

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SITE MANAGEMENT PLAN

TABLE OF CONTENTS

<u>ITEM</u>	<u>PAGE</u>
<u>SITE MANAGEMENT PLAN</u>	
1.00 INTRODUCTION	1
2.00 SITE MANAGEMENT AND MONITORING TEAM	1
3.00 SITE MANAGEMENT	1
3.02 Management Objectives	3
3.03 Material Volumes	3
3.05 Material suitability	4
3.08 Time of Disposal	5
3.09 Disposal Technique	5
3.12 Placement of Materials	5
3.13 Disposal Monitoring	6
4.00 SITE MONITORING	7
5.00 MODIFICATION OF THE SITE MANAGEMENT PLAN	8
 Attachment A - <u>SITE MONITORING PLAN</u>	
A.1.00 INTRODUCTION	12
A.2.00 OBJECTIVES	13
A.2.03 Responsible Party	14

TABLE OF CONTENTS
(Continued)

<u>ITEM</u>	<u>PAGE</u>	
A.3.00	MONITORING APPROACH AND RATIONALE	
A.3.01	Sediment Mapping and Site Bathymetry	14
A.3.05	Biological Impact Assessments	15
A.3.12	Disposal Plume Dispersion	17
A.3.14	Sediment Turbidity Transport Studies	17
A.4.00	CONTAMINANT STUDIES	
A.4.01	Sediment Contaminant Monitoring	19
A.4.04	Reference Site Assessment	19
A.4.08	Test Organism Assessment	20

SITE MANAGEMENT PLAN**BRUNSWICK HARBOR OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS)**

The following Site Management Plan for the Brunswick Harbor Ocean Dredged Material Disposal Site (ODMDS) has been developed and agreed to pursuant to the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, for the management and monitoring of ocean disposal activities, as resources allow, by the US Environmental Protection Agency (EPA) and the US Army Corps of Engineers (Corps).

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5/12/1999
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5/12/1999
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This plan is effective from the date of the last signature and shall be reviewed and revised as necessary.

SITE MANAGEMENT PLAN

BRUNSWICK HARBOR ODMDS

1.00 INTRODUCTION. The Environmental Protection Agency (EPA) formally designated the Brunswick Harbor Ocean Dredged Material Disposal Site (ODMDS) on January 23, 1989. The location of that site is shown in Figure 1. It is the responsibility of the EPA under the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 to manage and monitor ODMDSs designated by the EPA pursuant to Section 102 of MPRSA. As part of this responsibility, EPA/Region IV in conjunction with the Savannah District, US Army Corps of Engineers (Corps) developed a management and monitoring plan to specifically address deposition of dredged material into the Brunswick Harbor ODMDS. The non-Federal sponsor for the Brunswick Harbor Navigation Project is the Georgia Ports Authority.

2.00 SITE MANAGEMENT AND MONITORING TEAM. An interagency Site Management and Monitoring Plan (SMMP) team, consisting of representatives of EPA, Corps, Georgia Department of Natural Resources (GA DNR) Coastal Resources Division, and the Georgia Ports Authority has been established to review and comment on all Brunswick Harbor ODMDS management and monitoring activities. Other agencies will be asked to participate when appropriate. This SMMP Team will coordinate annually to discuss upcoming disposal activities, suitable management practices, and monitoring efforts for the Brunswick Harbor ODMDS.

3.00 SITE MANAGEMENT

3.01 Section 228.3 of the Ocean Dumping Regulations (40 CFR 220 to 229) states: "Management of a site consists of regulating times, rates, and methods of disposal and quantities and types of materials disposed of, developing and maintaining effective ambient monitoring programs for the site; conducting disposal

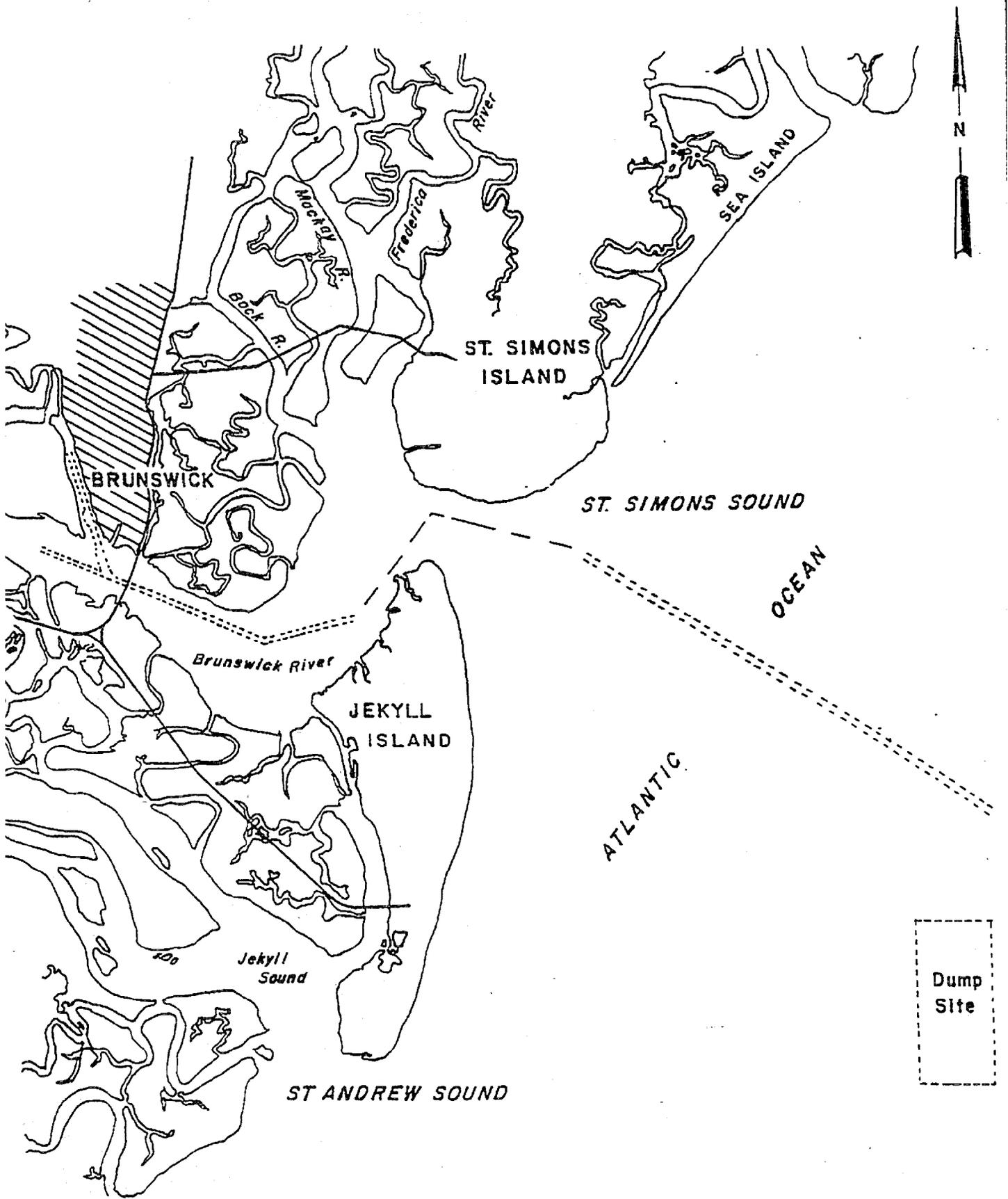


FIGURE 1

site evaluation studies; and recommending modifications in site use and/or designation." The plan may be modified if it is determined that such changes are warranted as a result of information obtained during the monitoring process.

3.02 Management Objectives. There are three primary objectives in the management of an ODMDS. These are:

- * Protection of the marine environment;
- * Beneficial use of dredged material whenever practical; and
- * Documentation of disposal activities at the ODMDS.

The following sections provide the framework for meeting these objectives to the extent possible.

3.03 Material volumes. To this point in time, the Brunswick ODMDS has only received materials excavated from the portion of the Brunswick Harbor Navigation Project located oceanward of the Sidney Lanier Bridge (US Highway 17). Sediments in that portion of the Navigation Project range from about 2 to 72 percent fines, generally depending on their location along the length of the channel. The Bar Channel portion of the navigation channel experiences high current and wave energy, while inner harbor ranges are much more protected from significant waves. The sediments are generally removed from the channel on an annual basis, although interruptions in that pattern have occurred due to both reduced shoaling and funding shortfalls. Corps records indicate that annual removal has averaged 902,800 cubic yards over the 32-year period from 1964 to 1996. Table 1 shows the Corps dredging volume by year. EPA's Final EIS for designation of the ODMDS stated that approximately 600,000 cubic yards per year are excavated from the entrance channel and deposited at the site. Future channel maintenance with subsequent deposition in the ODMDS is expected to continue at the long term average rate of approximately 900,000 cubic yards per year. That quantity could decrease if beneficial uses, such as beach placement or construction of nearshore berms or islands, are implemented for the entrance channel sediments.

3.04 The 1988 Final EIS for designation of the Brunswick ODMDS placed no restrictions on disposal volumes. Disposal of unrestricted volumes is dependent upon results from future monitoring surveys.

3.05 Material suitability. There is no general restriction regarding the type of material that may be placed at the site at this time. However, the suitability of dredged material for ocean disposal must be verified by the Corps and agreed to by EPA prior to disposal activities. Verification will be valid for three years from the date last verified. Verification will involve: (1) a case-specific evaluation against the exclusion criteria (40 CFR 227.13(b)), (2) a determination of the necessity for bioassay (toxicity and bioaccumulation) testing for non-excluded material based on the potential for contamination of the sediment since last tested, and (3) implementing testing and determining that the non-excluded, tested material is suitable for ocean disposal.

3.06 Documentation of verification will be completed prior to use of the site. Documentation for material suitability for dredging events proposed for ocean disposal more than 5 years since last verified will consist of a new Section 103 Evaluation and Public Notice. Documentation for material suitability for dredging events proposed for ocean disposal less than 5 years, but more than 3 years, since last verified will consist of a review through an exchange of letters between the Corps and EPA.

3.07 Should EPA conclude that reasonable potential exists for contamination to have occurred, testing acceptable to EPA will be completed prior to use of the site. Testing procedures to be used will be those delineated in the EPA/Corps testing manual (Green Book) and the Regional Implementation Manual. Only material determined to be suitable through the verification process by the Corps and EPA will be placed at the designated ocean disposal site.

3.08 Time of disposal. At present, no restrictions related to seasonal variations in ocean current or biotic activity have been determined to be necessary. As monitoring results are compiled, should any such restrictions appear necessary, disposal activities will be scheduled to avoid adverse impacts. Additionally, if new information indicates that an endangered or threatened species is being adversely impacted, restrictions for protection of that species may be instituted.

3.09 Disposal Technique. No specific disposal technique is required for this site. However, it is the intent of this plan to maximize any advantages of strategic placement of materials and minimize off-site migration of deposited materials.

3.10 Previous disposal has generally occurred in the northern half of the site. Recent hydrographic surveys indicate that practice this has not resulted in the formation of any significantly shallower mounds within that area. Future deposition of sediments should be placed in a manner such that the resulting top elevation does not interfere with navigation.

3.11 Use of any beach-compatible dredged material for beach nourishment, for nearshore placement where the deposited material would subsequently migrate to the beach, or other beneficial use is encouraged by both the Corps and EPA where economically feasible and environmentally sound. Expected environmental benefits should be included in the evaluation of the feasibility of placement alternatives. Disposal of coarser material should be planned to allow placement within or accessible to the littoral zone, to the maximum extent practical and following the provisions of the Clean Water Act.

3.12 Placement of Materials. Prior to any disposal of dredged materials other than normal maintenance sediments, an agreement between EPA and the Corps will be reached concerning the exact placement of those materials. Permits/contracts will specify locations for the disposal of any material from the project. Until monitoring results necessitate the need for any alterations, materials will be placed within the ODMDS according to paragraphs 3.9 through 3.11. Predominantly coarse-grained material may be used for beach nourishment or another beneficial purpose (i.e. submerged berms, feeder berms or nearshore islands).

3.13 Disposal Monitoring. For all disposal activities, the dredging contractor will be required to prepare and operate under an approved electronic verification plan for all disposal operations. As part of this plan, the contractor will use an automated system that will continuously track the horizontal location and draft condition (vertical) of the disposal vessel from the point of dredging to the disposal area, and return to

the point of dredging. Accuracy and precision of the locational system will be at least as good as provided by Loran C. Required digital data are as follows:

- (a) Date;
- (b) Time;
- (c) Vessel Name;
- (d) Dump Number;
- (e) Map Number on which dump is plotted;
- (f) Beginning and ending coordinates of the dredging area for each load, and the beginning and ending coordinates for each dump and the compass heading at the beginning of each dump;
- (g) Channel stations from which dredged material came; and
- (h) Volume and brief description of material disposed.

3.14 Prior to commencement of disposal operations, a baseline bathymetric survey will be conducted of the disposal area and adjacent areas by the site user. The survey will be taken along lines spaced on 500-foot intervals and be of sufficient length to adequately cover the area. Accuracy will be +/- 1.0 feet. The survey will be referenced to MLW and corrected for tide conditions at the time of the survey. As a follow-up to the baseline bathymetric survey, the site user will conduct a similar survey after disposal. The number of transects and accuracy required will be the same as in the baseline survey.

3.15 The user will be required to prepare and submit to the Corps daily reports of operations and a monthly report of operations for each month or partial month's work. The information contained in items (a) through (h) in paragraph 3.13 will be provided in IBM-compatible computer format.

3.16 When disposal operations are complete, the contractor will provide to the Corps two scatter plots showing where each load was deposited (beginning and end of each dump). One plot would be on a scale of 1 inch equals 2,400 feet (fit an 8 1/2 by 11 inch paper), and the other plot would be a scale of 1 inch equals 500 feet (fit a full size blue line drawing). The plots would also show the boundaries of the ODMDS.

4.00 SITE MONITORING

4.01 Part 228 of the Ocean Dumping Regulations establishes the need for evaluating the impacts of disposal on the marine environment. Section 228.9 indicates that the primary purpose of this monitoring program is to evaluate the impact of disposal on the marine environment by referencing the monitoring results to a set of baseline conditions. Section 228.10(b) states that in addition to other necessary or appropriate considerations, the following types of effects will be considered in determining to what extent the marine environment has been impacted by materials disposed at an ocean site (excerpted):

1. Movement of materials into estuaries or marine sanctuaries, or onto oceanfront beaches, or shorelines;
2. Movement of materials toward productive fishery and shellfishery areas;
3. Absence from the disposal site of pollution-sensitive biota characteristic of the general area;
4. Progressive, non-seasonal, changes in water quality or sediment composition at the disposal site, when these changes are attributable to materials disposed of at the site;
5. Progressive, non-seasonal, changes in composition or numbers of pelagic, demersal, or benthic biota at or near the disposal site, when these changes can be attributed to the effects of materials disposed at the site; and
6. Accumulation of material constituents (including without limitation, human pathogens) in marine biota at or near the site.

4.02 Part 228.10(c) states: "The determination of the overall severity of disposal at the site on the marine environment, including without limitation, the disposal site and adjacent areas, will be based on the evaluation of the entire body of pertinent data using appropriate methods of data analysis for the quantity and type of data available.

4.03 Impacts will be classified according to the overall condition of the environment of the disposal site and adjacent areas based on the determination by the EPA management authority assessing the nature and extent of the effects identified in paragraph (b) of this section in addition to other necessary or appropriate considerations."

4.04 The Monitoring Plan for the Brunswick Harbor ODMDS is described in Attachment A. The Monitoring Plan will be implemented subject to the availability of funding. Should shortfalls in funding occur, the SMMP team will recommend which aspects of the Monitoring Plan should receive priority. Results of monitoring will be reviewed by the SMMP team and recommendations made to the Corps and EPA on appropriateness and detail of future monitoring efforts.

5.00 MODIFICATION OF THE SITE MANAGEMENT PLAN.

5.01 Should the results of monitoring surveys indicate that continuing use of the Brunswick ODMDS would lead to unacceptable impacts, then either the Brunswick ODMDS Site Management Plan will be modified to alleviate the impacts, or the location of the ODMDS will be modified.

5.02 This Site Management Plan may be modified at any time by joint agreement of the signatory parties to the reflect the views of the SMMP team.

TABLE 1
DREDGING VOLUMES

<u>YEAR</u>	<u>DREDGE NAME</u>	<u>CUBIC YARDS REMOVED</u>
1964	Gerig	423,093
1965	Gerig	554,221
1966	Hyde	438,397
1967	Gerig	161,150
1968	Gerig	691,970
1969	Gerig	1,498,930
1970	Gerig	415,723
	Hyde	127,970
1971	Gerig	865,514
1972	Gerig	616,837
1973	Gerig	545,496
	Goethals	512,032
1974	Schweizer	27,720
1975	Davidson	158,579
	Schweizer	81,370
1976	Hyde	291,737
	Essayons	1,630,594
	Schweizer	170,090
1977	Hyde	928,451
	Essayons	617,840
1978	McFarland	239,129
1979	Hyde	298,649
1980	Manhattan Island	1,742,938
	Sugar Island	-----
1982	Manhattan Island	745,503
1983	Dodge Island	695,902
1984	Dodge Island	2,259,299
	Mermantau	-----
1986	McFarland	627,531
	Stuyvesant	1,951,090
1987	McFarland	309,059
1988	Dodge Island	2,066,198
	Manhattan Island	43,000

TABLE 1 (CONTINUED)

DREDGING VOLUMES

<u>YEAR</u>	<u>DREDGE NAME</u>	<u>CUBIC YARDS REMOVED</u>
1989	Eagle 1	1,392,472
1991	Dodge Island	449,919
	Bacon	140,975
	Sugar Island	1,568,480
1993	Quachitia	761,738
1994	-----	1,049,378
1995	Sugar Island	988,099
1996	Dodge Island	803,501
	Padre Island	-----

ATTACHMENT A

SITE MONITORING PLAN
FOR THE
BRUNSWICK HARBOR ODMS

ATTACHMENT A

SITE MONITORING PLAN
FOR THE
BRUNSWICK HARBOR ODMDSA.1.00 INTRODUCTION

A.1.01 The Brunswick Harbor Ocean Dredged Material Disposal Site (ODMDS) is an active, frequently used site in the South Atlantic Bight (part of EPA's Region IV area of responsibility). This is the first Site Management Plan which has been developed for the Brunswick ODMDS.

A.1.02 The Brunswick ODMDS encompasses an area of 2.0 nautical miles (NM) within a 1.0 by 2.0 NM rectangular site located about 6.6 NM east of the coastline and 2 NM south of the whistle buoy at mile 8 of the Brunswick Bar Channel. The site's four corners are located at 31 02'35"N and 81 17'40"W; 31 02'35"N and 81 16'30"W; 31 00'30"N and 81 16'30"W; 31 00'30"N and 81 17'42"W. The Final EIS for designation of the site was completed in March 1988 and the site was formally designated by EPA as an ODMDS on January 23, 1989. To date, the site has only been used for placement of material obtained from the Brunswick Harbor Navigation Project. The site has received both new work and maintenance dredged sediments from the harbor's shipping channel located oceanward of the Sidney Lanier Bridge (US Highway 17) (Station 33+000). No disposal activities are known to have occurred outside the boundaries of the site.

A.1.03 Monitoring activities were conducted by Savannah District since 1993 to assess (1) the capacity of the site, (2) the site's stability, and (3) as a basis for determining -- in general terms -- the fate of dredged material placed within the ODMDS. Since that time, only maintenance sediments excavated from the Brunswick Harbor shipping channel have been placed at the site. The bathymetric surveys have been performed on a yearly basis.

A.1.04 The Monitoring Plan is a component of the initial Site Management Plan for the Brunswick Harbor ODMDS. The Monitoring Plan should be regarded as a flexible strategy with the various task and techniques applied as appropriate and as dictated by disposal activities and observed effects. The following sections describe the objectives and methods for the site monitoring.

A.2.00 OBJECTIVES

A.2.01 Major objectives of the Brunswick ODMDS Monitoring Plan are to:

- (1) Determine the fate of dredged material placed at the site, and
- (2) Assess the impact of dredged material through the early detection of changes in sediment characteristics (physical and chemical), and biological communities which may be deemed as adverse and chronic.

A.2.02 Since several different ecological components are susceptible to perturbation by dredged material disposal, and an alteration to one component may have a resultant impact on another, a comprehensive monitoring approach is proposed with several specific objectives. These objectives are to:

- (1) Continue bathymetric mapping of the ODMDS and surrounding area, and relate findings to plotted coordinates of disposal events.
- (2) Using sediment mapping techniques, periodically review the direction and rate of migration of deposited dredged material.
- (3) Evaluate the effects of disposal and subsequent movement of dredged material on the physical and chemical characteristics of the sediments and benthic infaunal communities in and adjacent to the ODMDS.
- (4) If determined necessary, determine the areal distribution of turbidity plumes generated during a major disposal operation and compare the turbidity data with the ambient turbidity plume emanating from Brunswick Sound.
- (5) Select and characterize a sediment testing "reference site" meeting Green Book criteria, for use by public and private dredging projects, in conducting sediment toxicity and bioaccumulation test for ocean dumping evaluation.

A.2.03 Responsible Party. The activities described above in Section A.2.02 will be implemented by various agencies and parties. The site user will implement activities to accomplish objectives 1 and 5. EPA will implement activities to accomplish objectives 2 and 3. Should implementation of objective 4 become necessary, the SMMP team will advise its members which agency should be responsible and could best perform the necessary work.

A.3.00 MONITORING APPROACH AND RATIONALE

A.3.01 Sediment Mapping and Site Bathymetry.

A.3.02 An essential initial requirement for effective implementation of site monitoring activities at the Brunswick ODMDS is accurate placement, recording, and plotting of disposal events. The Savannah District, USACOE, will require such information from all dredging contractors and will compile and continuously update computer plots depicting placement of dredged material. Plotted coordinates will be in GPS-corrected latitude/longitude to enhance use by all associated monitoring agencies.

A.3.03 Using the above information as a basis, close grid bathymetry will be conducted at least annually. The site bathymetry would encompass the entire area of the ODMDS designated for maintenance disposal and a 0.25 NM buffer zone around that site (Figure 1). The spacing of the grid may be expanded on the southern half of the ODMDS if disposal activities occur only in the northern half of the site. While the scheduling of these surveys is complicated by the frequency and quantity of dredged material disposal at the site, it is expected that bathymetry will be surveyed at least twice annually; before and after annual winter disposal operations. Experience with these techniques at other ODMDS sites indicates that this frequency is the minimum necessary to effectively detect gross changes in dredged material redistribution. Due to the apparent highly dynamic nature of sediment transport at the site, detection of more discrete migration patterns may require bathymetry at a greater frequency, possibly targeting a specific portion of the site. In addition to bathymetric surveys, areal mapping of sediment chemistry may be employed to differentiate and track native sediments and dredged material migration.

A.3.04 Existing bathymetric surveys conducted at the Brunswick ODMDS sites (November 1993 and June 1996) reveal no distinct bottom feature within the ODMDS. These surveys indicate that significant off-site migration of deposited material may be occurring. The 1996 survey indicated a larger site capacity than in 1993, even with deposition from 3 maintenance dredging cycles during that interval.

A.3.05 Biological Impact Assessments.

A.3.06 The primary intent of these sampling efforts will be to assess whether ocean disposal of dredged material at the Brunswick ODMDS results in unacceptable adverse impacts to the biological communities adjacent to the ODMDS.

A.3.07 Benthic organisms are the resident community at the disposal site and do not have an ability to avoid increased sedimentation resulting from sediment disposal and movement.

They also serve as a primary food source for the fisheries associated with the nearshore zone off the Georgia coast. Their sessile life cycle subjects them to both the physical and chemical perturbations on the sea floor generated by disposal activities. Because of their importance in food web dynamics, assessment of the benthic community structure should be a primary focus for detection of biological impact.

A.3.08 A benthic assessment was conducted for EPA by the Marine Extension Service, University of Georgia (UGA) in October 1984 and April 1985. The sampling dates were selected to detect any seasonal differences. Box core sampling was conducted on both dates. Forty-four species were found in the samples collected in October, while sixty-two species were found in the April samples. Species richness was characterized as being fairly high, but numbers and biomass were very low. The data matrices were very sparse, with many species represented by single samples. Statistical analyses of the results were conducted based on the null hypothesis that no statistical differences would be ascertainable that could be attributed to the deposition of dredged sediments. No gradients were observed in the data across the ODMDS, leading one to conclude that the null hypothesis could not be rejected. The overall conclusion was that no adverse effects of the years of previous dredged material disposal at the ODMDS could be identified.

A.3.09 In order to expand the benthic database and allow evaluations to be made on the impacts which disposal operations at this site have on benthic communities, benthic surveys should be conducted both in the ODMDS and in the area immediately surrounding the site. The benthic data will allow determinations to be made concerning whether benthic resources outside the ODMDS are being affected by disposal of fine-grained materials, and determine whether these changes are detrimental. Benthic resources within the ODMDS are not the main concern, but rather those which exist in areas surrounding the site. The focus of this monitoring effort will be to determine whether disposal operations cause a major change in the faunal composition of benthos (which could affect trophic functions) and/or whether there are significant alterations in species numbers or biomass. Changes in other biological metrics, similar to those currently being evaluated in EPA's EMAP program will also be considered based on their applicability to this survey area.

A.3.10 After the bathymetric surveys, sediment mapping, and/or current studies conclusively determine the direction(s) of sediment migration, benthic surveys would be conducted. The benthic monitoring would be concentrated in those areas where sediment transport was expected or documented to occur. The benthic surveys will involve collecting benthic samples in and around the ODMDS using an appropriate stratified sampling design based on available information, such as areal mapping of sediment chemistry. The general zones (strata) will include areas both within the ODMDS and adjacent to all boundaries of the ODMDS.

The zones within the ODMDS would be used to document changes in the benthic communities following disposal operations for comparison with zones outside the ODMDS.

A.3.11 The number of samples obtained per zone will be sufficient to adequately represent the benthic community composition (based on species saturation curves) and detect moderate changes in faunal densities, biomass, and species numbers (based on power analyses). At least one sample will be taken within the area of steepest slope in the south-central portion of the ODMDS. Each benthic sample obtained for faunal assessment will be sub-sampled to determine sediment characteristics of the sample (e.g., grain size, percent silt, clay, sand, CaCO₃, etc.). The sediment samples will be used to (1) further characterize the composition of surficial sediments in and around the ODMDS, and (2) aid in interpreting changes in benthic infaunal composition.

A.3.12 Disposal Plume Dispersion.

A.3.13 At infrequently used disposal sites, the turbidity plume generated during ocean disposal of dredged material is generally viewed as an episodic event with impacts being limited and temporary. However, at frequently used ODMDSs, consideration of the potentially chronic effects of the turbidity plume should be considered. Sessile live bottom organisms such as octocorals and sponges may be particularly susceptible to suspended solids concentrations chronically above ambient. While no live bottom communities are known to be associated with the Brunswick ODMDS, such communities -- when present -- are an important habitat for productivity and fish use. Should benthic communities which are unique in the project vicinity be identified in or adjacent to the ODMDS, an evaluation would be conducted to determine if they would be impacted by turbidity plumes. At that time, a typical turbidity plume generated by a major disposal event should be delineated and its areal distribution plotted. A ship-mounted transmissometer could be used to profile light attenuation at grid points encompassing the plume. It may be feasible for the outer boundaries of the grid to be determined using an aircraft-mounted GPS during an aerial reconnaissance of the disposal operation prior to initiating the grid profiling. Information gleaned during this effort could be compared to plume turbidity/suspended solids concentrations for consideration of plume impact.

A.3.14 Sediment Turbidity Transport Studies.

A.3.15 An overall southerly movement of littoral material occurs along the Georgia coast. That trend is interrupted, somewhat, by flows leaving the Altamaha River and Brunswick Sound. It is

believed that the tidal inlets at those two locations tend to shift the overall southerly littoral drift pattern seaward to some degree. Shoaling patterns along the Brunswick Harbor Bar Channel support the position that the littoral drift movement is from north to south.

A.3.16 There is no known existing data on ocean currents specifically at the Brunswick ODMDS. However, predictions can be made based on the overall direction of waves which are recorded nearby. In the report titled Hindcast Wave Information for the US Atlantic Coast: Update 1976-1993 with Hurricanes (WIS Report 33) prepared in June 1995 by the Corps of Engineers, Waterways Experiment Station (WES), Station 29 is located east of the entrance to Brunswick Harbor and is the closest station to the Brunswick ODMDS. The historic data reveals that the predominant wave directions at the site are from the NE-E-SE. Those directions also produce both the largest and longest period waves. September and October produce the largest waves, which can reach just under 6 meters in height in the nearshore area. Nearly 50 percent of the waves exceed 1 meter in size. May, June and July are months which typically demonstrate smaller period waves of the year. The area experiences waves throughout the year, as the months of January, March, May, July, August, October and December all share the position of having the most wave activity.

A.3.17 Based upon these limited findings, present management strategies involve placing dredged sediments in the northern half of the ODMDS. Actual current data over an annual cycle would

- (1) add confidence to this management strategy, and
- (2) help clarify sediment redistribution patterns revealed by bathymetric surveys.

A.3.18 The primary task involved in the collection of current data would be the deployment and retrieval of continuously recording current meters. Ideally, a long-term continuous data base obtained over a two-year period should be obtained to evaluate both seasonal and yearly variability in current patterns. Deployment of a Acoustic Doppler Current Profiler (ADCP) placed within or adjacent to the ODMDS would provide the best data base for this effort. Quarterly or semi-annual retrieval of the data record would provide timely information on prevailing current patterns. Collection of such data should be coincident with a major disposal project during which sediment

mapping, plume dispersion, and sediment sampling occurs. This would allow integration of current data into these programs, thus enhancing interpretation of plume dispersion, sediment transport and sedimentation.

A.4.00 CONTAMINANT STUDIES

A.4.01 Sediment Contaminant Monitoring.

A.4.02 Previous sampling of sediments in and around the ODMDS conducted by EPA prior to their official designation of the site as an ODMDS did not detect significant elevations of sediment contamination. On the basis of heavy metal analysis, the deposited sediments would be considered clean and relatively unpolluted. EPA concluded that "It cannot be stated whether the (contaminant) values reported were related to disposal, nor for that matter even whether there is an anthropogenic relation. The values reported are not exceptional."

A.4.03 A critical component of the proposed monitoring plan will be to periodically sample sediments in and adjacent to the ODMDS to monitor for changes in sediment contaminant levels. This sampling would be conducted using a tiered approach, where sites outside the ODMDS are not monitored until elevated levels are detected inside the ODMDS. A Tier I evaluation of the need for sediment chemical testing would be conducted every 3 years to coincide with a similar evaluation of sediments in the Bar Channel. More frequent sampling of the sediments may be warranted if elevated levels of certain contaminants are found, but the analysis could be restricted to only those constituents which are above acceptable levels.

A.4.04 Reference Site Assessment.

A.4.05 Testing of sediments for ocean disposal in conformance with the "Green Book" requires comparison of the project sediments with that from sediments outside the influence of the project. Questionable results can arise if low survival is experienced in the reference sediment. Concern for the acceptability of the reference sediment is also generated when the survival in both the reference and test sediments is low and there are similar percentages for survival or mortality. As defined in the testing guidance, a reference sediment should (1) be substantially free of contaminants, (2) be as similar to the grain size of the dredged material and sediment at the disposal site as practical, and (3) reflect conditions that would exist in the vicinity of the disposal site had no dredged material disposal ever occurred, but had all other influences on sediment conditions taken place. These are the optimum conditions for evaluation of toxicity and bioaccumulation and, quite often, are not attainable. If it is not possible to fully

meet these conditions, test organisms should be selected that are not sensitive to grain size differences among the reference, control, and test sediments.

A.4.06 Satisfaction of the above requirements is often complicated because the disposal activity often does not involve the disposal of "like" material. The grain-size of sediments removed from the Bar Channel may be different than that found several miles offshore where the ODMDS is located. Sediments in the Bar Channel would be expected to be somewhat finer since that channel carries ebbing tidal water which have just flooded extensive salt marshes known for their detrital export functions.

A.4.07 Finding a reference sediment which is uncontaminated and similar to the grain size of the Bar Channel sediments, and yet represents conditions which would exist at the disposal site, which is primarily sand, is difficult. However, to aid in the long-term analysis of disposal at the Brunswick Harbor ODMDS, selection of a single location for a suitable reference sediment which can be used for repeated sediment analyses would (1) ease the process of developing a sampling plan, and (2) allow comparison of the dredged material with similar material outside the influence of the project in accordance with the "Green Book".

A.4.08 Test Organism Assessment.

A.4.09 Selection of test organisms appropriate for the Brunswick area, yet consistent with recommended national and regional "Green Book" species should be a part of this assessment. Information developed from this effort could then be used by the Corps both in-house and as instruction to any other organization which may be considering use of the Brunswick Harbor ODMDS.