

SAVANNAH HARBOR EXPANSION PROJECT

NEARSHORE PLACEMENT PLAN

Overview

Savannah District followed an iterative process to develop a plan for placement of sediments from the entrance channel. This document summarizes the process that we followed and the considerations we included.

The work started with an engineering determination of the quantity of sediments to be removed at various channel depths and the % fines / % sands of those sediments.

We reviewed previous information, including the Draft 2003 ERDC Report on Nearshore Placement at Tybee Island; the previously environmentally-approved placement areas on the south side of the entrance channel; and the recent changes to the GA CZM Program that incorporates Georgia HB 727.

We started by developing a placement plan with a priority placed on low cost.

We reviewed that plan from an environmental perspective. We consulted GA DNR-CRD, who provided a couple of alternate placement scenarios.

We discussed the work with the coastal engineering consultant to Tybee Island to obtain his engineering views and learn, in general terms, what he would advise Tybee Island concerning the various issues and proposals.

We revised our plan to incorporate the views of GA DNR-CRD and Tybee's consultant. During that period we consulted with Corps engineers to learn what would be reasonable from a cost perspective (keep pumping distances under the length where booster pumps would be needed), and what placement designs would not cause adverse currents or result in rapid migration of deposited sediments toward the shipping channel. Using that information, we developed a revised sediment placement plan.

We shared that plan with staff of GA DNR-CRD and CRD and Tybee's coastal engineering consultant at a meeting on 13 July 2006. We reviewed the latest Corps plan and the rationale upon which it was based. The discussions of that meeting are described below. After the meeting, the Corps revised the plan again to address items raised during the meeting.

The present plan is, therefore, based on information from Corps geotechnical engineers; discussions with Corps coastal engineers; discussions with GA DNR-CRD for information on CZM compliance, recreational and commercial boat

usage off of Tybee Island, and general environmental acceptability issues; and the coastal engineering consultant to Tybee Island for issues directly affecting the beaches at Tybee. We believe the plan is a good compromise of the various issues which need to be considered when developing a sediment placement plan for this large-scale project.

Meeting Summary

During the 13 July 2006 meeting with GA DNR-CRD and Tybee's consultant, the following items were mentioned:

- a. GA DNR-CRD requested the Corps evaluate depositing some sediments on the northern end of Tybee Island where the natural channel coming out of Lazaretto Creek is close to the shore and the beach is eroding.
- b. GA DNR-CRD concluded that we should evaluate nearshore placement of sediments exceeding an 80 % sand content (including shell hash). The District committed to identify areas along the entrance channel that meet that criteria and quantify the volume of O&M sediments normally removed from those areas. We would then develop cost estimates to deposit those sediments in several locations: at the ODMDS, in the submerged mounds already approved along the entrance channel, on Tybee at the MLW line, and on the northern end of Tybee. The District will then evaluate the costs and develop a plan that we believe complies with the recent CZM change. If that plan is different than actions for which we presently have environmental approvals, we would have to prepare an EA to obtain clearances for those additional actions.
- c. The Savannah Harbor Expansion Project was then discussed. The Corps revised sediment placement plan was the starting point for discussion during this meeting. That plan incorporated previous discussions with GA DNR-CRD and Tybee's coastal engineering consultant.

Tybee's consultant expressed concern about clay balls being deposited on the beach, which occurred during the 1992 harbor deepening project. The project placed relatively lower quality sediments (approximately 50% sands) for some distance south of the north groin and resulted in a wide, flat sub-tidal beach. In the Corps previous meeting, the consultant for Tybee Island stated that those results (the wide sub-tidal beach) were acceptable. The consultant believes that a portion of those sediments moved north through the groin and are responsible for the recent accretion of the northern tip of the island. The consultant acknowledged Tybee's (eventual) approval of the sediment placement from the previous deepening project. The consultant stated that he believes that only the coarser-grained sediments move landward from sediments deposited in the nearshore area. In our previous meeting he had said that sediments placed below a depth of about -5 MLW do not migrate much toward the shore. GA

DNR-CRD said that studies indicate sediments can be placed as deep as 25' and still migrate toward shore, but at a lower rate.

The Corps explained the intent behind various components of the latest proposed placement plan. Sediments with lower quality (Stations -10B to -20B) would be placed further from the shoreline. Higher quality sediments would generally be placed closer to the beach. Pumping distances were limited to 3 miles to keep from requiring a booster pump that would substantially increase costs. The Corps would not try to create a high beach (above MHW), since the sand content did not approach the 95% threshold normally desired of such sediments. The Corps would deposit sediments at the shore to keep from having a deeper channel between the beach and sediments deposited to a shallower depth out in front in the nearshore waters.

GA DNR-CRD suggested modifying the design to deposit sediments at the MLW line, allow the berm to be no higher than mid-tide, make the berm 500-foot wide at that mean tide elevation, then slope the berm down to existing depths. This would allow a substantial volume of sediment to be deposited close to the beach, removing concerns about increasing current velocities close the shoreline, and allowing the waves to move better quality sands up higher on the beach profile.

GA DNR-CRD expressed concern about the depth of sediments placed in the nearshore area because of potential conflicts with boaters. They reiterated their previous position that a depth of -5 feet MLW would be adequate to not interfere with boaters. The trade-off is that if sediments are placed at a lower depth, they will be moved less by waves toward the beach. Because of GA DNR-CRD's concerns, the Corps later asked our engineers to evaluate revising the design with a somewhat deeper final depth in the large nearshore deposition areas (ERDC and Site 2 Extension).

GA DNR-CRD asked about the Corps' plans for placement of sediments from upstream of Station 0. Project data shows sediments from the first few reaches to be similar in quality to that found in Stations 0 to -10B. They reiterated that the CZM change states that it applies to inlets, which would extend some distance upstream of our Station 0. After the meeting, the Corps' engineers evaluated revising the design to deposit sediments from Stations 0 to +10 on the Tybee north of the north groin in 200-foot wide, mid-tide berm.

Follow-up

As a result of the 13 July 2006 meeting, the Corps looked at the various offshore disposal options for the Savannah Harbor Expansion Project. The following assumptions are made:

a. A 30-inch pipeline dredge can pump material a total distance of about 3 miles without a booster pump. The design would be based on there not being a need for a booster pump.

b. Hopper dredges (with pump ashore capability) may not be effective since the nearshore water depths off Tybee Island are less than 15 feet mean high water. A loaded hopper dredge generally needs about 25 feet of water under its keel. With pump out capability, hopper dredges are able to tie up in deeper water and pump to shallower areas. The pump out process increases project costs.

c. For each channel reach from Stations +4+000 to -85+000 (see enclosed excel spreadsheet), the dredge quantities in cubic yards for the greatest dredging depth (i.e., -52 foot depth) was used for all disposal sites. Because of pumping distance limitations, we selected Station +4+000 as the most upriver location from which sediments could be practicably pumped to ocean face of Tybee Island.

Nearshore Sediment Placement Plan

The attached spreadsheet provides the sediment placement for sediments that would be excavated from the Savannah Harbor Entrance Channel (Stations +4+000 to -85+000B). One example from the plan is that sediments excavated from Stations +4+000 to 0+000 would be deposited in the site called MLW 200. That site has a capacity of 217,000 cubic yards when the sediments are mounded no higher than mean tide (Elevation +4 feet MLW). All of the sediments within that reach of the channel would be deposited in site MLW 200 when excavating to the 46, and 48-foot depth (42 and 44-foot authorized channel depths). Channel depths greater than that would produce a volume of sediments that exceed the capacity of the site. Those excess sediments would be deposited in a site called MLW 500.

The sediment placement sites identified in the plan are shown on the attached figure. Those sites can be described by the following information:

a. MLW 200 has a total capacity of 217,000 cubic yards and is located west of the North Groin on Tybee Island. The sediment would be deposited in the lower intertidal area (between mean sea level (MSL) and mean low water

(MLW)) and be allowed to mound up to mid-tide (0 MSL or +4 feet MLW). When filled to capacity, the placement would create a mid-tide berm about 200 feet wide and 3,200 feet long.

b. MLW 500 has a total capacity of 1,896,000 cubic yards and is located south of the North Groin on Tybee Island. The sediment would be deposited in the lower intertidal area and be allowed to mound up to mid-tide. When filled to capacity, the placement would create a mid-tide berm about 500 feet wide and 11,000 feet long.

c. ERDC Nearshore has a total capacity of 1,165,000 cubic yards and is located below the mean low water contour (MLW) in the nearshore area off Tybee Island. At total capacity, the top elevation of the placement site would be -4 feet.

d. Site 2 has a total capacity of 3,225,000 cubic yards and is located below the mean low water contour (MLW) in the nearshore area off Tybee Island. At total capacity, the top elevation of the placement site would be at mean high water (Elevation +8 feet MLW).

e. Site 2 Extension has a total capacity of 4,251,000 cubic yards and is located below the mean low water contour (MLW) in the nearshore area off Tybee Island. At total capacity, the top elevation of the placement site would extend to -4 feet MLW.

f. Savannah Harbor Ocean Dredged Material Disposal Site (ODMDS). The USEPA-approved ODMDS is a 4.26 square mile (or 2,726.4 acres) site and is centered at 31 56' 54" N and 80 45' 34" W. Total capacity is about 56,807,000 cubic yards and at capacity the top elevation would be -26 feet MLW.

g. Site 11 has a total capacity of 2,076,000 cubic yards and is located below the mean low water contour (MLW) in the nearshore area off Tybee Island. At total capacity, the top elevation of the placement site would extend to -10 feet MLW.

Placement Rationale

The basic goals for the sediment placement plan are for the placement to be implementable, affordable, and environmentally-acceptable. A second broad goal is to use as much of the good quality sediments as possible in a beneficial way. This beneficial use includes deposition within the sand sharing system south of the navigation channel (nearshore shelf) that has deflated over the years. The plan we have developed will benefit beaches of Tybee Island, the sand sharing system of the nearshore area oceanward of the Island, and to a smaller degree, fisheries at the outer end of the navigation channel.

To ensure implementability and affordability, the placement areas are within 3 miles—the pumping distance of a pipeline dredge without needing a booster pump. Including a booster pump would substantially increase the placement costs.

To address environmental acceptability, sediments with a fines content exceeding 20 percent would not be deposited near the beach. Since sediments located reasonably close to the beach contain more than a very low (5 percent) content of fines, there will be no attempt to create a dry beach (above MHW). All deposition at Tybee would occur at or just oceanward of the MLW line to protect the existing beach from scour during the deposition. The MLW deposition should also reduce the appearance of clay balls on the beach when construction is complete.

A substantial volume of sediments would be deposited in the nearshore area between the beach and Site 2 (located directly east of the middle of the island). This placement is an attempt to raise the elevation of some of the nearshore in front of the beach. The shallower depth will increase the likelihood of waves moving sediments toward the beach.

The crest of the deposition in the nearshore sites would occur at -4 feet MLW to ensure recreational boats are not severely impacted. That elevation represents a balance between producing no impact to recreational boaters and providing sediments that would be affected by both small and large waves. If sediments are too deep to be affected by waves, the waves cannot move those sediments toward the beach.

An intertidal mound would be created at Site 2, roughly 13,000 feet from the beach. The mound would provide isolated resting habitat for sea birds and some shorebirds for a period of time. We expect the mound to serve as a source of sediments pushed by waves toward the beach. Those waves will reduce the size of the island, eventually making it subtidal and of no value to birds. While it is intertidal, the mound will provide shelter from the ocean waves and a varied habitat for fish.

The base of this mound (Site 2) would be created using sediments with the poorest quality. Using those sediments as a base ensures they are beneficially used, while covering them with better sediments ensures that sediments which subsequently migrate from the site will contain a higher sand content.

Sediments at the outer end of the entrance channel (oceanward of the ODMDS) will be deposited in one location to create a mound rising about 10-feet above the ocean floor. This mound would provide a different habitat for fish than the adjacent ocean floor, thereby improving fish habitat a small degree. Depositing the sediments at that location will also keep them from being placed in the Ocean Dredged Material Disposal Site, thereby preserving some of the capacity of that site.

The plan complies with the Georgia Coastal Management Program, including the recent changes that incorporate Georgia HB 727.

Construction Sequencing

Normally the Corps does not direct the contractor how to accomplish work or in what order or sequence to complete the job. However, for this placement plan, since the sediments from Stations -10 to -20+000B contain more fines than other reaches, the Corps will direct the Contractor to deposit those sediments first—among the three reaches that will use the site—into Area 2. That sequencing will result in sediments with less fines being deposited higher on the mound constructed on the site and, thereby more available for subsequent shoreward migration.

Seasonal restrictions

If deposition occurs in the Tybee Island placement sites—MLW 200 and MLW 500—during the sea turtle nesting season, the contractor must implement a sea turtle nest monitoring and relocation program. The Contractor will ensure that each morning an inspection is conducted of the shoreline over which construction will occur until the end of the nesting and hatching season. If a nest is identified within that construction area, the Contractor will notify the Corps' inspector. The Corps will coordinate with GA DNR-CRD, informing them of the location of the nest and future construction activities in that area. If GA DNR-CRD believes it is best to move the nest, the Contractor will be responsible for funding the movement of that nest to another location on Tybee Island designated by GA DNR-CRD, through the Corps.

Restrictions to protect sea turtles

Sea turtles receive protection under the Endangered Species Act (ESA). The Impacts to endangered species from dredging of navigation channels in the southeast is currently covered by a Regional Biological Opinion issued by the NMFS in 1995, and amended in 1997. In addition, CESAD issued a Hopper Dredging Protocol for Atlantic Coast FY98-FY 03, which continues to be in effect until modified. The following conditions promulgated by the NMFS and South Atlantic Division apply to navigation channel hopper dredging operations conducted by Savannah District to ensure the protection of sea turtles:

- a. "The COE's draghead deflector engineer that (assisted) in this design should inspect the rigid draghead deflector annually to ensure that the deflector has been tailored appropriately to each draghead. Additionally, the inspector should assess whether the dredge operator appears to be familiar with the operation of the draghead deflector and provide

necessary training where appropriate” (NMFS 1997 BO Terms and Conditions).

- b. “The COE should develop an educational/training program for dredge operators to increase their understanding of how the draghead deflector works and why it is necessary” (NMFS 1997 BO Terms and Conditions).

Note: The District interprets this to mean that a COE inspector familiar with proper design of the draghead will inspect the draghead prior to the start of the dredging contract to ensure that it is has been designed and installed appropriately.

- c. “The sea turtle deflecting draghead is required for all hopper dredging during the months that turtles may be present, unless a waiver is granted by the COE SAD in consultation with NMFS” (NMFS 1995 BO Terms and Conditions).
 - 1. “Sea turtle deflecting dragheads will be used at all times” (SAD Protocol).
 - 2. “Districts will inspect sea turtle deflecting dragheads systems to ensure that they are fully operational, prior to initiation of work” (SAD Protocol).
 - 3. “Districts will ensure that draghead operators know how to properly use the sea turtle deflecting system” (SAD Protocol).
- d. “All hopper dredging will be scheduled for November 1 through May 31. No screening or monitoring is required during the period December 1 through March 31” (NMFS 1995 BO Reasonable and Prudent Measure).
 - 1. “Maintenance dredging at Savannah, Brunswick and Kings Bay Harbors must be restricted to 15 December through the end of March. Maintenance dredging at Charleston and Wilmington Harbors must be restricted to 1 December through the end of March where the sea turtle deflecting draghead system can not be used effectively. Dredging may begin as soon as mid-November in those portions of the Wilmington and Charleston Harbor channels where the sea turtle deflecting draghead can be used effectively. All Districts will cooperate to ensure that their scheduling of hopper dredging contracts, does not interfere with this Division priority work area” (SAD Protocol).
 - 2. “Sea turtle observers, inflow screens and overflow screens will be used during all dredging operations, except for the months of January and February, which are optional. Variations from this

provision may be granted by Division, but must be justified from a technical perspective" (SAD Protocol).

Note: Savannah requires inflow and overflow screening and sea turtle observers for work all done by hopper dredges. Dredging contracts for Savannah specify a construction time of 15 Dec through 31 March. Approvals to extend dredging into April must come from SAD. Any extension into May should be coordinated with GA DNR Coastal Resources Division.

- e. "One hundred percent inflow screening is required, and 100 percent overflow screening is recommended when sea turtle observers are required on hopper dredges in areas and seasons in which sea turtles may be present (see Table below). If conditions disallow 100 percent inflow screening, inflow screening can be reduced but 100 percent overflow screening is required, and an explanation must be included in the preliminary dredging report." (NMFS 1995 BO Terms and Conditions).
- f. "To prevent impingement of sea turtles within the water column, every effort should be made to keep the dredge pumps disengaged when the dragheads are not firmly on the bottom" (NMFS 1995 BO Terms and Conditions).
- g. "Reporting: A preliminary report summarizing the results of the dredging and the sea turtle take must be submitted to the COE and NMFS within 30 days of completion of any given dredging project. An annual report (based on either calendar or fiscal year) must be submitted to NMFS summarizing hopper dredging projects, documented sea turtle and sturgeon incidental takes, and whale sightings" (NMFS 1995 BO Terms and Conditions).
- h. The water intake ports on the top of the draghead shall be screened with metal elliptical cages, or other suitable means to exclude sea turtles from entering the drag arm.
- i. "The annual (by fiscal year) documented incidental take, by injury or mortality, of seven (7) Kemp's ridleys, seven (7) green turtles, two (2) hawksbills, thirty-five (35) loggerhead turtles, and five (5) shortnose sturgeon is set pursuant to section 7(b) of the ESA. To ensure that the specified levels of take are not exceeded early in any project, COE should reinitiate consultation for any project in which more than one turtle is taken within 24 hours, or once five or more turtles are taken. The Southeast Region, NMFS, will cooperate with COE in the review of such incidents to determine the need for developing further mitigation measures or to terminate the remaining dredging activity." (1997 BO Incidental Take Statement).

1. "All sea turtle takes will be reported promptly to SAD-ET-C)/PD and posted at usace.sad.turtle newsgroup on the Internet." (SAD Protocol)
2. "If two sea turtle takes occur within 24 hours, you should immediately notify the Division POC so he can initiate reconsultation with National Marine Fisheries Service." (SAD Protocol)
3. "If a third take occurs on the project the district will cease operations and notify the South Atlantic Division. Continuation of dredging will occur only after cleared by Division. Upon taking three turtles, District will develop a risk assessment along with an appropriate risk management plan, and submit that to Division for assessment. Generally relative abundance and relocation trawling would be an integral part of a risk assessment and management plan. Should a total take of 5 seaturtles occur, for whatever reason, all work will be terminated unless other prior agreements had been reached with Division." (SAD Protocol)
4. "If a total of two endangered species of sea turtles are taken during a project, work will be suspended until further guidance from Division has been received." (SAD Protocol)

Summary: Hopper dredges will be equipped with 100 percent inflow screening or baskets to better monitor the intake (if possible) or, if inflow screening is not possible, 100 percent overflow screening for sea turtles and their remains. Screening at 100 percent is required during the periods November 1 through 30 and April 1 through May 31. During periods when screening is required, a trained turtle observer will be placed on the hopper dredges to monitor for sea turtles for 100 percent of the period of dredging and transiting to and from the disposal area.

Dredging shall be suspended in accordance with the criteria established by the NMFS. The current regional Biological Opinion requires reinitiation of consultation -- including a temporary cessation of dredging -- whenever more than one turtle is taken in a day, and/or once five or more turtles are taken. Reinitiation of consultation would also take place upon the taking of one hawksbill turtle. Dredging operations will not commence again until NMFS remediation requirements are implemented, such as relocation trawling with a shrimp boat, to ensure compliance with the Endangered Species Act.

A report summarizing the take of sea turtles will be submitted to the NMFS immediately following completion of the project.

Restrictions to protect whales

Whales also receive protection under the ESA. The Regional Biological Opinion issued by the NMFS in 1995 and amended in 1997 also addressed potential impacts to right whales (Eubalaena glacialis) and humpback whales (Megaptera novaengliae) from dredging of navigation channels. The following conditions promulgated by the NMFS and South Atlantic Division apply to hopper dredging operations conducted by Savannah District to ensure the protection of whales:

- a. "The COE's continued participation in the Right Whale Early Warning System is necessary. Dredging within right whale critical habitat from December through March must follow the protocol established within the Early Warning System." (NMFS 1995 BO Terms and Conditions).
- b. "NMFS requires monitoring by endangered species observers with at-sea large whale identification experience to conduct daytime observations for whales between December 1 and March 31, when humpback and right whales occur in the vicinity of channels and borrow areas, north of Cape Canaveral. Monitoring will be 100% for the first year of the biological opinion, unless subsequently altered upon authorization from NMFS." (NMFS 1995 BO Terms and Conditions).
- c. "During daylight hours, the dredge operator must take necessary precautions to avoid whales." (NMFS 1995 BO Terms and Conditions).
- d. "During evening hours or when there is limited visibility due to fog or sea states greater than Beaufort 3, the dredge must slow down to 5 knots or less when transiting between project areas if whales have been spotted within 15 nm of the vessel's path within the previous 24 hours." (NMFS 1995 BO Terms and Conditions).

Note: The District requires "minimum safe speed" instead of "5 knots or less".

Summary: There will be 100 percent coverage by endangered species observers with at-sea large whale identification experience to conduct daytime observations for whales between December 1 and March 31. Monitoring by sea turtle observers is allowed between April 1 and November 30.

Note: The District allows one of the sea turtle observers, provided they meet the identification experience requirement, to serve as the whale observer, as long as he is on watch during transit of the dredge to the ODMDS or port.

During evening hours or when visibility is limited due to fog or sea states greater than Beaufort 3, the dredge must slow to a minimum safe speed when transiting the area when whales have been spotted within 15 nm of the vessel's path within the previous 24 hours.