

**Environmental Assessment for
Alternative Dredged Material Disposal Sites
in Charleston Harbor**

by

**A.F. Holland
D.E. Porter
R.F. Van Dolah
R.H. Dunlap
G.H. Steele
S.M. Upchurch**

**Marine Resources Research Institute
and
Office of Fisheries Management
South Carolina Wildlife and Marine Resources Department
Post Office Box 12559
Charleston, South Carolina 29422-2559**

February 1993

*Rec'd
1-93
LWS*

Executive Summary

Charleston Harbor is one of the most valuable economic resources in South Carolina and has a major role in national defense as a Navy home port. Large numbers of jobs and tax revenues result from the investments made in port facilities. The Harbor is also a valuable environmental resource providing spawning and nursery habitat for recreationally and commercially important fish and shellfish. The Harbor is used extensively for recreational fishing, shrimping, and boating.

The maintenance and development of navigational channels in Charleston Harbor is critical to the regional economy and national security. Annually, more than five million cubic yards of material must be removed from channels to maintain water depths required by shipping traffic. Construction of planned new port facilities and deepening of the Harbor to support a broader range of vessels will require more than twelve million cubic yards of additional dredged material disposal capacity. Activities associated with dredging, particularly the disposal of dredged material, may have substantial adverse impacts upon environmental resources.

Currently, the majority of material dredged from Charleston Harbor is deposited at a site located on the southern portion of Daniel Island which has large capacity, low environmental impact, and is economical to use. Unfortunately, the lease agreement for the use of Daniel Island expired in 1992, and the owner plans to develop the site into a community including residential housing, light industry, a shipping terminal, recreational space, and associated support services (e.g., schools).

Due to the impending loss of Daniel Island as a dredged material disposal site, the U.S. Army Corps of Engineers (USACOE) working with the South Carolina Coastal Council, the State Ports Authority (SPA), the U.S. Navy, and the City of Charleston initiated a study to identify alternatives to Daniel Island that have acceptable economic costs and environmental impacts. The USACOE was lead agency for conduct of the study and was responsible for the conduct of economic and engineering studies. The S.C. Wildlife and Marine Resources Department, Marine Resources Division (MRD), was contracted to conduct analyses to identify alternatives to Daniel Island that could sustain acceptable levels of environmental impacts. The alternative of not dredging the Harbor was not considered because the resultant economic and national security impacts were considered unacceptable.

MRD worked with the USACOE, other state and federal agencies, and the public, to identify alternative dredged material disposal sites that could be used in lieu of Daniel Island. Twenty prospective sites that had disposal capacities ranging from about one million cubic yards to 120 million cubic yards were identified. The areal extent of these sites ranged from 49 acres to over 9,800 acres. Sixteen were diked upland sites, two were diked estuarine sites, and two were uncontained ocean disposal sites. Six of the sites were existing dredged material disposal areas. The complete range of environmental conditions that exists in Charleston Harbor was represented by the alternative sites included in the evaluation. Multiple engineering configurations were evaluated for several sites.

MRD convened a workshop to define environmental concerns associated with construction and operations of dredged material disposal facilities in Charleston Harbor. Participants at the workshop included representatives of state and federal regulatory and resource management agencies, academic institutions, environmental activist groups, and cultural resource agencies. Environmental concerns associated with dredged material disposal facilities identified by participants at the workshop included:

- Impacts on existing environmental quality,
- Impacts on water quality,
- Critical habitat losses,
- Impacts on environments adjacent to candidate sites,
- Impacts on material cycles,
- Impacts on migration and movement patterns,
- Impacts on groundwater resources,
- Impacts on cultural resources,
- Impacts on human uses.

Projecting and contrasting the environmental consequences associated with siting of dredged material disposal facilities at the alternative sites required data collected in a standardized manner for all sites. MRD's review of the ecological literature for these sites found it to be fragmented, incomplete, and limited in spatial and temporal coverage. To overcome this problem, MRD developed a standardized data base of habitat types for the sites that provided data which could be used as a basis for projecting and evaluating environmental impacts for each of the environmental concerns identified. The habitat-cover data were developed using post-Hugo color infrared photography obtained by the National Aerial Photography Program (NAPP), existing nautical charts, and coastal bottom mapping data collected by the United States Environmental Protection Agency (EPA).

MRD developed quantitative measures (i.e., indicators) for projecting impacts associated with the environmental concerns identified at the workshop except impacts on groundwater resources and impacts on cultural resources. The South Carolina Water Resources Commission (WRC) was responsible for projecting impacts on groundwater resources, and Brockington and Associates, Inc., a Charleston based archaeological consulting firm, was responsible for projecting impacts on cultural resources. The indicators developed by MRD incorporated habitat-cover data and scientific knowledge about the sensitivity and vulnerability of habitats to estimate the relative magnitude of impacts associated with development of dredged material disposal facilities. The MRD analytical approach was also designed to allow the results obtained from WRC and Brockington and Associates, Inc. to be incorporated into the final assessment. Cumulative impacts were assessed by summing impacts across all environmental concerns. Environmental concerns were weighted equally for the cumulative impact assessment. Estimates of the degree of impact were adjusted for among-site differences in capacity to facilitate comparison of the alternatives. The final assessment we developed identified alternatives that had both small cumulative environmental impact and small environmental costs per cubic yard.

Major Conclusions were:

- None of the alternative sites were preferred habitat for threatened or endangered species or blocked migrational routes for recreationally and commercially important species.
- Existing diked dredged material disposal facilities at Yellow House Creek, Naval Weapons Station, Drum Island, and Clouter Creek were projected to represent the least threat to environmental resources and were the most acceptable alternatives to Daniel Island. These sites generally have large capacity and are located in regions of the Harbor where impacts on ecologically valuable resources are low. The smaller Ocean Dredged Material Disposal Site was also determined to be an acceptable alternative to Daniel Island for disposal of uncontaminated dredged material. The combined capacity of these existing disposal sites is about 240 million cubic yards. In combination, they provide most of the dredged material disposal capacity required for Charleston Harbor for the next 50 years.

- The most acceptable "new" site identified was Upper Thomas Island. Development of this site would provide about 25 million cubic yards of additional disposal capacity.
- Most of the sites do not warrant further evaluation as alternatives to Daniel Island because of the high environmental impact which would be associated with their development and use. Included in this group are the proposed Folly Beach Berm, modifications to the existing Morris Island disposal site, Patriots Point, Middle Shoal, Rodent Island alternatives, Lower Thomas Island, Fort Johnson, Cainhoy Road alternatives, Point Hope Island alternatives, and Parkers Island alternatives.