

File

8 May 1992

**DAUPHIN ISLAND, ALABAMA
FACT SHEET ON EROSION PROBLEMS**

Problem. Two separate reaches of shoreline on Dauphin Island, Alabama, have recently experienced severe erosion. One, at the east end of the island, is at Fort Gaines, a famous and historic structure which once guarded the mouth of Mobile Bay. The eroding shoreline extends past the fort for about a mile to include the U.S. Coast Guard recreation area and the beach front for a public campground just west of the USCG property. The other, about 3 miles west, is centered on a public park and fishing pier. Both sites are public property administered by the Dauphin Island Park and Beach Board, an agency of the State of Alabama (excluding the USCG area). Unfortunately, these two sites provide the only public access on the island to the Gulf of Mexico beach.

If the erosion continues unchecked at the east end of the island, the eventual destruction of Fort Gaines could occur. This event is, admittedly, some time in the future. In the mean time public use of the area is impaired and that area is becoming increasingly unsafe. The beach at the campground has eroded into the tree line and a walkway recently had to be relocated. At the public park, the fishing pier is being undermined, two pavilions built on top of the dune line now have a side hanging over a scarp on the dune face, the gulf end of a walkway has fallen off, and the edge of the building with the public rest rooms is almost at the erosion scarp.

Historical Background. Dauphin Island is a gulf coast barrier island with a long history of shoreline erosion and accretion and hurricane damage. The earliest maps show Dauphin Island and Petit Bois Island connected around 1717. Later the two islands were separated, probably by a hurricane. Dauphin Island was completely breached by a hurricane between 1909 and 1917. That breach was not shown on maps as filled until 1942. The island was again breached by a hurricane in September 1948 and March 1950 aerial photographs showed it was rejoined. Hurricane Frederic in 1979 caused massive washover on the west end but a complete breach did not occur. Shoreline change maps for the period 1942 to 1974 show gulf shoreline erosion rates of about 6 feet per year. Accretion of the west end between 1917 and 1974 added almost 2 miles of gulf shoreline to the island.

Late in the 1800's, the Corps of Engineers began installing a revetment seawall and short groins around the east end of the

island to protect Fort Gaines. An 1894 shoreline map shows progressive erosion of the east end of the island from 1856, the earliest survey, to 1893, with a total recession of about 200 feet during that period. There is a series of plans showing various installations of revetment plus stub groins from 1894 onward. All works were completed about 1909. These structures have survived with little to no maintenance and successfully protected the fort until the present. There is now evidence that the revetment seawall is beginning to fail as fill behind it is eroded by wave action.

The USCG recreation area just west of Fort Gaines has had severe erosion also. District representatives have visited the site and consulted with the USCG at least twice, but they did not have funds available for countermeasures. This area was once used by Brookley Air Force Base for recreation, also. Then it was maintained by the Corps, and our old surveys show erosion of that area back into the 1940's.

The Isle Dauphine Club is about half way between Fort Gaines and the public park. There is a short reach of beach opposite one hole of the Isle Dauphine Golf Course which has eroded for many years. A freshwater lake at that site has been endangered by the erosion, along with a significant portion of the course. Since the Isle Dauphine Club cannot afford massive protective works, that site presents an interesting exhibit of failed low cost shore protection methods.

A recent study by Dr. Scott Douglass (see below), a professor of Civil Engineer at the University of South Alabama, suggests that Shell and/or Pelican Island, a highly mobile island(s) just south of Dauphin Island, is actually a visible portion of the massive ebb tidal shoal at the mouth of Mobile Bay. As such, the island is part of the total sand transfer process. His work indicates that the island has migrated northward in the past, as it is now doing. This migration pushes Pelican Pass northward and erodes the shoreline on Dauphin Island until some natural force breaches the shoal island and restarts the migration process. Unfortunately, this is the site of the present public park and fishing pier.

Navigation Projects. The entrance to the Mobile Harbor ship channel runs a distance of about 5 miles from deep water in the Gulf of Mexico, through Mobile Pass, between Fort Gaines on Dauphin Island and Fort Morgan on the peninsula in Baldwin County, and into Mobile Bay. Work on the existing project commenced in 1931 and was completed in 1981. Phase I of the channel improvement authorized by the 1986 WRDA was completed in 1990 and the entrance channel is presently maintained at 47 feet deep by 600 feet wide.

There are two Federal small boat channels at Dauphin Island. The Dauphin Island Bay Channel provides a 7-foot by 100-foot entrance from Mississippi Sound into a 500-foot square turning basin at Dauphin Island village. The Fort Gaines Channel includes a 7-foot by 150-foot entrance channel from Mobile Bay into a 7 acre turning basin, also 7 feet deep, and a 6-foot by 40-foot channel from the turning basin into Dauphin Island Bay to a locally maintained channel in that bay. There is also a 7-foot channel from Mississippi Sound into Graveline Bay maintained by local interests.

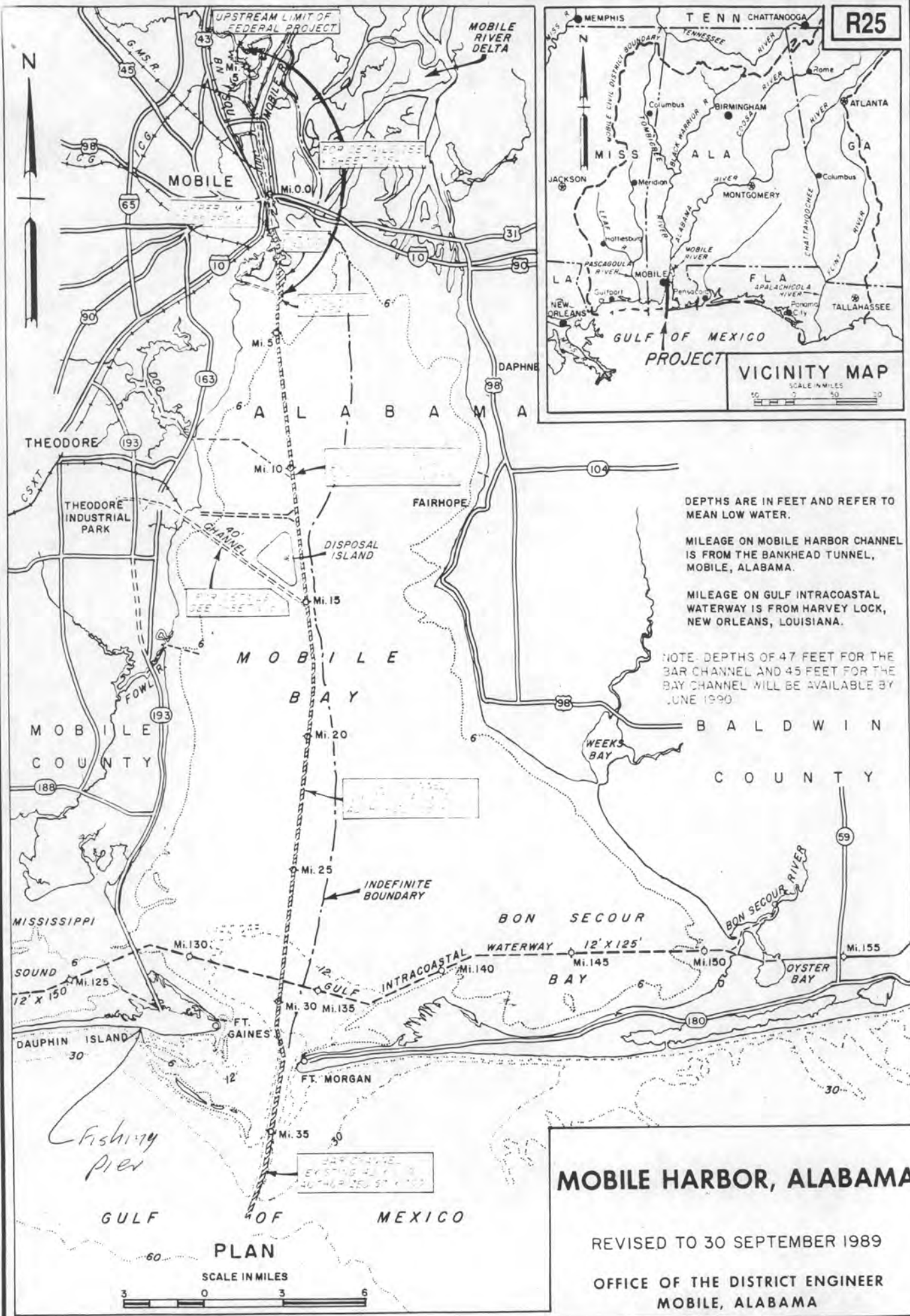
Previous COE Reports. In 1978 the Mobile District submitted a report, **MOBILE COUNTY, ALABAMA FEASIBILITY REPORT FOR BEACH EROSION CONTROL AND HURRICANE PROTECTION.** That study concluded that problems did exist, but, that structural solutions to those problems were either uneconomical or unacceptable to local interests. The sole recommendation in that report was for littoral zone placement near Dauphin Island of suitable material dredged during maintenance of the ship channel. This recommendation was based on a study of historical maps and charts that suggested that the practice of dumping material removed by hopper dredge in depths beyond littoral processes could be contributing to erosion on the island. That report was reviewed by the South Atlantic Division office and returned for revision. SAD indicated that revisions to the navigation project should be addressed in ongoing studies of that project. The report was never revised and resubmitted because there was no local interest.

Other Reports. Dr. Scott Douglass is a professor of Civil Engineer at the University of South Alabama with a background in coastal engineering. He has been acting as a consultant to the Alabama Department of Economic and Community Affairs, Coastal Programs Office. His first report was **SUMMARY OF EXISTING COASTAL ENGINEERING DATA FOR DAUPHIN ISLAND, ALABAMA,** dated January 1991. He has recently completed **COASTAL PROCESSES OF DAUPHIN ISLAND, ALABAMA,** dated February 25, 1992. That report has several conclusions. Those directly implicating Corps projects and activities include:

1. That maintenance dredging the ship channel "has completely blocked the natural, long-term source of sand for the beaches of Dauphin Island," and,
2. That the Fort Gaines channel has divided the littoral system on the eastern tip of the island. Dredging that channel is contributing to sand starvation on the eastern end by placing dredged sand on Little Dauphin Island, which is now a separate system.

Present Action. The Mobile District was recently funded for two Section 14 studies, East End Dauphin Island, Alabama, and Dauphin Island Shoreline, Alabama. While we are still in the early stages, the results to date clearly show that there is no Federal interest, as all benefits are directly attributable to recreation.

R25



DEPTHS ARE IN FEET AND REFER TO MEAN LOW WATER.

MILEAGE ON MOBILE HARBOR CHANNEL IS FROM THE BANKHEAD TUNNEL, MOBILE, ALABAMA.

MILEAGE ON GULF INTRACOASTAL WATERWAY IS FROM HARVEY LOCK, NEW ORLEANS, LOUISIANA.

NOTE: DEPTHS OF 47 FEET FOR THE BAR CHANNEL AND 45 FEET FOR THE BAY CHANNEL WILL BE AVAILABLE BY JUNE 1990.

MOBILE HARBOR, ALABAMA

REVISED TO 30 SEPTEMBER 1989

OFFICE OF THE DISTRICT ENGINEER
MOBILE, ALABAMA