

**FINAL  
INTEGRATED GENERAL REEVALUATION REPORT  
AND ENVIRONMENTAL IMPACT STATEMENT**

**SHORE PROTECTION**

**WEST ONSLOW BEACH AND NEW RIVER INLET  
(TOPSAIL BEACH)**

**NORTH CAROLINA**

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**1. STUDY OVERVIEW**

This General Reevaluation Report presents the results of studies to reexamine the feasibility of Federal shore protection for the Town of Topsail Beach, which is located on the southern end of Topsail Island. Topsail Island lies in Pender and Onslow Counties, North Carolina as indicated in Figure 1.1, Location and Vicinity Map. Topsail Beach was included in a Federal project for hurricane protection and beach erosion control that was authorized by Section 101 of the Water Resources Development Act (WRDA) of 1992. However, the project was not implemented, and the project was then placed in the inactive status. The island suffered storms and erosion in the late 1990s and the Town of Topsail Beach requested reactivation of the project. Following authorization by the Energy and Water Development Appropriations Act for Fiscal Year 2001, the General Reevaluation Study was started. The Town of Topsail Beach is the project sponsor. The study has evaluated alternative plans for protecting the commercial and residential structures and infrastructure of Topsail Beach. The study has resulted in a recommendation to modify the authorized project to meet current economic and environmental criteria. The scale and costs of the project have been optimized to produce the maximum net economic benefits, or National Economic Development (NED) Plan, as directed by Federal planning guidelines. The Town of Topsail Beach has chosen another feasible plan as the Locally Preferred Plan (LPP). The selected plan is the Locally Preferred Plan.

Comparisons of alternatives and selections of the NED Plan and the LPP were conducted at October 2004 price levels and interest rates. Detailed economic evaluations of the NED Plan and the LPP are presented at October 2008 price levels and interest rates.

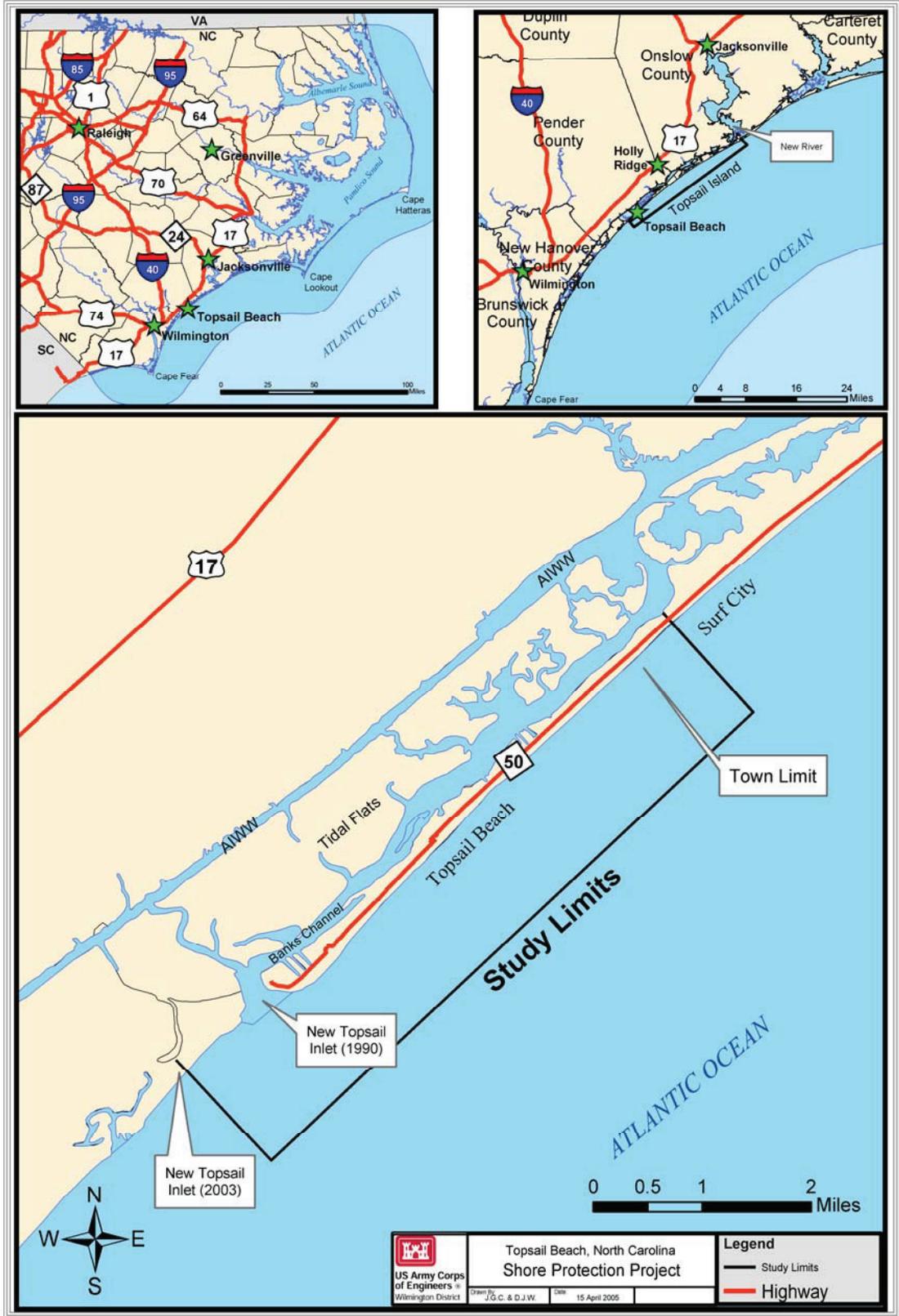


Figure 1.1 Location and Vicinity Map

## 1.01 Study Authority

Section 101 of the Water Resources Development Act (WRDA) of 1992 authorized the construction or implementation of the West Onslow Beach and New River Inlet (Topsail Beach) Shore Protection Project At Topsail Beach, Pender County, North Carolina. Applicable sections of WRDA92 are copied below.

### TITLE I – WATER RESOURCES PROJECTS

#### SEC. 101. PROJECT AUTHORIZATIONS.

Except as provided in this section, the following projects for water resources development and conservation and other purposes are

authorized to be carried out by the Secretary substantially in accordance with the plans, and subject to the conditions, recommended in the respective reports designated in this section:

(15) WEST ONSLOW AND NEW RIVER INLET, NORTH CAROLINA. – The project for flood control, West Onslow and New River Inlet, North Carolina: Report of the Chief of Engineers, dated November 19, 1991, at a total cost of \$14,100,000, with an estimated Federal cost of \$7,600,000 and an estimated non-Federal cost of \$6,500,000

This authorization was based upon information presented in House Document Number 393, 102<sup>nd</sup> Congress, 2<sup>nd</sup> Session, dated September 23, 1992, entitled "Final Feasibility Report and Environmental Impact Statement on Hurricane Protection and Beach Erosion Control, West Onslow Beach and New River Inlet, North Carolina (Topsail Beach)". This document will herein be referred to as "HD 393/102/2." The authorized project consisted of a dune, beach fill, and transition sections to improve shoreline conditions of the south end of Topsail Beach. More detailed description of the authorized project is provided in Section 1.09.

Authority to continue the preconstruction, engineering, and design (PED) investigations is contained in the Resolution adopted November 14, 1979, by the United States House of Representatives in accordance with Section 110 of the River and Harbor Act of 1962. The Design Memorandum prepared under PED was published in August 1992. However, the Project Cooperation Agreement was not executed and the project was then placed in the inactive status. The project was reactivated in 2000 at the request of the Town of Topsail Beach. The Energy and Water Development Appropriations Act for Fiscal Year 2001, Public Law 106-377, included funds for the Government to initiate a General Reevaluation Report (GRR) of the currently authorized West Onslow Beach and New River Inlet (Topsail Beach) Shore Protection Project, and the remaining shoreline at Topsail Beach. The scope of the study includes the entire shoreline of the town of Topsail Beach.

This General Reevaluation Report has been prepared in response to the April 9, 2001 letter from the Town of Topsail Beach and the Appropriations Act. The town's letters appear in Appendix H.

## **1.02 Study Area**

The focus of the General Reevaluation Study is the 6-mile long ocean shoreline of the Town of Topsail Beach. Topsail Beach is located at the southern end of Topsail Island adjacent to New Topsail Inlet in Pender County on the central North Carolina coast. Topsail Island is a 22-mile long and 0.5-mile wide barrier island located approximately 40 miles northeast of Wilmington, North Carolina. Due to the northeast-southwest orientation of the coastline, the island faces the Atlantic Ocean on the southeast. Other waterbodies in the vicinity include New Topsail Inlet immediately to the southwest, Banks Channel and the Atlantic Intracoastal Waterway (AIWW) to the northwest, and New River Inlet at the far northeastern end of the island. The study area is shown on Figure 1.1. More detailed maps of the study area are in Section 7, Figure 7.2 and in Appendix A, Figures A-7 and A-8.

Topsail Beach is uniformly developed with few undeveloped lots and a wide range of structures consisting mostly of single-family dwellings, some multi-unit apartment and condominium buildings, about 30 commercial buildings of various sorts, a few hotels and a sea turtle hospital. Most of the land in Topsail Beach suitable for development is already occupied with structures. Roadway access to the mainland is provided via N.C. Highway 50 to Surf City and then by bridges on N.C. Highway 50/210 at Surf City and N.C. Highway 210 at North Topsail Beach. Public access to the beach is provided by numerous parking areas and dune walkovers.

Over the past 35 years Topsail Beach has developed rapidly as a family ocean resort community for outdoor recreation. The Town of Topsail Beach estimates the peak seasonal population at more than 7,000. In the off-season the population drops to about 500 residents. During the summer months a large portion of the homes within the study area are available as summer rentals to vacationers primarily from inland North Carolina and other locations around the Eastern United States. There is one fishing pier in the project area.

### **1.03 Purpose and Need for Action**

The purpose and need for action includes reduction of potential future damages from hurricanes and storms suffered by residential and commercial properties and public infrastructure, and the need to address erosion of the shoreline as protection of the above. There is also a need to reduce erosion of the shoreline as an environmental resource in itself, in its protection to the terrestrial environment inland, and as a recreational resource to the public.

### **1.04 Scope of Study**

This study consists of reevaluation of the authorized improvement for the Town of Topsail Beach. A reevaluation study may reaffirm the previous plan, reformulate and modify the plan based on analysis of additional alternatives, or determine that no plan of improvement is justified under current planning criteria and policies.

### **1.05 Study Process**

The US Army Corps of Engineers (USACE) studies for water and related land resources follow detailed guidance provided in the Planning Guidance Notebook (Engineer Regulation 1105-2-100). This guidance is based upon the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies that were developed pursuant to Section 103 of the Water Resources Planning Act (P.L. 89-80) and Executive Order 11747, which were approved by the U.S. Water Resources Council in 1982 and by the President in 1983. A defined six-step process is used to identify and respond to problems and opportunities associated with the Federal objective and specific State and local concerns. The process involves an orderly and systematic approach to making evaluations and decisions at each step so that the public and the decision makers can be informed of basic assumptions made, the data and information analyzed, risk and uncertainty, the reasons and rationales used, and the significant implications of each alternative plan. The process concludes with the selection of a plan for recommendation. Specific aspects of this process are described in more detail in other sections of this document.

### **1.06 National Objective**

The Federal objective of water and related land resources project planning is to contribute to national economic development in a manner consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. If the projected benefits of shore protection measures at Topsail Beach exceed their estimated costs and are judged environmentally acceptable, their construction as a Federal project would contribute to this objective.

## 1.07 Prior Studies and Reports

The USACE has conducted a number of prior studies regarding the Topsail Island area and has prepared a number of related engineering, planning, and environmental reports. These studies have addressed shoreline erosion and hurricane protection as well as navigation needs. Reports particularly pertinent to the present study are briefly described below. Other reports related to the study area are cited in the Section 15, References.

### **Hurricane Protection and Erosion Control**

- House Document No. 480, 89th Congress, “Topsail Beach and Surf City, North Carolina.” This report, approved by Congress in 1966, presents the results of an investigation of Topsail Island conducted during the period 1963 – 1965 as part of a comprehensive study of shore protection needs for the segment of the North Carolina coast extending between Bogue and Moore Inlets. With approval of this report, Congress authorized hurricane protection and beach erosion control projects for the towns of Topsail Beach and Surf City. Improvements along the northernmost 11.7 miles of Topsail Island, referred to as West Onslow Beach, were determined to be economically infeasible. The improvements authorized by this report were not constructed, and the project was deauthorized August 5, 1977. The reason for this deauthorization was that there was no apparent non-Federal interest in the project following authorization.
- House Document No. 393, 102<sup>nd</sup> Congress, 2<sup>nd</sup> Session, “West Onslow Beach and New River Inlet, North Carolina.” This report (HD 393/102/2) was conducted pursuant to four congressional resolutions adopted between 1970 and 1979. The resolutions addressed beaches, channels and inlets in the greater vicinity of Topsail Island. Studies for navigation purpose were conducted separately. The recommendation of the Final Feasibility Report and Environmental Impact Statement on Hurricane Protection and Beach Erosion Control was a dune and berm system at Topsail Beach as described below in Section 1.09, Authorized Project.

### **Navigation**

- House Document No. 450, 69th Congress, “Inland Waterway, Beaufort – Cape Fear River.” This house document, approved by Congress in 1927, authorized construction of the AIWW from Beaufort to the Cape Fear River, with dimensions of 12 feet deep by 90 feet wide.
- House Document No. 421, 80th Congress, “Inland Waterway from Beaufort to Jacksonville, NC and New River to Jacksonville.” This house document, approved by Congress in 1948, authorized construction of a 12-foot deep by 90-foot wide channel in New River. However, the project was deferred for restudy

and has not been constructed. The natural river channel is considered adequate for existing river traffic and no improvements are being considered.

- House Document No. 691, 75th Congress, “Channel to New River Inlet.” This house document, approved by Congress June 20, 1938, authorized construction of a 6-foot deep by 90-foot wide channel from the AIWW through New River Inlet to the Atlantic Ocean.
- “Detailed Project Report on Improvement of Navigation, New Topsail Inlet and Connecting Channels.” This July 1965 report, approved by the Chief of Engineers April 7, 1966, authorized construction of a channel 8 feet deep by 150 feet wide through New Topsail Inlet. A connecting channel through Banks Channel to the Atlantic Intracoastal Waterway was also authorized under Continuing Authorities Program, Section 107 of the River and Harbor Act of July 14, 1960.
- “Detailed Project Report on Improvement of Navigation, New River Inlet, December 1987.” This report by the Wilmington District addresses that portion of the study authority concerning navigation at New River Inlet. The report recommends deepening of the authorized navigation channel from 6 to 8 feet and widening from 90 to 150 feet.

#### **1.08 Existing Federal Projects**

The nearest Federal hurricane and shore protection project is at Wrightsville Beach, which is 12 miles to the southwest and beyond this study area. A number of Federal navigation projects are located in this study area. They are listed and briefly described below.

- **Atlantic Intracoastal Waterway (AIWW)** - The AIWW provides an important inland navigation route from Norfolk, Virginia to the St. Johns River, Florida. The 308-mile-long North Carolina portion is the state's only north-south commercial navigation thoroughfare. The authorized project includes a navigation channel with a depth of 12 feet and widths varying from 90 feet in land cuts to 300 feet in open waters; side channels and basins at a number of locations; and five highway bridges. The Beaufort to Cape Fear River Section was authorized by House Document No. 450, 69th Congress, “Inland Waterway, Beaufort – Cape Fear River.” The main channel of the AIWW in North Carolina was completed in 1940, and it has since been maintained by dredging to remove shoals that develop periodically. Some of the dredged material removed during maintenance activities is beach quality sand. This material is placed directly on nearby ocean beaches, when practicable; otherwise, it is stockpiled in confined disposal areas near the shoreline of the AIWW. This sand can serve as a viable source of beach fill where it exists in sufficiently large volumes and in proximity to beaches.

- **New Topsail Inlet and Connecting Channels** – Channel 8 feet deep and 150 feet wide through New Topsail Inlet, with connecting channels 7 feet deep and 80 feet wide to the AIWW. The connecting channels are through Old Topsail Creek (1.42 miles) and Banks Channel (6.27 miles), both between the AIWW and New Topsail Inlet.
- **New River Inlet** – Channel 6 feet deep and 90 feet wide through New River Inlet to the AIWW, a length of 2.3 miles. The channel continues another 18.8 miles from the AIWW to highway US 17 at Jacksonville, NC, but has not been maintained.

### 1.09 Authorized Project

The plan authorized by HD 393/102/2 consisted of a dune and beach fill over a total of 19,200 feet of the south end of Topsail Beach, as shown in Figure 1.2. Reaches covered by the authorized project included a 1,800-foot south transition, a 10,250-foot main fill section, and a 7,150-foot north transition section. In the authorizing documents, elevations are referenced to mean sea level (m.s.l.), which in this study area is equivalent to +0.6 feet, National Geodetic Vertical Datum (NGVD), the currently used datum. The authorized project cross section consisted of a dune of 25-foot crest width at elevation 13 feet m.s.l. (13.6 feet NGVD) fronted by a storm berm of 35-foot width at elevation 9 feet m.s.l. (9.6 feet NGVD), and a beach berm of 40-foot width at elevation 7 feet m.s.l. (7.6 feet NGVD), as shown in Figure 1.3. The estimated in-place volume required was 4,566,000 cubic yards of sand including 644,000 of advance beach nourishment. The borrow source for the authorized project was a 1,000-foot by 5,000-foot site in Banks Channel, just north of New Topsail Inlet. The estimated frequency of renourishment was 2 years.

That plan authorized by HD 393/102/2 was a locally preferred plan formulated specifically to comply with the laws of the state of North Carolina prohibiting a terminal groin. The estimated Average Annual Cost for the authorized plan was \$2,362,000 (October 1989 price levels). The National Economic Development plan presented in HD 393/102/2 (Old 1990 NED plan) included a terminal groin and an estimated frequency of renourishment of 4 years. The estimated Average Annual Cost for the Old 1990 NED plan was \$2,057,000 (October 1989 price levels). Therefore the authorized plan was more costly than the Old 1990 NED plan, and the authorized plan's incremental cost would have been 100% non-federal cost. The resulting overall cost sharing was 54% Federal and 46% non-federal. In March 1993 Topsail Beach determined they could not support this incremental cost and did not execute the Project Cooperation Agreement.

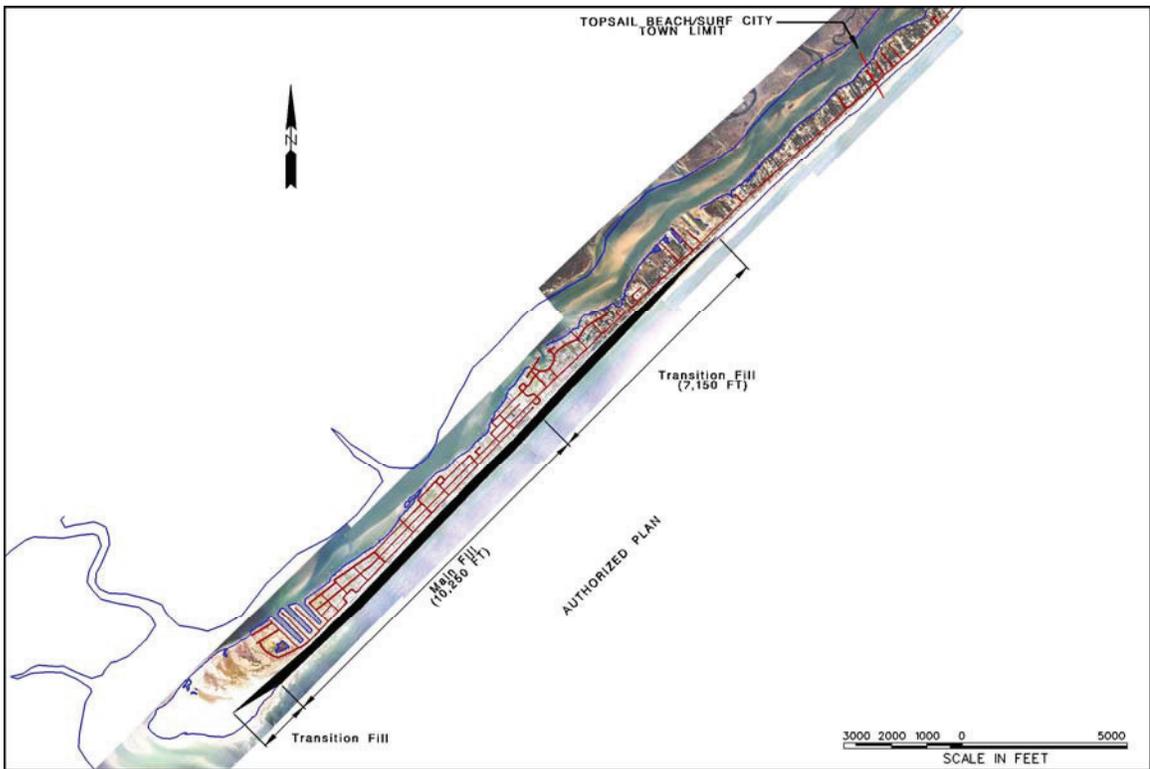


Figure 1.2 - General Map - Authorized Project

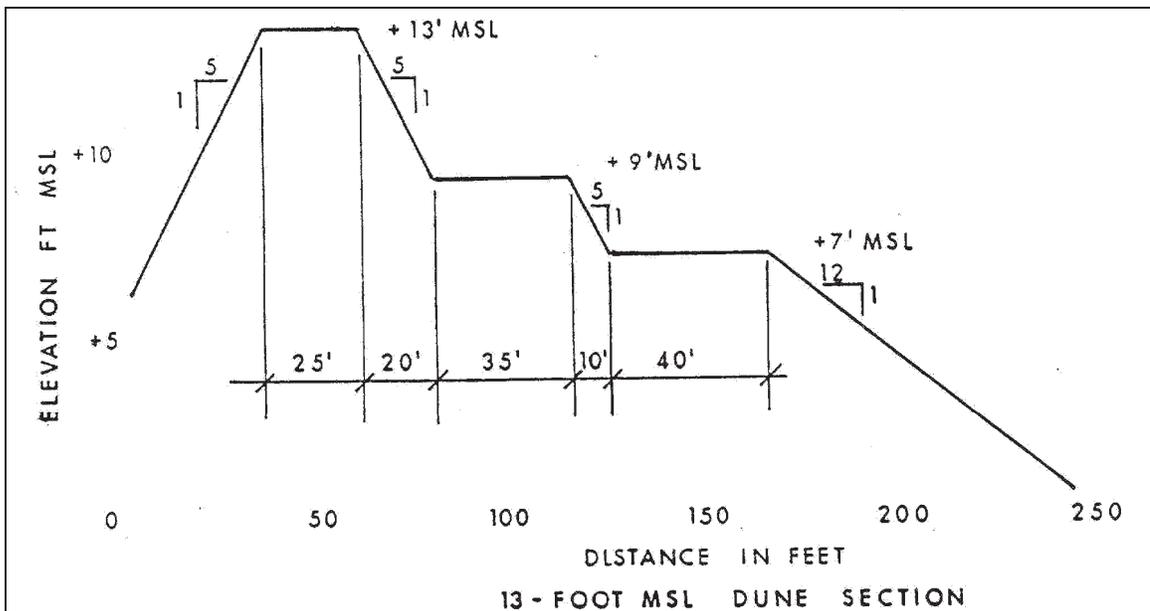


Figure 1.3 - Cross Section - Authorized Project

### 1.10 Section 902 Limit

The Authorized Project Cost was \$14,100,000 at price levels of October 1992. The Water Resources Development Act of 1986, Section 902, provides for an explicit limit to the cost increases which may be incurred in any water resources development project without further authorization by the Congress.

Project cost increases are limited to any modifications which do not materially alter the scope of the project and do not increase total project costs by more than 20 percent plus increases for inflation and for changes specifically authorized or required under Federal law. The originally authorized project cost, \$14,100,000 was for initial construction and no administrative limit on nourishment was established for this project. The Section 902 limit for the project is \$27,293,000 as calculated for October 2008 and applies only for initial construction. Table 1.1 provides a short summary of the development of the cost limit for this project.

Table 1.1 – Section 902 limit, authorized project, as of October 2008.

Line 1	
a. Current Project estimate at current price levels, October 2007	\$37,519,000
b. Current project cost estimate, inflated through construction	\$40,003,000
c. Ratio: Line 1b/Line 1a	1.0662
d. Authorized cost at current price levels	\$22,954,000
e. Authorized cost , inflated through construction, line 1c x line 1d:	\$24,473,000
Line 2	
Cost of modifications required by law (none)	\$0
Line 3:	
20 percent of authorized cost, 0.2 x \$14,100,000	\$2,820,000
Line 4:	
Maximum cost of limited by Section 902, Line 1e + Line 2 + Line 3:	\$27,293,000