GUIDE
SHORE EROSION PROTECTION

NORTH CAROLINA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
RALEIGH, NORTH CAROLINA

Technical Guide
Section III-H
August 1973

INTERIM GUIDES FOR SHORE EROSION PROTECTION IN NORTH CAROLINA

PURPOSE

These guidelines are intended to provide a source of information and guidance to Soil Conservation Service personnel as they work with soil and water conservation districts towards minimizing erosion of inland shorelines of North Carolina. The guidelines include the use of vegetative cover and simple structural measures to reduce the damaging effects of waves and currents. The guidelines may be used in giving technical assistance on shore erosion control to property owners, land developers, local government agencies and others who share this interest. It is recognized that the information contained in these guidelines will not be adequate to cover all problems which may arise, therefore, it is intended that they will be revised as more information is gained through experience. A valuable contribution to these guidelines in the form of information and drawings and guidance based on his experience in beach and shore protection work in Virginia was made by Fred B. Givens, Soil Conservation Service, Warsaw, Virginia. Some very helpful information and drawing suggestions were also provided by Clyde S. Sawyer, Soil Conservation Service, Raleigh, North Carolina, from his experience on beach and shore protection in North Carolina.

SCOPE

The Soil Conservation Service recognizes that the land and water use and treatment problems directly affected by shore erosion are within the scope of its proper activities. However, this area of activity is a very complex one and involves many situations outside the range of practicability for Service participation. The Corps of Engineers also has responsibilities for beach and shore protection, hence, any project in which SCS participates that might have off-site effects, should be coordinated with the District Engineer, Wilmington District Corps of Engineers, Wilmington, North Carolina.

AUTHORITY

Authority for granting permits to alter shorelines, marshlands, estuarine bottoms and tidelands in North Carolina are vested by

law in the North Carolina Department of Natural and Economic Resources and the U. S. Corps of Engineers. All applicable State and Federal laws and policies must be followed when providing technical assistance on shoreline installations. (See Engineering Memorandum NC-32, Re: SCS Responsibilities in Providing Assistance on Projects involving Tideland, Marshland, Estuarine Bottoms, Navigable Streams and State-Owned Lakes that Require Permits.)

GENERAL OBJECTIVES

It is the intent of these guidelines to help meet the following objectives:

1. To investigate and determine the expediency of using relatively inexpensive materials in shore protection in an effort to reduce the high costs which prevent the majority of shore front owners from protecting their property from erosion.

2. To provide technical assistance for the design and installation of simple erosion control devices that will help protect the property on which they are to be constructed without causing adverse effects to the adjacent property.

CONDITIONS WHERE THESE GUIDELINES APPLY

These guidelines apply to homesites, croplands, woodlands, recreation areas, and sites of high historic or land resource values along eroding shorelines of estuaries, bays, coves and sounds. They do not apply to coastlines directly exposed to the open sea or ocean. Neither do they apply to banks of non-tidal rivers and streams, or to inland lakes where little or no littoral drift occurs.

The measures proposed in these guidelines are intended to reduce shore erosion from the action of waves and currents generated by normal shore processes of tidal waters and moderate storms. They do not apply to erosion caused by infrequent storms of very high intensity or hurricane force winds. The methods of protection discussed may be subject to severe damage from storms of very high intensity. The frequency of occurrence of such storms should be considered when evaluating the economic benefits to be obtained from the installation of protective measures. These guidelines are limited to vegetative cover and simple structural measures, such as low groins for building up and maintaining beaches and small bulkheads for protecting banks or a combination of these. They do not apply to sites requiring large jetties, massive bulkheads or seawalls.

These guidelines limit the establishment of vegetative cover for protecting against surface erosion to areas where the action of waves and currents are slight.

The use of groins is limited to areas having sufficient littoral drift of sand materials to build a protective beach and to areas that have a gradual offshore slope.

The estimated life of groins and bulkheads, as contained in this guide, are from 15 to 20 years.

CAUSES OF SHORE EROSION, PHYSICAL FACTORS INVOLVED AND APPLICABLE SOLUTIONS

Shore erosion consists of wearing away of the land by the application of energy to shore materials. Causes of shore erosion may be categorized as long-term or short-term. The coastline of North Carolina is experiencing a very slow rise in sea level. The rise in sea level causes a readjustment of beach profiles indicated by shoreline retreat or erosion. This condition falls into the category of a long-term natural cause. Sediments in motion along shorelines, under the influence of tides, waves and currents encounter natural obstructions and entrapments. When supplies of sediment are denied to the adjacent shores, erosion may occur. This is also a long-term natural cause.

A common short-term natural cause of erosion is associated with the frequent storms experienced along coastal areas. The combination of storm waves and tides induces nearshore hydraulic circulations which move sediments offshore, creating erosion. Following a storm, restorative ground swells may return the displaced sediments to the shore and re-establish favorable shore conditions. If shoreline developments are placed too close to the shore, natural short-term beach fluctuations will inflict structural damages to these developments.

A common problem which may increase the effects of both long-term and short-term erosion is unwise development practices along shorelines, such as the destruction of natural protective vegetation and the installation of major structures which significantly change the natural configuration of the shore.

Determining the most efficient and least expensive method of protecting a shore front is technically complex and varies with each separate