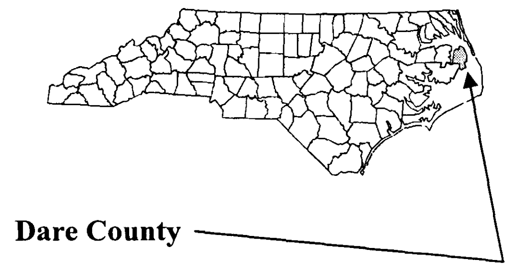
FLOOD INSURANCE STUDY

A Report of Flood Hazards in

DARE COUNTY, NORTH CAROLINA

AND INCORPORATED AREAS



Community Name	Community Number	River Basin
Dare County (Unincorporated Areas)	375348	Pasquotank, Tar-Pamlico
Duck, Town of	370632	Pasquotank
Kill Devil Hills, Town of	375353	Pasquotank
Kitty Hawk, Town of	370439	Pasquotank
Manteo, Town of	375355	Pasquotank
Nags Head, Town of	375356	Pasquotank
Southern Shores, Town of	370430	Pasquotank

North Carolina Cooperating Technical State

FEMA'S COOPERATING TECHNICAL PARTNER

September 20, 2006

Federal Emergency Management Agency
State of North Carolina

Flood Insurance Study Number
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FOREWORD

This countywide Flood Insurance Study (FIS) Report was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long-term approach to floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the state level. As a part of this effort, the State of North Carolina has joined with FEMA in a Cooperating Technical State (CTS) agreement to produce and maintain this FIS Report and the accompanying digital Flood Insurance Rate Map (FIRM) for North Carolina.

NOTICE TO FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

The following is a list of the publication dates of this Countywide FIS Report starting with the initial Report accompanying the North Carolina Statewide FIRM:

September 20, 2006

This FIS has been produced as part of the North Carolina Floodplain Mapping Program. Dare County, North Carolina, falls under the administrative jurisdiction of Region IV of the Federal Emergency Management Agency (FEMA). Questions concerning this FIS may be directed to the North Carolina Floodplain Mapping Program at www.ncfloodmaps.com, the FEMA Map Assistance Center by calling the toll-free information line at 1-877-FEMA MAP (1-877-336-2627), or by contacting the FEMA Regional Office at the following address:

FEMA, Federal Insurance and Mitigation Administration
Koger Center - Rutgers Building
3003 Chamblee Tucker Road
Atlanta, Georgia 30341
(770) 220-5400

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Section 1.0 - Introduction

1.1 The National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer-funded disaster relief for flood victims and the increasing amount of damage caused by floods. The NFIP makes federally backed flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. Federally backed flood insurance is available in more than 19,000 communities across the United States and its territories.

The NFIP is managed by the Federal Insurance and Mitigation Administration of the Federal Emergency Management Agency (FEMA). The Federal Insurance and Mitigation Administration manages the insurance component of the NFIP and oversees the flood hazard mapping and the floodplain management aspects of the program.

The NFIP, through involvement with communities, the insurance industry, and the lending industry, helps reduce flood damage by nearly $800 million a year. Further, buildings constructed in compliance with NFIP building standards suffer approximately 80% less damage annually than those not built in compliance. In addition, every $3 paid in flood insurance claims saves $1 in disaster assistance payments. The NFIP is self-supporting for the average historical loss year, which means that operating expenses and flood insurance claims are not paid by the taxpayer, but through premiums collected for flood insurance policies.

Additional information of interest to homeowners, community officials, insurance companies, lenders, and study contractors is available in Section 9.0 of this FIS Report and on the NFIP Internet homepage at http://www.fema.gov/nfip/index.htm.

1.2 Purpose of this Flood Insurance Study

Flood Insurance Studies (FISs) are one of the primary means by which the NFIP administers the National Flood Insurance Act of 1968, the Flood Disaster Protection Act of 1973, and the National Flood Insurance Reform Act of 1994. FISs develop flood risk data that are used to establish actuarial flood insurance rates. The information in this FIS Report will also be used by Dare County and the jurisdictions therein (hereinafter referred to collectively as Dare County) to facilitate the adoption and maintenance of floodplain management ordinances, which form the basis of communities' continued participation in the NFIP. Minimum requirements for participation in the NFIP are set forth in Title 44, Part 60, Section 3 of the Code of Federal Regulations (44 CFR 60.3). In some States and/or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. In such cases, the more restrictive criteria will take precedence, and the State and/or community (or other jurisdictional agency) will be able to explain them.

This FIS investigates the existence and severity of flood hazards in, or revises and updates previous FISs for, the geographic area of Dare County, North Carolina, including the jurisdictions listed in Table 1.

Table 1—Jurisdictions in Dare County

Community	Included in this FIS	Not Included in this FIS	If Not Included, Location of Flood Hazard/Flood Insurance Rate Data
Dare County (Unincorporated Areas)	X		
Duck, Town of	X		
Kill Devil Hills, Town of	X		
Kitty Hawk, Town of	X		
Manteo, Town of	X		
Nags Head, Town of	X		
Southern Shores, Town of	X		

1.3 FIS Components

A Flood Insurance Study (FIS) is an analysis of flood hazards, typically presented as a set of Flood Insurance Rate Map (FIRM) panels and the FIS Report, which includes a set of Flood Profiles.

Flood Insurance Rate Map

The FIRM shows 1% annual chance (100-year) and 0.2% annual chance (500-year) floodplains, using tints, screens, and symbols. Floodways, the locations of selected cross sections used in the hydraulic analyses and floodway computations, and Velocity Zones are shown where applicable. The FIRM for North Carolina has been produced digitally, and there are separate data layers that are available in the public domain via the Internet.

Flood Insurance Study Report

The FIS Report provides a context for the information shown on the FIRM, as well as a summary of the data upon which the analyses are based. It also includes an index of sources of additional information on the NFIP.

Flood Profiles

A Flood Profile is provided for every stream studied in detail, showing the continuum of calculated flood elevations of various recurrence periods along the studied reaches. Flood Profiles are the documents that serve as a basis for determining flood insurance rate zones.

Section 2.0 – Floodplain Management Applications

Flood events of a magnitude expected to occur with a 10%, 2%, 1%, or 0.2% annual chance have been selected as having special significance for developing sound floodplain management programs. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10%, 2%, 1%, and 0.2% chance, respectively, of being equaled in any given year. Therefore, FIS Reports typically determine water-surface elevations for floods with these probabilities. The FIRM delineates 1% and 0.2% annual chance floodplains and 1% annual chance floodway boundaries, and depicts 1% annual chance flood elevations, rounded to the nearest foot, to assist in developing floodplain management measures.

2.1 Floodplains

To provide a national standard without regional discrimination, the 1% annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. A 1% annual chance flood, or base flood, is defined as that having a 1% chance of being equaled or exceeded in any given year. The 1% annual chance floodplains shown on the FIRM identify areas that are expected to be inundated by the 1% annual chance flood. This 1% annual chance floodplain is also called a Special Flood Hazard Area (SFHA), where the NFIP's floodplain management regulations must be enforced by the community as a condition of participation in the NFIP. The 0.2% annual chance floodplain is employed to indicate additional areas of flood risk associated with exceptionally severe floods.

2.2 Floodways

Encroachment on floodplains such as that caused by placement of structures and fill reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, floodways are provided as a tool to assist local communities in this aspect of floodplain management. Under this concept, the 1% annual chance riverine floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. Figure 1, "Floodway Schematic," illustrates this principle. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this FIS are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional encroachment studies.

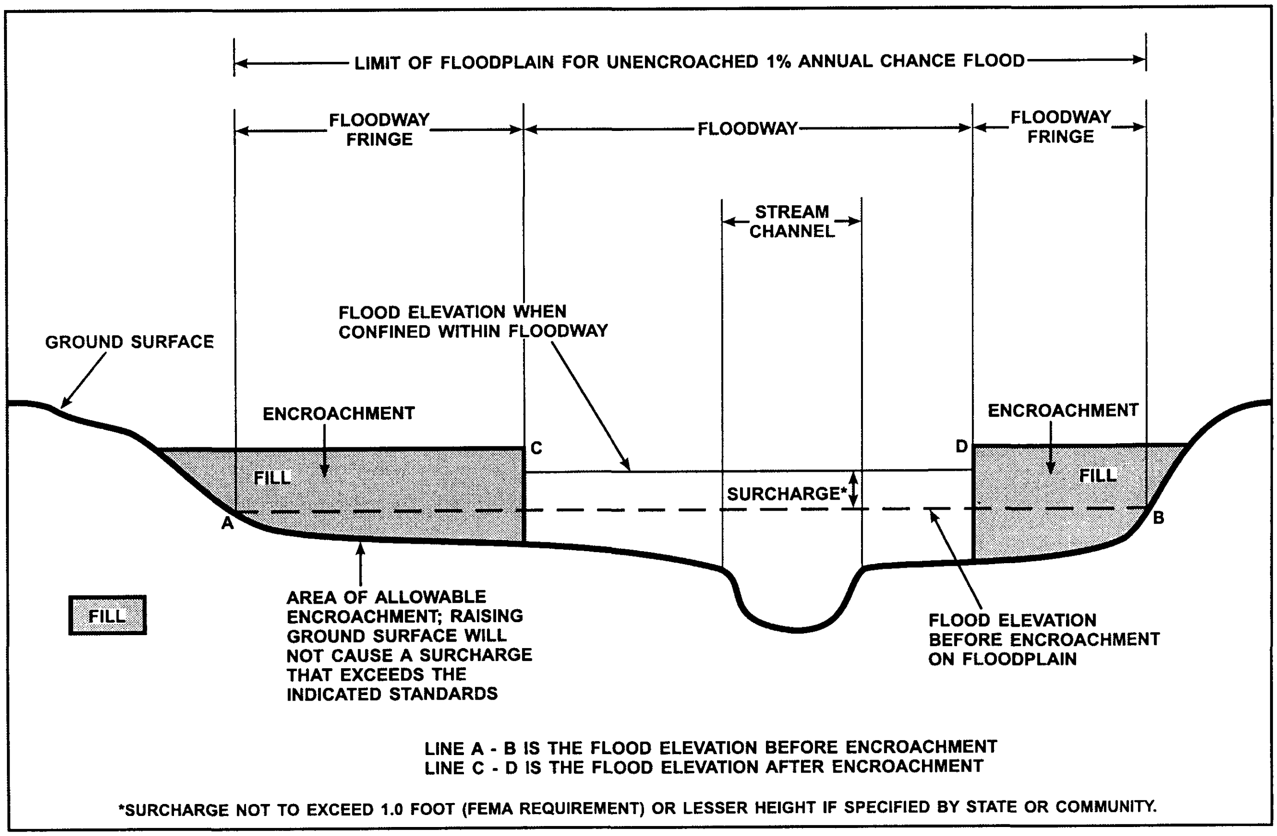


Figure 1—Floodway Schematic

2.3 Base Flood Elevations

Base Flood Elevations (BFEs) are shown on the FIRM and represent rounded, whole-foot elevations at selected locations along flooding sources that have been studied in detail. Flood Profiles in this FIS Report provide a comprehensive and definitive tool to determine specific flood elevations along a stream studied by detailed methods. In order to reduce the risk of damage from floods up to the base (1% annual chance) flood, communities are advised to consider these elevations when issuing building permits for structures.

Coastal flood elevations are provided in the Summary of Coastal Stillwater Elevations table in this report. If the elevation on the FIRM is higher than the elevation shown in this table, a wave height, wave runup and/or wave setup component likely exists, in which case, the higher elevation should be used for construction and/or floodplain management purposes.

2.4 Watershed Characteristics

Because a FIS is a probability analysis that may not account for some of the factors listed below, communities are strongly encouraged to consider adopting more restrictive or higher floodplain management criteria or ordinances than the minimum Federal requirements. Communities may also increase the validity of their flood hazard data by investing in continuous maintenance of river gages (see the **Data Validity and Reliability** paragraph below). If the U.S. Geological Survey (USGS) or other agencies do not maintain gages on the flooding sources of interest, partnerships with the USGS may be pursued, or local gages may be installed. For more information, see Section 9.0 of this report.

This flood hazard study represents an analysis of certain watershed characteristics, some of which are summarized as follows:

Drainage Area
In general, streams that drain larger areas have greater flood hazards. FISs, in North Carolina, do not typically analyze flood hazards in places with rural drainage areas of less than one square mile and within urban drainage areas of less than ½ square mile.

Soil Permeability and Infiltration
Differences in the types of soil and the amount of vegetation in a watershed have a significant effect on the amount of water that the soil can absorb; soils with a high sand content absorb much more water than soils with a high clay content. The presence of vegetation increases infiltration; the presence of pavement decreases infiltration and also speeds runoff to receiving waters. As soil permeability and infiltration decrease, the volume and rate of overland flow increases.

Soil Moisture Conditions
In addition to soil permeability and infiltration, the level of the water table helps determine the saturation point, beyond which no water is absorbed. As rainfall duration increases, the height of the water table increases.

Channel and Floodplain Geometry
The geometric contour of a streambed, termed channel geometry, and the geometric contour of a floodplain determine the volume of water that a channel can hold and partially determine the rate at which water flows through it.

Channel and Floodplain Roughness
The roughness of a surface affects the characteristics of runoff whether the water is on the surface of the watershed or in the channel.

FIS Reports include analyses of how these factors will combine to produce overland flow patterns during floods that have a certain probability of occurring in any given year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at shorter intervals or even within the same year. The risk of experiencing a rare flood increases when longer periods are considered. For example, the risk of having a flood which equals or exceeds the 1% annual chance flood (1% chance of annual exceedence) in any 50-year period is approximately 40% (4 in 10), but for any 90-year period, the risk increases to approximately 60% (6 in 10).

It is important to note that the 1% annual chance flood is used as the national standard to allow a consistent approach to floodplain management, flood hazard assessment, and flood hazard mapping. In any given community, a number of factors may result in flooding characteristics that do not conform to predicted conditions. Therefore, the determination that an area is not shown on the FIRM as being within a Special Flood Hazard Area is no guarantee that it will not flood during a 1% annual chance flood. Examples of these factors include Data Validity and Reliability; Developmental and Topographic Changes Over Time; Erosion, Deposition, and Debris Flow; and Meandering and Lateral Migration.

Data Validity and Reliability

Certain types of analysis methods yield more justifiable characterizations of flood hazards. For example, a gage analysis, to determine peak discharges, is based on actual measurements of watershed conditions over time and, therefore, is typically considered the most accurate method of hydrologic analysis. However, it is not feasible to install enough gages to gather data on every stream. In addition, for many of the gage sites that do exist, there are interruptions in the period of record. The usefulness of gage data for the purpose of predicting flooding behavior decreases with interruptions in the period of record; predicted flooding conditions over a 100-year period based on 20 years of measurements spread over a 35-year period are less valid than those based on 30 years of continuous measurements. A regression analysis is typically considered the best method in the absence of gage data, as it uses gage data from watersheds with similar characteristics to estimate flood frequency and magnitude in an ungaged watershed. Regression equations reflect average conditions for a region; therefore, the results will not exactly match the results of a gage analysis at a particular location. The standard errors of the North Carolina rural regression equations range from 44 to 51 percent for estimates of the 1% annual chance flood. That means the difference between the results of the regression equation and the gage analysis for approximately two-thirds of the locations that gage data exists are within 44 to 51 percent of the gage analysis results. A rainfall-runoff hydrologic analysis may be used for gaged or ungaged watersheds, and can estimate the effects of storage areas and flood control structures and measures. This method is most valid when calibrated against historical data.

Developmental and Topographic Changes Over Time

A FIRM is based on the best topographic and planimetric information available to FEMA and the State of North Carolina at the time the study is produced. In time, however, development and/or natural phenomena can alter the physical characteristics of a watershed and its drainage channels, resulting in changes in the flood hazards in those areas. For example, constructing a housing subdivision reduces the amount of soil that is available to absorb water; this in turn causes an increase in the volume of surface water that flows into the channel.

Erosion, Deposition, and Debris Flow

The flood hazards shown on a FIRM are based on the assumption of unobstructed flow. The FIRM does not reflect an analysis of areas that are subject to erosion caused by the increased water-surface elevations and velocities that occur during flooding. In addition to the risks of landslides or a weakening of the ground underneath roads or structures, any sediment that is removed from one location will be deposited in another; accumulated deposits may have a pronounced effect on flood hazards in those areas. Similarly, debris such as fallen trees or branches, litter, or other items may obstruct stream channels or hydraulic structures, increasing water-surface elevations, velocities, and floodplain width.

Meandering and Lateral Migration

FISs are based on the assumption that channel geometry will remain stable during normal drainage and during flood events. This assumption is valid for most streams, which flow over bedrock or between bedrock outcroppings that form non-alluvial channels. However, alluvial streams change the channel geometry with time, significantly so during flood events. Alluvial streams are subject to erosion and deposition, which may result in braided or meandering channels. Streams of this type may be characterized by lateral migration, or channel shifting, in which the stream may change course entirely during a flood. Whenever clear evidence is available, a FIRM will identify the alluvial nature of a studied flooding source and designate wider floodways to allow for potential migration. However, these floodways are based on qualitative assessments and not on quantitative geomorphic and engineering analyses.

Section 3.0 – Insurance Applications

For flood insurance applications, the FIRM designates flood insurance rate zones and, in 1% annual chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies. Table 2, "Flood Zone Designations," includes a description of each type of flood hazard zone.

Table 2—Flood Zone Designations

Zone	Description
A	Zone A is the flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined in the FIS Report by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations or depths are shown within this zone.
AE	Zone AE is the flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined in the FIS Report by detailed methods. In most instances, whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
AH	Zone AH is the flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
AO	Zone AO is the flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.
AR	Zone AR is the flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
A99	Zone A99 is the flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No Base Flood Elevations or depths are shown within this zone.
V	Zone V is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no Base Flood Elevations are shown within this zone.
VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Table 2—Flood Zone Designations

Zone	Description
X	Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2% annual chance floodplain, areas within the 0.2% annual chance floodplain, and to areas of 1% annual chance flooding where average depths are less than 1 foot, areas of 1% annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone.
D	Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

3.1 Coastal Barrier Resources System

The FIRM for North Carolina includes areas designated by Congress as units of the Coastal Barrier Resources System (CBRS), where federally backed flood insurance is not available.

The Coastal Barrier Resources Act of 1982 and the Coastal Barrier Improvement Act of 1990 define and establish a system of protected coastal areas (including the Great Lakes) known as the CBRS. The Acts define areas within the CBRS as depositional geologic features consisting of unconsolidated sedimentary materials; subject to wave, tidal, and wind energies; and protecting landward aquatic habitats from direct wave attack. The Acts further define coastal barriers as "all associated aquatic habitats, including the adjacent wetlands, marshes, estuaries, inlets and nearshore waters, but only if such features and associated habitats contain few manmade structures and these structures and man's activities on such features, and within such habitats do not significantly impede geomorphic and ecological processes." The Acts provide protection to CBRS areas by prohibiting most expenditures of Federal funds within them. These prohibitions refer to "any form of loan, grant, guarantee, insurance, payment, rebate, subsidy or any other form of direct or indirect Federal assistance," with specific and limited exceptions. The CBRS boundaries depicted on the FIRM for North Carolina were adopted into public law by Acts of Congress and are, therefore, considered final and not subject to appeal.

In addition to the CBRS, the Coastal Barrier Improvement Act of 1990 established Otherwise Protected Areas (OPAs). OPAs are undeveloped coastal barriers within the boundaries of an area established under Federal, State, or local law, or held by a qualifying organization, primarily for wildlife refuge, sanctuary, recreational, or natural resource conservation purposes.

Congress designated the initial CBRS areas in 1982. Subsequent modifications of the CBRS are introduced as legislation to be acted on by Congress, and originate from State and local requests, as well as recommendations made by the U.S. Fish and Wildlife Service. After Congress approves additions to the CBRS, the new areas are assigned a unique effective date, after which Federal assistance prohibitions apply. In cooperation with the U.S. Department of the Interior, FEMA transfers CBRS boundaries to FIRMs using Congressionally adopted source maps titled *Coastal Barrier Resources System*. FIRMs clearly depict the different CBRS areas and their effective dates with special map notes and symbols. It should be noted that although FEMA shows CBRS areas on FIRMs, only Congress may authorize a revision of CBRS boundaries.

Section 3.0 – Insurance Applications

Within CBRS boundaries, Federal flood insurance is not available for structures built or substantially improved on or after the date that the subject area was added to the CBRS. To assist map users in determining the correct insurance prohibition date in CBRS areas, each separate CBRS unit is clearly identified on the FIRM. It is important to note that insurance for structures in OPAs may be obtained if written documentation is provided, which certifies that the structures are used in a manner consistent with the purpose for which the area is protected.

Section 4.0 – Area Studied

4.1 Basin Characteristics

Pasquotank River Basin

The Pasquotank River Basin is located in the northeast corner of North Carolina's Coastal Plain region and covers approximately 3,700 square miles. A small portion of the basin extends north into Virginia. The basin is bordered by the Roanoke River Basin to the west, the Chowan River Basin to the west and northwest, Virginia to the north, the Atlantic Ocean to the east, and the Tar-Pamlico River Basin to the southwest and south. The Pasquotank River Basin is part of the Albemarle-Pamlico Estuarine system, one of the largest estuarine systems in the United States.

The Pasquotank River Basin is made up of many smaller watersheds that flow into Albemarle, Currituck, Croatan, Roanoke, and northeastern Pamlico Sounds. The basin is named for the Pasquotank River, a tributary to Albemarle Sound. The Pasquotank River flows along the border between Pasquotank and Camden Counties. Upstream of Elizabeth City the river is freshwater, but downstream it is brackish and tidally influenced.

The land area encompassed by the Pasquotank River Basin is low-lying with extensive open waters. The total distance of freshwater flooding sources is approximately 475 miles. The total area of saltwater in the basin is approximately 868,800 acres.

Included in the many natural wetland ecosystems are various endangered and threatened mammals, fish, and birds. The basin contains two State Parks, two State Natural Areas, five National Wildlife Refuges, many Significant Natural Heritage Areas, as designated by the North Carolina Natural Heritage Program, and other protected areas.

The Pasquotank River Basin includes 10 counties and 11 municipalities in North Carolina. Based upon 2000 census data, the population in Dare County is approximately 125,021. The population density is greatest in Elizabeth City and the Kill Devil Hills-Nags Head area.

Land cover in the basin consists mainly of open water area. In addition, a significant amount of land cover is agricultural land, which relies largely on the use of drainage canals, wetlands, and forestland. Land use in the basin also consists of federally owned land that is designated as National Wildlife Refuge land.

Agriculture and commercial fishing largely support the economy of the Pasquotank River Basin. Other strong industries include tourism and recreation, especially in the Outer Banks region of the basin. Construction and manufacturing are also important to the economy.

Given the historical impact of hurricanes, tropical storms, and northeasters on the coastal plain of North Carolina, both riverine and coastal flooding are significant problems. Flooding in the Pasquotank River Basin occurs as both flooding due to rain and, in areas near the coastline, flooding due to wind-driven surges that are generated by tropical storms and hurricanes in the Atlantic Ocean.

Tar-Pamlico River Basin

The Tar-Pamlico River Basin extends from its headwaters in the north central Piedmont section of North Carolina to the Atlantic Ocean. The basin is bordered by the Roanoke River Basin to the north and northwest, the Pasquotank River Basin to the north and northeast, the Atlantic Ocean to the east, and the Neuse River Basin to the southwest and south. The basin covers approximately 5,500 square miles and is the fourth largest basin in North Carolina. It is also one of four river basins that lies entirely within the State boundaries.

The basin originates in the Piedmont region in Person and Granville Counties and continues in a southeast direction toward Pamlico Sound. The upstream portion of the river from its headwaters downstream to the City of Washington is named the Tar River. Downstream from the City of Washington to Pamlico Sound, the main flooding source is named the Pamlico River. Most of the Tar River is freshwater, whereas the Pamlico River is entirely estuarine.

Approximately four-fifths of the Tar-Pamlico River Basin is located within the Coastal Plain region of North Carolina, while the remaining one-fifth lies within the Piedmont region. Slow-moving streams surrounded by swamps, forests, low-lying marshes, and estuarine areas characterize the water flow in the Coastal Plain region.

Overall, the Tar-Pamlico River Basin contains approximately 2,350 miles of freshwater flooding sources, approximately 634,000 acres of saltwater, most of which is located in the Pamlico Sound and its tributaries, and thousands of acres of lakes and reservoir waters. One of these lakes, Lake Mattamuskeet, is the largest natural lake in North Carolina.

The Tar-Pamlico River Basin encompasses all or part of 19 counties and 53 municipalities. Only small portions of Carteret, Tyrrell and Washington Counties are located in the Tar-Pamlico River Basin with no flooding sources located in these areas. The basin includes dense populations in the vicinity of the larger municipalities, as well as sparse populations in rural areas. Data from the 2000 census indicate that the population of the basin is approximately 29,967.

The topography of the Tar-Pamlico River Basin consists of relatively flat terrain in the Coastal Plain region to gently rolling hills in the Piedmont region. The approximate land use in the basin is as follows: 54% forestland and wetland, 22% agricultural cropland, 20% open water area, 3% managed pastureland, and 1% urban land.

The Tar-Pamlico River Basin contains many natural resources including rare species of plants, birds, and fish and mussels. In the lower area of the basin, the Pamlico River and Pamlico Sound are home to significant fishery resources. Additionally, the basin includes all or part of three National Wildlife Refuges, two State Parks, and six Significant Natural Heritage Areas, as established by the North Carolina Natural Heritage Program.

Agriculture and commercial fishing largely support the economy of the Tar-Pamlico River Basin. Also important to the economy are textile and wood product manufacturing.

Given the historical impact of hurricanes, tropical storms, and northeasters on the coastal plain of North Carolina, both riverine and coastal flooding cause significant problems. Flooding in the Tar-Pamlico River Basin occurs not only as a result of rain but also in coastline areas, where surges generated by tropical storms and hurricanes in the Atlantic Ocean cause flooding.

4.2 Principal Flood Problems

North Carolina experiences hurricanes, tropical storms, and severe extratropical cyclones, usually referred to as "northeasters." Unlike a hurricane, which may pass over a coastal location in a fraction of a day, a northeaster may blow from the same direction and over long distances for several days (Simon Baker, 1978). The contribution from northeasters to the overall storm-surge elevation in the Dare County area was found to be significant.

The dominant source of flooding in Dare County is storm surge generated in the Atlantic Ocean by tropical storms and hurricanes. In addition, this surge propagates into Pamlico Sound and Albemarle Sound and further propagates into the Alligator River, Croatan Sound, Currituck Sound, Davis Channel, East Lake, Old House Channel, Roanoke Sound, and South Lake, where high winds associated with tropical storms may produce high waves. The wave action associated with storm surge can be more damaging than the higher water level. Not all storms which pass near the study area produce extremely high surge. Similarly, storms which produce flooding conditions in one area may not necessarily produce flooding conditions in other parts of the study area.

4.3 Historic Flood Elevations

Storms passing North Carolina in the vicinity of Dare County have produced severe floods and extensive structural damage. Brief descriptions of several significant storms provide historical information to which coastal flood hazards and flood depths can be compared (U.S. Army Corps of Engineers, 1977).

October 5 to 18, 1954 (Hurricane Hazel)
Hurricane Hazel was the most destructive storm in the history of North Carolina. The storm crossed the coast just north of Myrtle Beach, South Carolina, as hurricane winds hit the Atlantic coast between the City of Georgetown, South Carolina, and Cape Lookout, North Carolina. Storm tides (i.e., hurricane surge) devastated the immediate ocean front of this stretch of coast. Every fishing pier along 170 miles of coast, from Myrtle Beach, South Carolina, to Cedar Island, North Carolina, was destroyed. The waterfront between the South Carolina – North Carolina state line and Cape Fear was completely destroyed. Grass-covered dunes, some 20 feet high, along and behind which beach homes had been built in a continuous line five miles long, simply disappeared—dunes, houses, and all. From Cape Fear to Cape Lookout, the degree of devastation was not a great, but ocean front property was damaged an average of 50 percent along this entire stretch. North of Cape Lookout, damage was relatively light.

Storm surge of 16.6 feet above the NGVD was observed at Holden Beach Bridge and the Town of Calabash, North Carolina. The lowest recorded barometric pressure of the storm was 938 millibars (mb), reported at Little River Inlet on the North Carolina – South Carolina border. Maximum wind speeds were 83 miles per hour (mph), with gusts recorded at 98 mph at the City of Wilmington, North Carolina; 106 mph at Myrtle Beach, South Carolina; and an estimated 150 mph at Cape Fear. The storm continued inland through North Carolina causing widespread damage as a result of high winds and record rainfall. Nineteen people were killed and 200 injured during this storm.

August 3 to 14, 1955 (Hurricane Connie)
Hurricane Connie entered North Carolina close to Cape Lookout at about 8:30 a.m. on August 12, 1955. The prolonged pounding of high waves against the coast caused tremendous beach erosion, probably worse than that caused by Hurricane Hazel in 1954. Storm tides along the coast from the City of Southport to the Town of Nags Head were reported to be about 7 feet NGVD (6.9 feet NGVD at Wrightsville Beach and 7.5 feet NGVD at Kure Beach). Water in sounds and near the mouths of rivers was five to eight feet above normal. At the City of Wilmington, winds were reported at 72 mph, gusting to 83 mph. At Fort Macon, winds of 75 mph, gusts of 100 mph, and

a barometric pressure of 962 mb were reported. The storm also brought torrential rains with the maximum rainfall, around 12 inches to 48 hours, occurring near the City of Morehead City. Total damage throughout the state was estimated at $50 million.

August 7 to 21, 1955 (Hurricane Diane)
Five days after Hurricane Connie, and before the damage from that storm could be estimated, Hurricane Diane struck the coast near Carolina Beach about 6 a.m. on August 17, 1955. The highest wind speed reported during this storm was 74 mph at Wilmington Airport. Storm tides ranged from five to nine feet above mean low water on the beaches (6.8 feet NGVD at Wrightsville Beach), and in some areas of sounds and rivers emptying into sounds, estimated water levels were five to nine feet above normal. Water was three feet above floor level in the business district of the Town of Belhaven and "waist deep" in parts of the Cities of Washington and New Bern. Hurricane Diana caused severe beach erosion along the North Carolina coast. The total damage caused in North Carolina by Hurricanes Connie and Diane was estimated to be in excess of $90 million. No deaths or injuries in North Carolina were attributed to either of the storms.

September 10 to 23, 1955 (Hurricane Ione)
Hurricane Ione moved up from the south and crossed the North Carolina coast near Salter Path, 10 miles west of Morehead City, at about 5 a.m. on September 19. It then slowly curved to the northeast and went out to sea near the Virginia border early on September 20. When Ione entered North Carolina, winds gusted to over 100 mph. Wind speeds of 75 mph with gusts to 107 mph were recorded at Cherry Point. The minimum barometric pressure recorded over North Carolina during this storm was 960 mb. Heavy rains also accompanied Ione. At the same time, prolonged easterly winds drove tidal water onto beaches and into sounds and estuaries to heights 3 to 10 feet above normal. The result was the largest inundation of eastern North Carolina ever known to have occurred. At New Bern, the depth of the flood was the greatest ever recorded, about 10.5 feet above mean low water; forty city blocks were flooded, several hundred homes were washed away, and thousands more were flooded with up to 4 feet of water. A high tide of 6.9 feet NGVD was reported at Atlantic Beach, North Carolina, and an estimated 5.3 feet NGVD at Wrightsville Beach.

September 21 to October 3, 1958 (Hurricane Helene)
Hurricane Helene was one of the most powerful storms of recent history; fortunately for the people of North Carolina, the storm center was well out to sea as it moved north on September 26 and 27. Nevertheless, high winds were recorded at Wilmington, with the highest winds measured at 85 mph and peak gusts recorded at 135 mph. The lowest reported central pressure of the storm was 932 mb; this measurement was recorded south-southeast of Cape Fear early on the morning of the 27th. There was some beach erosion due to the seas and tides, but this erosion was minimized by the fact that the storm occurred at a time of low astronomical tides. High tides were estimated at 3 to 5 feet above normal; a high tide of 5.1 feet NGVD was reported at Wrightsville Beach. Tides were higher on the southern edge of Pamlico Sound, when the wind shifted as the storm center passed it brought the tides 7 to 8 feet above normal.

August 29 to September 13, 1960 (Hurricane Donna)
Hurricane Donna crossed the North Carolina Coast between Wilmington and Morehead City on September 11. The center of the storm passed a few miles east of Wrightsville Beach, although Wilmington and Wrightsville Beach were each in the eye for about an hour. The lowest barometric pressure recorded during this storm was 962 mb at Wilmington. High tides, 6 to 8

feet above normal, together with high winds, caused severe damage at many points. Winds of hurricane force, up to 97 mph, were reported from Wilmington.

During the night of September 11, the storm center moved northward, parallel and slightly east of a line drawn between Wilmington and Norfolk. Wind gusts were in excess of 97 mph and tides were 4 to 8 feet above normal. High tides of 10.3 and 8.3 feet NGVD were reported at Atlantic Beach and Wrightsville Beach respectively. Coastal communities from Wilmington to Nags Head suffered heavy structural damage and considerable beach erosion. Eight deaths and approximately 100 injuries were attributed to the storm. Damages were estimated at millions of dollars.

<u>September 13, 1984 (Hurricane Diana)</u>
The landfall location of Diana was 38 miles south of Wilmington with 90 mph winds at its closest approach to Wilmington. Diana had 115 mph sustained winds before landfall. Storm surge was approximately 5-6 feet.

<u>September 26, 1985 (Hurricane Gloria)</u>
The landfall location of Gloria was Cape Hatteras, with 90 knot winds and a storm surge of approximately 6-8 feet.

<u>July 12, 1996 (Hurricane Bertha)</u>
1996 was a damaging year in the hurricane history of North Carolina. Tropical Storm Arthur, Hurricane Bertha, and Hurricane Fran all made direct landfall on the North Carolina coastline. It was the most active tropical cyclone season in the state since 1955, when Hurricanes Connie, Diane, and Ione all hit the coast. Bertha entered North Carolina in North Topsail Beach with 105 mph gust and a storm surge of approximately 5 feet.

<u>September 5, 1996 (Hurricane Fran)</u>
The landfall location of Fran near the city of Wilmington and its progression into the Raleigh-Durham area caused an estimated $1.275 billion in damage in North Carolina alone. Fran hit with gusts up to 105 mph and a storm surge of approximately 16 feet. Over $1 billion in damage was reported in North Topsail Beach and Surf City and 23 people were killed.

<u>August 26, 1998 (Hurricane Bonnie)</u>
The landfall location of Bonnie was in southern North Carolina near Cape Fear very close to landfall of both Hurricanes Bertha and Fran in 1996. Even though a powerful storm, damage from Bonnie was much less than Fran, which was also Category 3. Winds gusted up to 100 knots and storm tides of 5 to 8 feet above normal were reported mainly in eastern beaches of Brunswick County, while a storm surge of 6 feet was reported at Pasquotank and Camden Counties in the Albemarle Sound.

<u>September 16, 1999 (Hurricane Floyd)</u>
Hurricane Floyd made landfall near Wilmington with category two winds of 105 to 110 mph. Rainfall totals from Floyd were as high as 15 to 20 inches over portions of eastern North Carolina; with a record of 23.45 inches of rain falling in the month of September at Wilmington, NC. This breaks the previous record of 21.12 inches set in July 1886. These rains combined with saturated ground from previous rain events, including Hurricane Dennis, to produce an inland flood disaster. There were 74 deaths in the United States, including 52 in North Carolina, due to drowning from flood waters.

Data from the USGS indicate that eleven of their stream gage monitoring sites in North Carolina (Ahoskie, Rocky Mount, Hilliardston, White Oak, Enfield, Tarboro, Lucama, Hookerton, Trenton, Chinquapin, and Freeland) exceeded 0.2% annual chance flood levels due to Floyd. Total losses in North Carolina approach $5 billion with an estimated $3.5 billion in damages to North Carolina homes, businesses, roads, and infrastructure.

Floyd passed relatively close to the entire U.S. east coast, justifying hurricane warnings from Florida to Massachusetts and requiring an estimated two million people to evacuate. The last hurricane to require warnings for as large a stretch of coastline was Hurricane Donna in 1960.

4.4 Flood Protection Measures

Flood protection measures may be structural (such as levees, dams, and reservoirs) or non-structural (such as land-use management ordinances, policies, or practices).

To provide safe flood protection and be mapped as such, FEMA specifies that all levees must: have a minimum of three feet of freeboard against the 1% annual chance flood event; be equipped with closure devices at every opening; be constructed with embankments and foundations that are certified not to fail due to erosion, seepage, or instability; and be certified against future loss of freeboard due to settling. For additional requirements, please refer to 44 CFR 65.10.
Table 3, "Flood Protection Measures," lists the flood protection measures undertaken to mitigate flood damage in Dare County.

Table 3—Flood Protection Measures

Type of Measure	Description of Measure or Location and Description of Structure	Levee Compliant with 44 CFR 65.10?
Public Warning System	Operated by National Oceanic and Atmospheric Administration, through the National Weather service	N/A

N/A-Not Applicable

4.5 Scope of Study

In order to determine the areas studied in this FIS, initial research and community coordination was necessary. Initial scoping meetings were held in Dare County to present the results of initial research to the county and communities within the county and to discuss their flood mapping needs. The county and communities were asked to provide input on proposed study priorities and analysis methods. Those meetings resulted in the identification of flooding sources having a flood mapping need. Draft basin plans were developed based on the results of the initial scoping meetings. Final scoping meetings were held by the State and FEMA to provide counties and communities an overview of the draft basin plans, including the proposed scope and schedule for the project, and to provide an opportunity for additional county and community input. After the final scoping meeting was held, the Final Basin Plans were produced.

This FIS covers the geographic area of Dare County, North Carolina, and all jurisdictions therein. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction. Limits of detailed study are indicated on the Flood Profiles and/or the FIRM. Please see Table 4, "Flooding Sources Studied by Detailed Methods: Revised or Newly Studied," for a list of flooding sources that were revised or newly studied by detailed methods for this FIS.

Table 4—Flooding Sources Studied by Detailed Methods: Revised or Newly Studied

Transect Number	Source	Coastal Sources		Affected Communities
		From	To	
1-141	Atlantic Ocean/ Pamlico Sound	Hyde/Dare county line	Approximately 10.5 south of southern end of Oregon Inlet	Unincorporated Areas
142-161	Atlantic Ocean	Approximately 10.5 south of southern end of Oregon Inlet	Approximately 1,300 ft south of intersection of Bodie Island Lighthouse Road and NC State Road 12	Unincorporated Areas
162-164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 183, 185, 187	Atlantic Ocean/ Roanoke Sound	Approximately 1,300 ft south of intersection of Bodie Island Lighthouse Road and NC State Road 12	Approximately 1,300 ft south of intersection of Bodie Island Lighthouse Road and NC State Road 12	Nags Head and Unincorporated Areas
189, 191, 197, 199, 201, 203-247	Atlantic Ocean	Approximately 1,300 ft south of intersection of Bodie Island Lighthouse Road and NC State Road 12	Currituck/Dare county line	Southern Shores, Kitty Hawk, Kill Devil Hills, Nags Head, and Unincorporated Areas
160, 165, 167, 169, 171, 173, 175, 177, 179, 181	Roanoke Sound	Southern tip of Roanoke Island	Washington Baum Bridge	Unincorporated Areas
192-196	Roanoke Sound	Baum Point	Intersection of Scuppernong Road and Mother Vineyard Road	Unincorporated Areas
258-261	Croatan Sound	US Highway 64/264	Approximately 2.1 miles up shore of the confluence of Callaghan Creek	Unincorporated Areas

Table 5, "Flooding Sources Studied by Detailed Methods: Redelineated," contains a list of flooding sources that were studied by detailed methods for previous FISs, but were only partially revised in the current study. Their effective analyses remain valid; however, their floodplain delineations have been revised on the current FIRM.

Table 5—Flooding Sources Studied by Detailed Methods: Redelineated

Transect Number	Source	Coastal Sources		Affected Communities
		From	To	
184-191	Roanoke Sound	Washington Baum Bridge	Baum Point	Town of Manteo and Unincorporated Areas
198-202	Roanoke Sound	Intersection of Scuppernong Road and Mother Vineyard Road	Northern tip of Roanoke Island	Unincorporated Areas
N/A	Croatan Sound	Southern tip of Roanoke Island	Northern tip of Roanoke Island	Town of Manteo and Unincorporated Areas
262-265	Croatan Sound	Haulover Point, 2.5 miles northeast of Mashoes Road	US Highway 64/264	Unincorporated Areas
248-257	Pamlico Sound	Approximately 2.1 miles up shore of the confluence of Callaghan Creek	Hyde/Dare county line	Unincorporated Areas

Section 5.0 – Engineering Methods

5.1 Coastal Analyses

Users of the FIRM should be aware that coastal flood elevations are provided in the "Summary of Stillwater Elevations" table in this Report. If the elevation on the FIRM is higher than the elevation shown on this table, a wave height, wave runup and/or wave setup component likely exists, in which case, the higher elevation should be used for construction and/or floodplain management purposes.

Figure 2 is a profile for a hypothetical transect showing the effects of energy dissipation or regeneration on a wave as it moves inland. This figure shows the wave elevations being decreased by obstructions, such as buildings, vegetation, and rising ground elevations, and being increased by open, unobstructed wind fetches. Actual wave conditions in Dare County may not necessarily include all the situations illustrated in Figure 2.

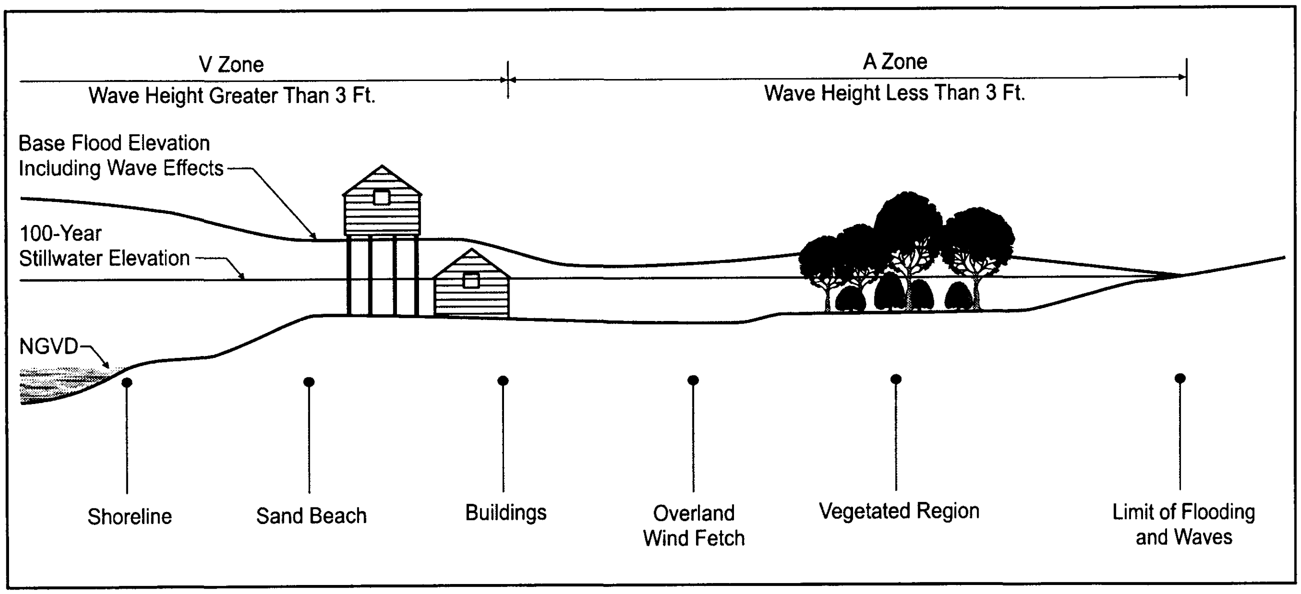


Figure 2—Transect Schematic

Pre-Countywide Hydrologic Analyses

Each jurisdiction within Dare County had previously printed FIS Reports describing each community's hydrologic analyses. Those analyses have been compiled from the FIS Reports and are summarized below. These analyses remain valid for those flooding sources listed in Table 5, "Flooding Sources Studied by Detailed Methods: Redelineated."

Coastal analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

Coastal inundation above the usual astronomic tide level from the Atlantic Ocean, caused by passage of storms (storm surge) was determined by the joint probability method (U.S.

Department of Commerce, 1970). The storm populations were described by probability distributions of five parameters that influence surge heights. These parameters were central pressure depression (which measures the intensity of the storm), radius to maximum winds, forward speed of the storm, shoreline crossing point, and crossing angle. These characteristics were described statistically based on an analysis of storms that have passed near the southern coast of North Carolina. Primary sources of data for this analysis were the NWS and the Mariners Weather Log. The NWS provided information on tropical cyclones of the North Atlantic Ocean from 1871 to 1977, and on storms from 1886 through 1979 (U.S. Department of Commerce, January 1978; U.S. Department of Commerce, June 1978; U.S. Department of Commerce, 1975). The Mariners Weather Log provided information on North Atlantic Tropical Cyclones in 1978 and 1979 (Lawrence, Miles B., 1980; Hebert, Paul J., 1980). A summary of the parameters used for the area of Dare County is presented in Table 6, Parameter Values for Surge Elevations.

The storm-surge elevations for the 10-, 2-, 1-, and 0.2-percent annual chance floods have been determined for Dare County and are shown in Table 7, Summary of Coastal Stillwater Elevations. The analyses reported herein reflect the stillwater elevations resulting from tidal and wind setup effects, but do not include the contributions from wave action effects.

Wave setup was determined to significantly contribute to the total stillwater flood levels along the coastline of Dare County. The amount of wave setup was calculated to be 2.6 feet as determined by the methodology outlined in the Shore Protection Manual (U.S. Army Corps of Engineers, 1984).

Maximum wave-crest elevations associated with 1- and 2-percent annual chance events were determined using established methodology (National Academy of Sciences, 1977).

Pre-Countywide Hydraulic Analyses

Each jurisdiction within Dare County had previously printed FIS Reports describing each community's hydraulic analyses. Those analyses have been compiled and are summarized below. These analyses remain valid for those flooding sources listed in Table 5, "Flooding Sources Studied by Detailed Methods: Redelineated."

Coastal analyses of the shoreline characteristics of the flooding sources studied in detail were performed to provide estimates of the elevations of floods for the selected recurrence intervals along each of the shorelines.

For areas subject to flooding directly from the Atlantic Ocean, FEMA's standard coastal surge model (Federal Emergency Management Agency, 1981) was used to simulate the coastal surge generated by any chosen storm (that is, any combination of the five storm parameters previously defined). Performing such simulations for a large number of storms, each of known total probability, permits one to establish the frequency distribution of surge height as a function of coastal location. These distributions incorporate the large-scale surge behavior, but do not include an analysis of the added effects associated with much finer scale wave phenomena such as wave height, setup, or runup. (The added effects associated with wave height were later analyzed and added to the stillwater storm-surge elevations. The astronomic tide for the region is then statistically combined with the computed storm surge to yield recurrence intervals of total water level.)

The surge model uses grid patterns that approximate the geographical features of the study area. Simulations were first performed for the area of Dare County using an open-coast grid having an element size of 5 nautical miles (nm). Surge was then propagated through a second 2-nm grid covering an extensive portion of coastal North Carolina, including the outer barrier islands and the entire Albemarle Sound system. The 2-nm grid adequately represented the study area; therefore, no finer grid was constructed (Federal Emergency Management Agency, 1981).

Although northeasters (winter storms) are more diffuse and less intense than hurricanes, they occur more frequently and cover larger areas and longer coastal reaches at one time. The effects of northeasters were analyzed through a two-step procedure. The first step was to perform a statistical analysis of the tide gage data for winter storms at Hampton Roads, Virginia. The second was to develop a spatial correlation of the northeaster-induced water elevations between the Hampton Roads gage and each of the selected locations along the coast of the study through numerical model simulations.

The northeaster analysis led to two significant conclusions. First, the effects of northeasters on the 100-year storm surge elevations are significant only along the ocean side of the Outer Bank areas north of Cape Hatteras. Second, the effects are most significant in Currituck County, where northeasters typically contribute between 1 and 1.5 feet to the 10-year surge elevations and generally less than 0.5 foot to the 100-year surge elevations. These contributions refer to the added effects of northeasters above surge computations which consider only the effects of hurricanes and other tropical storms plus astronomical tides.

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in a National Academy of Sciences (NAS) report (National Academy of Sciences, 1977). This method is based on the following major concepts. First, depth-limited waves in shallow water reach a maximum breaking height that is equal to 0.78 times the stillwater depth. The wave crest is 70 percent of the total wave height above the stillwater level. The second major concept is that wave height may be diminished by dissipation of energy due to the presence of obstructions, such as sand dunes, dikes and seawalls, building, and vegetation. The amount of energy dissipation is a function of the physical characteristics of the obstruction and is determined by NAS procedures (National Academy of Sciences, 1977). The third major concept is that wave height can be regenerated in open-fetch areas due to the transfer of wind energy to the water. This added energy is related to fetch length and depth.

Wave heights were computed along transects (cross-section lines) that were located along the coastal areas, as illustrated in Figure 3, Transect Location Map, as determined by the State of North Carolina. The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Each transect was taken perpendicular to the shoreline and extended inland to a point where wave action ceased or was significantly reduced. Along each transect, wave heights and elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. The stillwater elevations for the 100-year flood were used as the starting elevations for these computations. Wave heights were calculated to the nearest 0.1 foot, and wave elevations were determined at whole-foot increments along the transects. The location of the three-foot breaking wave for determining the terminus of the V zone (area with velocity wave action) was computed at each transect. Also, along the open coast, the V-zone designation applies to all areas seaward of the heel of the primary dune system. Table 7 provides a listing of the transect locations and stillwater starting elevations, as well as initial wave crest elevations.

Dune erosion was taken into account along the Atlantic coastline of Dare County. The amount of dune erosion was calculated using methodology established by FEMA (Federal Emergency Management Agency, 1989).

In addition to the wave height and erosion analyses, wave runup was estimated along the Atlantic coastline of Dare County, and computed using the FEMA runup model (Federal Emergency Management Agency, 1981).

Table 8, "Summary of Coastal Analyses," includes transect descriptions, stillwater elevations, maximum wave crest, and other information derived from the analyses.

Revised Analyses for Countywide FIS

For coastal areas not receiving a new detailed study, the inland limit of the 1% annual chance floodplain and the location of the Zone VE/Zone AE boundary may have been adjusted using new elevation data obtained for producing the updated FIRM panels. The intermediate zones in Dare County were obtained from the previously effective FIRMs. The inland limit of the V zone may have been adjusted as appropriate based on the definitions for the coastal high hazard area and primary frontal dune in 44 Code of Federal Regulation (CFR) 59.1. Whole-foot BFEs from the previously effective FIRMs were converted to NAVD 88 and included for these areas. For redelineated coastal flooding reaches, FEMA-issued Letters of Map Change (LOMCs) were incorporated, as appropriate.

For this revision of the Dare County, NC, FIS, the majority of the barrier islands, as well as portions of Roanoke Island and mainland Dare County, was restudied using detailed methods. New analyses of wave setup, wave heights, storm induced erosion, and primary frontal dune issues were performed using the existing stillwater elevations for the Atlantic Ocean and Pamlico Sound.

The wave setup calculation is based upon wave behavior over a sloping beach. Using methods specified in the *Shore Protection Manual* (U.S. Army Corps of Engineers, 1984) the wave setup at the outer coast was determined to be 2.6 feet; owing to limited fetch and extremely shallow water in Pamlico Sound, setup was not added anywhere inside the Outer Banks.

Although the existing coastal dunes near Buxton and Avon were found to be large enough to survive a wave attack during a 100-year storm, the dunes in many areas of the Dare County shoreline were found to be insufficient in size. Frontal dunes with cross sections above the stillwater surge level and seaward of the dune crest exceeding 540 square feet are considered to experience only dune retreat, while those with reservoirs of less than 540 square feet are considered to experience dune removal. Using FEMA's standard erosion analysis procedures outlined in the *Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix D: Guidance for Coastal Flooding Analyses and Mapping*, the protection afforded by the dunes with less than a 540 square-foot sand reservoir is removed from the coastal analysis, resulting in a low beach profile slope (Federal Emergency Management Agency, 2003). The majority of dunes in Dare County were treated by dune removal. Wave runup on dune faces was also considered where appropriate, but was found to be less than wave setup and so was not added for this study.

Wave crest elevations were added to the stillwater storm surge elevations using the methodology recommended by the National Academy of Sciences (Federal Emergency Management Agency, 2003). This methodology considers maximum conditions associated with the 100-year flood and performs wave propagation analysis along transects oriented perpendicularly to the shoreline to determine wave crest elevations from the coast and inland bays to the limits of the 100-year floodplain. The transects used in this study are shown on the FIRM and were chosen based on topography, vegetation, and cultural development.

Additional "reverse" transects for Pamlico Sound were utilized for this restudy. Since a wave threat depends on the available fetch over which waves can be generated, sound-side, "reverse" transects were analyzed south of Orgeon Inlet, where this effect will be most significant. North of Orgeon Inlet, the available fetch across Croatan Sound and Roanoke Sound is too limited to pose a comparable threat, although wave effects will still occur.

For this revision, information describing the transects was obtained from Light Detection and Ranging (LiDAR) topographic data converted to the North American Vertical Datum of 1988 (NAVD 88); high resolution aerial imagery for the County; and site visit reconnaissance. Note that the LiDAR covering the ocean-side of the outer banks reflects post-Hurricane Isabel conditions.

Based on the eroded beach and dune profiles, and the effective FIS stillwater elevations (adjusted to include wave setup), the wave crest envelope was computed for each transect. The wave crest envelope represents the vertical extent of wave activity and includes the storm surge, the wave setup, and the wave crest elevation above the surge and setup. The computer program *Wave Height Analysis for Flood Insurance Studies* (Federal Emergency Management Agency, 2003) provided the maximum expected wave crest elevation along each transect accounting for fetch length, submerged bathymetry, and type and extent of the land cover along each transect which blocks or reduces wave heights. Density, type, and physical dimensions of rigid and flexible vegetation, buildings, and other structures were considered based on field inspection and high resolution aerial photography.

For limited coastal areas which were not restudied using detailed methods, the existing mapping was adjusted according to the new LiDAR topographic data in order to accurately reflect the position of the transition from Zone VE to Zone AE and the inland limit of the 1% annual chance flood zone; the intermediate zones in those areas were obtained from the previously effective FIRMs. For these redelineated coastal flooding reaches, any existing FEMA-issued Letters of Map Change (LOMCs) were incorporated, as appropriate.

Commencing in 1989, FEMA identifies a "coastal high hazard area" as an area of special flood hazards extending from offshore to the inland limit of a primary frontal dune along the open coast, or any other area subject to high-velocity wave action (i.e., wave heights greater than or equal to 3 feet) from storms or seismic sources. The "primary frontal dune" is defined as a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes, immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the landward point where there is a distinct change from a relatively steep landward dune slope to a relatively mild slope. The entirety of this primary frontal dune high hazard area is designated as Zone VE. This administrative rule was implemented in the revised mapping.

Table 6—Parameter Values for Surge Elevations

Central Pressure Depression *(Milibars)*	**Parameter Value**		85	75	65	55	45	35	25	15	5
	Probabilities	**I:**	0.011	0.088	0.061	0.139	0.161	0.121	0.138	0.137	0.144
		II:	0.011	0.089	0.060	0.143	0.159	0.119	0.139	0.136	0.144
		III:	0.007	0.033	0.023	0.055	0.063	0.086	0.246	0.240	0.247
Storm Radius to Maximum Winds *(Nautical Miles)*	**Parameter Value**				20				35		
	Probabilities				0.51				0.49		
Maximum Forward Speed *(Knots)*	**Parameter Value**				10				30		
	Probabilities	**I:**			0.647				0.118		
		II:			0.396				0.226		
		III:			0.448				0.121		
Direction of Storm Path (Degrees from True North)**	**Parameter Value**		276			312		348	24		60
	Probability		0.016			0.016		0.102	0.414		0.453
	Rate (Storms per Nautical Miles per Year)		0.090			0.076		0.49	2.32		2.06

*I: Used for crossing angle 276^0, 312^0, 348^0

II: Used for crossing angle 24^0

III: Used for crossing angle 60^0

** Direction of forward motion, measured positive clockwise from true North

Table 7—Summary of Coastal Stillwater Elevations

Flooding Source	FIRM Panel Number(s)	Elevations *(feet NAVD)* 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean/ Roanoke Sound	3720979800 3730070800 3730070900	6.7	8.0	8.4	9.7
Atlantic Ocean/ Roanoke Sound	3720979900 3720988200 3720989000 3720989100 3720989200 3720989300 3730070900 3730071800 3730071900 3730080000 3730080100	6.6	8.0	8.4	9.6
Atlantic Ocean/ Roanoke Sound/ Colington Creek	3720987400 3720987500 3720988300 3720988400 3720988500 3720989300	6.3	7.7	8.3	9.7
Atlantic Ocean/ Currituck Sound/ Kitty Hawk Bay	3720986400 3720986500 3720986600 3720986700 3720987500 3720987600	6.3	7.6	8.3	9.7

Table 7—Summary of Coastal Stillwater Elevations

Flooding Source	FIRM Panel Number(s)	Elevations *(feet NAVD)*			
		10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean/ Roanoke Sound	3720976800 3720978800 3720978900 3720979900 3720986000 3720986100 3720986200 3720986300 3720986400 3720987000 3720987100 3720987200 3720987300 3720987400 3720987500 3720988000 3720988100 3720988200 3720988300 3720988400 3720989000 3720989100 3730070900 3730080000	6.4	7.9	8.2	9.8
Atlantic Ocean/ Roanoke Sound	3720979800 3730070700 3730070800 3730070900 3730071600 3730071700 3730071800 3730071900 3730072600 3730072700	6.4	7.7	8.2	9.2
Atlantic Ocean/ Roanoke Sound	3730071600 3730071700 3730072500 3730072600 3730072700	6.2	7.3	7.7	8.7

Table 7—Summary of Coastal Stillwater Elevations

Flooding Source	FIRM Panel Number(s)	Elevations *(feet NAVD)*			
		10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean/ Roanoke Sound	3720979700 3720979800 3720979900 3730070600 3730070700 3730070800 3730070900	6.1	7.3	7.7	8.7
Atlantic Ocean/ Pamlico Sound	3730053600 3730053700 3730053800 3730054800	4.6	6.6	7.6	8.5
Atlantic Ocean/ Currituck Sound	3720985800 3720985900	5.1	6.7	7.4	8.2
Atlantic Ocean/ Roanoke Sound	3720979600 3730070400 3730070600 3730070700 3730071600 3730071700 3730072500 3730072600	5.6	6.9	7.3	8.2
Atlantic Ocean/ Pamlico Sound	3720064000 3730052800 3730052900 3730053800 3730053900 3730054800 3730054900 3730062000 3730063000	4.8	6.5	7.2	7.6
Atlantic Ocean/ Pamlico Sound	3730051600 3730051700 3730052600 3730052700 3730053600 3730053700	4.2	6.3	7.0	8.4

Table 7—Summary of Coastal Stillwater Elevations

Flooding Source	FIRM Panel Number(s)	Elevations *(feet NAVD)*			
		10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean/ Pamlico Sound	3730064700 3730064800 3730064900 3730065700 3730065800 3730065900 3730072000 3730072500 3730073200 3730073300 3730073400 3730073500 3730074000 3730074100 3730074200 3730074300	5.4	6.2	6.9	7.6
Atlantic Ocean/ Pamlico Sound	3730053800 3730053900 3730054800 3730054900 3730062400 3730063000 3730064000 3730064100 3730064200 3730064300 3730064400 3730064500 3730064600 3730064700 3730064800 3730064900 3730065600 3730065700 3730065800 3730065900 3730074000	5.0	6.0	6.8	7.7
Atlantic Ocean	3720985900 3720986800 3720986900 3720994100 3720995000 3720995100	4.8	6.2	6.8	8.6

Table 7—Summary of Coastal Stillwater Elevations

Flooding Source	FIRM Panel Number(s)	Elevations *(feet NAVD)* 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean	3720988300 3720988400 3720988500 3720989300	4.7	6.2	6.7	8.3
Atlantic Ocean	3720989100 3720989200 3730070900 3730071800 3730071900 3730080000 3730080100	4.7	6.0	6.6	8.2
Atlantic Ocean/ Currituck Sound	3720985700 3720985800 3720986600 3720986700 3720986800	4.3	5.8	6.5	7.4
Atlantic Ocean/ Oregon Inlet/ Davis Channel/ Roanoke Sound/ Croatan Sound	3730071600 3730072500	4.8	6.0	6.3	7.0
Atlantic Ocean	3730064700 3730064800 3730064900 3730065700 3730065800 3730065900 3730074000	4.4	5.6	6.3	7.4
Atlantic Ocean/ Pamlico Sound/ Croatan Sound	3720984100 3720984200 3720984300 3720985100 3720985200 3720985300 3720986100 3720986200 3720986300	4.3	5.8	6.3	7.2
Atlantic Ocean/ Currituck Sound	3720985900 3720994100 3720995000 3720995100	4.2	5.6	6.2	7.4

Table 7—Summary of Coastal Stillwater Elevations

Flooding Source	FIRM Panel Number(s)	Elevations *(feet NAVD)* 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean/ Pamlico Sound	3720957400 3720958400 3720958500 3720959400 3720959500 3730050500 3730050600 3730051500 3730051600 3730051700 3730052500 3730052600 3730053500	3.8	5.5	6.2	7.4
Atlantic Ocean	3730064700 3720064800 3730064900 3730065700 3720065800 3730065900 3730074000	4.4	5.6	6.0	7.4
Atlantic Ocean/ Pamlico Sound/ Croatan Sound	3720974800 3720976800 3720982100 3720982200 3720983100 3720983200 3720984000 3720984100 3720985000 3720985100 3720986000 3720986100	4.3	5.7	6.0	6.8
Atlantic Ocean	3730064700 3730064800 3730064900 3730065700 3730065800 3730065900 3730074000	4.4	5.6	5.9	7.4

Table 7—Summary of Coastal Stillwater Elevations

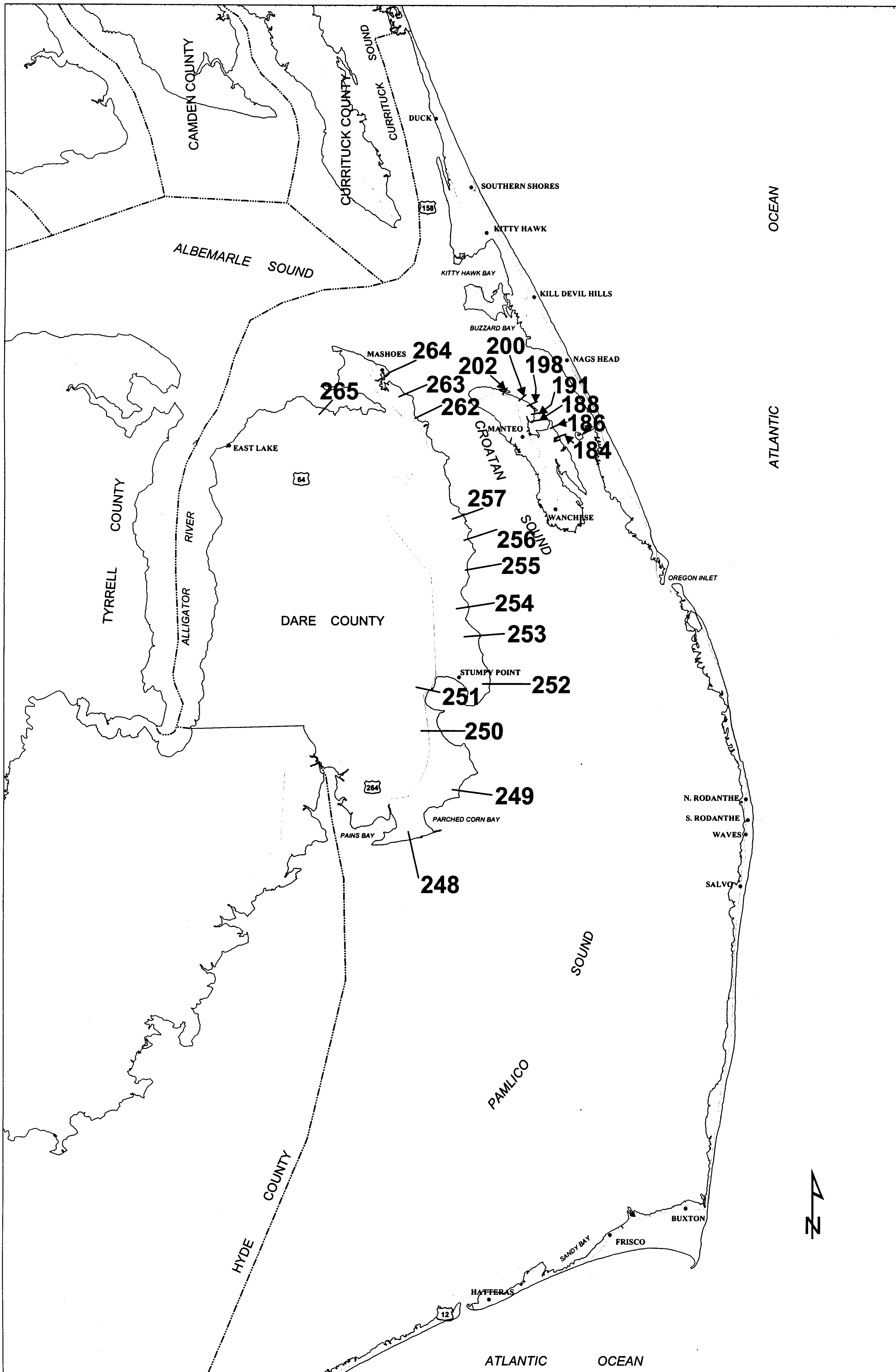
Flooding Source	FIRM Panel Number(s)	Elevations *(feet NAVD)* 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean	3730064700 3730064800 3730064900 3730065700 3730065800 3730065900 3730074000	4.4	5.6	5.7	7.4
Atlantic Ocean	3730064500 3730064600 3730064700 3730065600 3730065700	4.4	5.6	5.6	7.4
Atlantic Ocean	3730064500 3730064600 3730064700 3730065600 3730065700	4.4	5.6	5.4	7.4
Atlantic Ocean	3720958400 3720958500 3720959400 3720959500 3730050500	3.1	4.1	5.3	5.8
Atlantic Ocean/ Pamlico Sound	3720957400 3720958400 3720958500 3720959400 3720959500	2.9	4.7	5.3	6.3
Atlantic Ocean	3730053600 3730053700 3730053800 3730054700 3730054800	4.0	5.0	5.2	6.6
Atlantic Ocean	3730053600 3730053700 3730053800 3730054700 3730054800	3.5	4.1	5.2	6.0

Table 7—Summary of Coastal Stillwater Elevations

Flooding Source	FIRM Panel Number(s)	Elevations *(feet NAVD)* 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean	3730064700 3730064800 3730064900 3730065700 3730065800 3730065900 3730074000	4.4	5.6	5.1	7.4
Atlantic Ocean	3730053800 3730053900 3730054800 3730054900 3730063000 3730064000	4.0	5.0	5.1	6.6
Atlantic Ocean/ Pamlico Sound/ Croatan Sound	3720970800 3720972800 3720974800 3720976600 3720976800 3720978600 3720978700 3720978800 3720980000 3720982000 3720983000 3720984000 3720984100 3720985000 3720985100 3720986000	3.8	4.8	5.1	5.7
Atlantic Ocean	3730053800 3730053900 3730054800 3730054900 3730063000 3730064000	4.0	5.0	5.0	6.6
Atlantic Ocean	3720957300 3720957400 3720958400 3720958500 3720959400 3720959500 3730050500	3.5	4.8	5.0	6.3

Table 7—Summary of Coastal Stillwater Elevations

Flooding Source	FIRM Panel Number(s)	Elevations *(feet NAVD)* 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean/ Pamlico Sound/ Croatan Sound	3720878200 3720878400 3720878600 3720878800 3720962800 3720964700 3720965700 3720970000 3720970200 3720970400 3720970600 3720970800 3720972600 3720972800 3720974400 3720974600 3720976200 3720976400 3720976600 3720978200 3720978400 3720978600 3720980000	3.2	3.9	4.4	5.4
Atlantic Ocean/ Pamlico Sound/ Croatan Sound	3720878400 3720878600 3720878800 3720964800 3720966800 3720970000 3720970200 3720970400 3720970600 3720972000 3720972200 3720972400 3720972600 3720974000 3720974200 3720974400 3720976000	2.0	2.7	3.0	3.8



FEDERAL EMERGENCY MANAGEMENT AGENCY

DARE COUNTY, NC AND INCORPORATED AREAS

APPROXIMATE SCALE

0 2 4 8 12 16 Miles

TRANSECT LOCATION MAP

Figure 3

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	1	Approximately 2.7 miles southwest of the intersection of South Beach Drive and Highway 12	3.5	4.8	7.6[2]	6.3	N/A	VE 9-12 AE 8-9	Yes
			2.9	4.7	5.3	6.3	N/A	AE 7-8	N/A
Atlantic Ocean / Pamlico Sound	2*	Approximately 2.5 miles southwest of the intersection of South Beach Drive and Highway 12	2.9	4.7	5.3	6.3	N/A	VE 7-8 AE 5-7	No
Atlantic Ocean	3	Approximately 2.4 miles southwest of the intersection of South Beach Drive and Highway 12	3.5	4.8	7.6[2]	6.3	N/A	VE 10-12 AE 7-10	Yes
			2.9	4.7	5.3	6.3	N/A	AE 7-8	N/A
Atlantic Ocean	4	Approximately 1.9 miles southwest of the intersection of South Beach Drive and Highway 12	3.5	4.8	7.6[2]	6.3	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	5*	Approximately 1.7 miles southwest of the intersection of South Beach Drive and Highway 12	2.9	4.7	5.3	6.3	N/A	VE 7-8 AE 6-7	No
Atlantic Ocean	6	Approximately 1.4 miles southwest of the intersection of South Beach Drive and Highway 12	3.5	4.8	7.6[2]	6.3	N/A	VE 10-12 AE 8-10	Yes
			2.9	4.7	5.3	6.3	N/A	AE 7-8	N/A
Atlantic Ocean	7	Approximately 5,025 feet southwest of the intersection of South Beach Drive and Highway 12	3.5	4.8	7.6[2]	6.3	N/A	VE 8-12	Yes
			2.9	4.7	5.3	6.3	N/A	VE 8	N/A
Atlantic Ocean/ Pamlico Sound	8*	Approximately 3,930 feet southwest of the intersection of South Beach Drive and Highway 12	2.9	4.7	5.3	6.3	N/A	VE 7-8 AE 5-7	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	9	Approximately 2,585 feet southwest of the intersection of South Beach Drive and Highway 12	3.5	4.8	7.6[2]	6.3	N/A	VE 10-12 AE 8-10	Yes
			2.9	4.7	5.3	6.3	N/A	AE 7-8	N/A
Atlantic Ocean	10	Approximately 700 feet south of the intersection of Marina Way and Highway 12	3.5	4.8	7.6[2]	6.3	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	11*	Approximately 1,150 feet northwest of the intersection of Woodall Way and Highway 12	2.9	4.7	5.3	6.3	N/A	VE 7-8 AE 5-7	No
Atlantic Ocean	12	Approximately 1,060 feet south of the intersection of Sea View Drive and Woodall Way	3.5	4.8	7.6[2]	6.3	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	13*	Approximately 850 feet northwest of the intersection of Odens Lane and Highway 12	2.9	4.7	5.3	6.3	N/A	VE 7-8 AE 6-7	No
Atlantic Ocean	14	Approximately 400 feet southeast of the intersection of Lighthouse Court and Sea Scape Lane	3.5	4.8	7.6[2]	6.3	N/A	VE 10-12 AE 8-10	Yes
			2.9	4.7	5.3	6.3	N/A	AE 7-8	N/A
Atlantic Ocean / Pamlico Sound	15*	Approximately 1,860 feet northwest of the intersection of M. V. Australia Lane and Stowe Landing	2.9	4.7	5.3	6.3	N/A	VE 7-8 AE 6-7	No
Atlantic Ocean	16	Approximately 675 feet southwest of the intersection of NC Highway 12 and Odens Court	3.5	4.8	7.6[2]	6.3	N/A	VE 8-12 AE 8-10	Yes
			3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 8	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	17*	Approximately 630 feet northwest of the intersection of Pamlico Drive and Elizabeth Avenue	3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 6-8	No
Atlantic Ocean	18	Approximately 275 feet southeast of the intersection of G. NC Highway 12 and Austin Road	3.5	4.8	7.6[2]	6.3	N/A	VE 9-12 AE 8-9	Yes
			3.8	5.5	6.2	7.4	N/A	AE 7-8	N/A
Atlantic Ocean / Pamlico Sound	19*	Approximately 1,475 feet northeast of the intersection of NC Highway 12 and Austin Road	3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 7-8	No
Atlantic Ocean	20	Approximately 2,500 feet northeast of the intersection of NC Highway 12 and Austin Road	3.4	4.6	7.7[2]	6.2	N/A	VE 9-12	Yes
			3.8	5.5	6.2	7.4	N/A	VE 9	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	21	Approximately 5,150 feet northeast of the intersection of NC Highway 12 and Austin Road	3.3	4.4	7.7[2]	6.1	N/A	VE 10-12 AE 8-10	Yes
			3.8	5.5	6.2	7.4	N/A	AE 7-8	N/A
Atlantic Ocean / Pamlico Sound	22*	Approximately 4,025 feet west of the inter-section of Highway 12 and Osprey Way	3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 8	No
Atlantic Ocean	23	Approximately 2,700 feet southwest of the intersection of Highway 12 and Osprey Way	3.2	4.2	7.8[2]	5.9	N/A	VE 10-12 AE 8-10	Yes
			3.8	5.5	6.2	7.4	N/A	AE 8	N/A
Atlantic Ocean	24	Approximately 570 feet south of the intersection of Highway 12 and Osprey Way	3.1	4.1	7.9[2]	5.8	N/A	VE 10-12 AE 8-10	Yes
			3.8	5.5	6.2	7.4	N/A	AE 8	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect No.	Transect Location	Stillwater Elevations in feet NAVD 88: 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Wave Runup Analysis: Zone Designation and BFE in feet NAVD 88	Wave Height Analysis: Zone Designation and BFE in feet NAVD 88[1]	Primary Frontal Dune Identified
Atlantic Ocean / Pamlico Sound	25*	Approximately 400 feet north of the inter-section of Highway 12 and Surf or Sound Drive	3.8	5.5	6.2	7.4	N/A	VE 8-9	No
Atlantic Ocean	26	Approximately 775 feet southeast of the intersection of Trent Drive and Shoresurf Lane	3.1	4.1	7.9[2]	5.8	N/A	VE 10-12 AE 8-10	Yes
			3.8	5.5	6.2	7.4	N/A	AE 8	N/A
Atlantic Ocean / Pamlico Sound	27*	Approximately 750 feet northwest of the intersection of Basnett Landing Road and Bowen Road	3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 8	No
Atlantic Ocean	28	Approximately 780 feet southeast of the intersection of Robin Lane and Sparrow Court	3.1	4.1	7.9[2]	5.8	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	29*	Approximately 1,475 feet northwest of the intersection of Highway 12 and Willis Road	3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 6-8	No
Atlantic Ocean	30	Approximately 2,950 feet southeast of the intersection of Highway 12 and Billy Mitchell Road	3.1	4.1	7.9[2]	5.8	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	31*	Approximately 1,050 feet north of the intersection of Sportsman Drive and Sportsman Place	3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 6-8	No
Atlantic Ocean	32	Approximately 4,630 feet south of the intersection of Hughes Lane and Piney Ridge Road	3.1	4.1	7.9[2]	5.8	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	33*	Approximately 950 feet north of the intersection of Highway 12 and Morriss Lane	3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 6-8	No
Atlantic Ocean	34	Approximately 5,080 feet south of the intersection of Huges Lane and Piney Ridge Road	3.2	4.1	7.9[2]	5.8	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	35*	Approximately 1,350 feet north of the intersection of NC Highway 12 Lassiter Lane	3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 6-8	No
Atlantic Ocean	36	Approximately 1.4 miles southeast of the intersection of NC Highway 12 Lassiter Lane	3.2	4.1	7.9[2]	5.9	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	37*	Approximately 380 feet east of the intersection of Blackbeards Court and Brooks Court	3.8	5.5	6.2	7.4	N/A	VE 8-9 AE 6-8	No
Atlantic Ocean	38	Approximately 1.76 miles southeast of the intersection of Highway 12 and Spencer Lane	3.2	4.1	7.9[2]	5.9	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	39*	Approximately 460 feet northwest of the intersection of Highway 12 and Maurice Burrus Road	4.2	6.3	7.0	8.4	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	40	Approximately 1.85 miles south of the intersection of Highway 12 and Maurice Burrus Road	3.2	4.1	7.9[2]	5.9	N/A	VE 10-12 AE 9-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	41*	Approximately 500 feet north of the intersection of Highway 12 and Serenity Circle	4.2	6.3	7.0	8.4	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	42	Approximately 1.60 miles southwest of the intersection of Old Doctor's Road and Flowers Ridge Road	3.3	4.1	7.9[2]	5.9	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	43*	Approximately 560 feet north of the intersection of Highway 12 and Old Doctor's Road	4.2	6.3	7.0	8.4	N/A	VE 9-11 AE 7-9	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	44	Approximately 1.69 miles southeast of the intersection of Old Doctor's Road and Flowers Ridge Road	3.3	4.1	7.9[2]	6.0	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	45*	Approximately 1,140 feet northwest of the intersection of Highway 12 and Barley Lane	4.2	6.3	7.0	8.4	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean / Pamlico Sound	46*	Approximately 1,100 feet northwest of the intersection of Highway 12 and Ethans Way	4.2	6.3	7.0	8.4	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	47	Approximately 1.68 miles southwest of the inter-section of Loggerhead Lane and Lighthouse Road	3.3	4.1	7.8[2]	6.0	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	48*	Approximately 770 feet north of the intersection of Highway 12 and Balance Road	4.2	6.3	7.0	8.4	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	49	Approximately 4,370 feet southwest of the intersection of Lighthouse Road and Cape Point Campground	3.4	4.1	7.8[2]	6.0	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	50*	Approximately 730 feet northeast of the intersection of Stoney Lane and Rocky Rollinson Road	4.6	6.6	7.6	8.5	N/A	VE 10-12 AE 8-10	No
Atlantic Ocean	51	Approximately 5,625 feet southeast of the intersection of Lighthouse Road and Cape Point Campground	3.4	4.1	7.8[2]	6.0	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	52	Approximately 3,830 feet southeast of the intersection of Lighthouse Road and Cape Point Campground	3.4	4.1	7.8[2]	5.8	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	53	Approximately 2,225 feet southeast of the intersection of Lighthouse Road and Cape Point Campground	3.4	4.1	7.8[2]	5.8	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	54	Approximately 1,650 feet northeast of the intersection of Lighthouse Road and Cape Point Campground	3.4	4.1	7.8[2]	5.9	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	55	Approximately 3,140 feet northeast of the intersection of Lighthouse Road and Cape Point Campground	3.4	4.1	7.8[2]	5.9	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	56	Approximately 2,700 feet southeast of the intersection of Lighthouse Road and Loggerhead Lane	3.5	4.1	7.8[2]	6.0	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	57	Approximately 1,050 feet southeast of the intersection of Old Lighthouse Road and Schooner ES Newman Drive	3.5	4.1	7.8[2]	6.0	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	58	Approximately 350 feet southeast of the intersection of Tower Road and S. Tower Road	3.5	4.1	7.8[2]	6.0	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	59*	Approximately 1,660 feet north of the intersection of Highway 12 and Buxton Oaks Lane	4.6	6.6	7.6	8.5	N/A	VE 10-12 AE 8-10	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	60	Approximately 1,875 feet northeast of the intersection of Highway 12 and Buxton Oaks Lane	3.8	4.6	7.8[2]	6.3	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	61	Approximately 2,900 feet northeast of the intersection of Highway 12 and Oramar Drive	4.0	5.0	7.8[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	62*	Approximately 3,725 feet north of the intersection of Highway 12 and Oramar Drive	4.6	6.6	7.6	8.5	N/A	VE 10-12 AE 8-10	No
Atlantic Ocean	63	Approximately 4,950 feet northeast of the intersection of Highway 12 and Oramar Drive	4.0	5.0	7.8[2]	6.6	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	64	Approximately 1.35 miles northeast of the inter-section of Highway 12 and Oramar Drive	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	65*	Approximately 1.52 miles northeast of the intersection of Highway 12 and Oramar Drive	4.6	6.6	7.5	8.4	N/A	VE 10-11 AE 8-10	No
Atlantic Ocean	66	Approximately 1.77 miles northeast of the intersection of Highway 12 and Oramar Drive	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	67	Approximately 2.20 miles northeast of the intersection of Highway 12 and Oramar Drive	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	68*	Approximately 2.36 miles northeast of the intersection of Highway 12 and Oramar Drive	4.7	6.6	7.4	8.2	N/A	VE 10-11 AE 7-10	No
Atlantic Ocean	69	Approximately 1.35 miles south of the intersection of Highway 12 and Park Drive	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	70	Approximately 4,880 feet south of the intersection of Highway 12 and Park Drive	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	71*	Approximately 4,700 feet southwest of the intersection of Highway 12 and Park Drive	4.8	6.6	7.3	8.1	N/A	VE 9-11 AE 7-9	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	72	Approximately 2,925 feet southeast of the intersection of Highway 12 and Park Drive	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	73	Approximately 810 feet southeast of the intersection of Highway 12 and Park Drive	4.0	5.0	7.6[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	74*	Approximately 1,975 feet northwest of the intersection of Highway 12 and Park Drive	4.8	6.5	7.2	7.9	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	75	Approximately 650 feet southeast of the intersection of E. Kinnakeet Drive and Greenwood Place	4.0	5.0	7.6[2]	6.6	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	76*	Approximately 2,600 feet west of the intersection of Highway 12 and Greenwood Place	4.8	6.5	7.1	7.7	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	77	Approximately 630 feet southeast of the intersection of Ocean View Drive and Myrtle Street	4.0	5.0	7.6[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	78*	Approximately 1,980 feet southwest of the intersection of Starboard Drive and Portside Drive	4.8	6.5	7.1	7.6	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	79	Approximately 660 feet southeast of the intersection of Ocean View Drive and Tern Street	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	80*	Approximately 2,970 feet west of the inter-section of Highway 12 and Nino Road	4.9	6.5	7.0	7.6	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	81	Approximately 1,050 feet east of the inter-section of Highway 12 and Moore Way	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	82*	Approximately 1,850 feet west of the intersection of McMullen Road and Electric Lane	4.9	6.4	7.0	7.6	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	83	Approximately 1,230 feet southeast of the intersection of Highway 12 and Leslie Lane	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	84*	Approximately 1,470 feet northwest of the intersection of Jarvis Gray Lane and North End Road	4.9	6.4	7.0	7.6	N/A	VE 9-11 AE 7-9	No
Atlantic Ocean	85	Approximately 1,420 feet east of the inter-section of Highway 12 and Sailfish Lane	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	86*	Approximately 520 feet northwest of the intersection of Bluefish Court and N. Albacore Lane	4.9	6.4	6.9	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	87	Approximately 1,200 feet east of the inter-section of Highway 12 and Island Creek Drive	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	88	Approximately 2,600 feet northeast of the intersection of Highway 12 and Pamlico Court	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	89*	Approximately 4,040 feet north of the intersection of Highway 12 and Pamlico Court	5.0	6.3	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	90	Approximately 4,930 feet northeast of the intersection of Highway 12 and Pamlico Court	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean	91	Approximately 1.83 miles northeast of the intersection of Highway 12 and Pamlico Court	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	92*	Approximately 1.84 miles north of the intersection of Highway 12 and Pamlico Court	5.0	6.3	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	93	Approximately 2.74 miles northeast of the intersection of Highway 12 and Pamlico Court	4.0	5.0	7.7[2]	6.6	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	94*	Approximately 2.93 miles northeast of the intersection of Highway 12 and Pamlico Court	5.0	6.3	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	95	Approximately 3.67 miles northeast of the intersection of Highway 12 and Pamlico Court	4.0	5.0	7.8[2]	6.7	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	96*	Approximately 3.83 miles northeast of the intersection of Highway 12 and Pamlico Court	5.0	6.2	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	97	Approximately 4.58 miles northeast of the intersection of Highway 12 and Pamlico Court	4.1	5.1	7.8[2]	6.8	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	98*	Approximately 4.78 miles northeast of the intersection of Highway 12 and Pamlico Court	5.0	6.2	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	99	Approximately 5.53 miles northeast of the intersection of Highway 12 and Pamlico Court	4.1	5.1	7.9[2]	6.8	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	100*	Approximately 5.74 miles northeast of the intersection of Highway 12 and Pamlico Court	5.0	6.2	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	101	Approximately 5.26 miles south of the intersection of Highway 12 and Ocean Spray Road	4.2	5.2	7.9[2]	6.9	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	102*	Approximately 5.06 miles southwest of the intersection of Highway 12 and Ocean Spray Road	5.0	6.1	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	103	Approximately 4.35 miles south of the intersection of Highway 12 and Ocean Spray Road	4.2	5.2	8.0[2]	7.0	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	104*	Approximately 4.16 miles southwest of the intersection of Highway 12 and Ocean Spray Road	5.0	6.1	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	105	Approximately 3.44 miles south of the intersection of Highway 12 and Ocean Spray Road	4.2	5.3	8.0[2]	7.0	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	106*	Approximately 3.22 miles southwest of the intersection of Highway 12 and Ocean Spray Road	5.0	6.1	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	107	Approximately 2.54 miles southeast of the intersection of Highway 12 and Ocean Spray Road	4.3	5.4	8.1[2]	7.1	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	108*	Approximately 2.33 miles southwest of the intersection of Highway 12 and Ocean Spray Road	5.0	6.0	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	109	Approximately 1.62 miles southeast of the intersection of Highway 12 and Ocean Spray Road	4.3	5.4	8.1[2]	7.2	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	110*	Approximately 1.48 miles southwest of the intersection of Highway 12 and Ocean Spray Road	5.0	6.0	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	111	Approximately 1.18 miles southeast of the intersection of Highway 12 and Ocean Spray Road	4.4	5.5	8.1[2]	7.3	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	112	Approximately 3,970 feet southeast of the intersection of Highway 12 and Ocean Spray Road	4.4	5.5	8.2[2]	7.3	N/A	VE 10-13 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	113*	Approximately 2,435 feet southwest of the intersection of Highway 12 and Ocean Spray Road	5.0	6.0	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	114	Approximately 2,355 feet southeast of the intersection of Highway 12 and Ocean Spray Road	4.4	5.6	8.2[2]	7.4	N/A	VE 10-13 AE 8-10	Yes
Atlantic Ocean	115	Approximately 2,055 feet east of the inter-section of Highway 12 and Sand Street	4.4	5.6	8.2[2]	7.4	N/A	VE 10-13 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	116*	Approximately 780 feet northwest of the intersection of Highway 12 and Roth Road	5.1	6.0	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	117	Approximately 1,000 feet southeast of the intersection of Colony Drive and Bluebeard Road	4.4	5.6	8.2[2]	7.4	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	118*	Approximately 1,585 feet northwest of the intersection of Highway 12 and Jolly Roger Road	5.1	6.0	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	119	Approximately 780 feet east of the inter-section of Colony Drive and Merrimac Lane	4.4	5.6	8.2[2]	7.4	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	120*	Approximately 1,250 feet southwest of the intersection of Highway 12 and Wimble Shores Drive	5.1	6.0	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	121	Approximately 1,700 feet southeast of the intersection of Sea Vista Drive and Sea Vista Court	4.4	5.6	8.2[2]	7.4	N/A	VE 10-12 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	122*	Approximately 685 feet southwest of the intersection of Highway 12 and Leland Lane	5.1	6.0	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	123	Approximately 2,110 feet east of the inter-section of Highway 12 and Bold Dune Drive	4.4	5.6	7.7[2]	7.4	N/A	VE 10-12 AE 8-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	124*	Approximately 550 feet southwest of the intersection of Highway 12 and Island Pines Drive	5.2	6.1	6.8	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	125	Approximately 600 feet southeast of the intersection of Mac Oca Drive and Mac Oca Court	4.4	5.6	8.3[2]	7.4	N/A	VE 10-13 AE 8-10	Yes
Atlantic Ocean / Pamlico Sound	126*	Approximately 800 feet northwest of the intersection of Highway 12 and Camp Hatteras	5.2	6.1	6.9	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	127	Approximately 940 feet southeast of the intersection of Trade Winds Drive and Seabreeze Drive	4.4	5.6	8.4[2]	7.4	N/A	VE 11-13 AE 7-10	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	128*	Approximately 495 feet southwest of the intersection of Highway 12 and Atlantic Drive	5.2	6.1	6.9	7.7	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	129	Approximately 2,030 feet east of the inter-section of Highway 12 and Dean Avenue	4.4	5.6	8.6[2]	7.4	N/A	VE 11-13 AE 9-11	Yes
			5.2	6.1	6.9	7.7	N/A	AE 8-9	N/A
Atlantic Ocean / Pamlico Sound	130*	Approximately 570 feet southwest of the intersection of Highway 12 and Sudie Payne Road	5.2	6.1	6.9	7.6	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	131	Approximately 1,675 feet east of the inter-section of Highway 12 and Joseph Midgett Road	4.4	5.6	8.5[2]	7.4	N/A	VE 11-13 AE 9-11	Yes
			5.2	6.1	6.9	7.6	N/A	AE 8-9	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	132*	Approximately 1,850 feet southwest of the intersection of Highway 12 and Sea Oat Drive	5.2	6.1	6.9	7.6	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	133	Approximately 610 feet northeast of the intersection of Highway 12 and Wimble Shoals Drive	4.4	5.6	8.6[2]	7.4	N/A	VE 11-13 AE 9-11	Yes
			5.2	6.1	6.9	7.6	N/A	AE 8-9	N/A
Atlantic Ocean / Pamlico Sound	134*	Approximately 350 feet southwest of the intersection of Cross of Honor Way and Mirlo Court	5.3	6.2	6.9	7.6	N/A	VE 9-10 AE 7-9	No
Atlantic Ocean	135	Approximately 640 feet northeast of the intersection of Highway 12 and Green Lantern Court	4.4	5.6	8.9[2]	7.4	N/A	VE 11-14 AE 9-11	Yes
			5.3	6.2	6.9	7.6	N/A	AE 8-9	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	136*	Approximately 2,000 feet northwest of the intersection of Highway 12 and Green Lantern Court	5.3	6.2	6.9	7.6	N/A	VE 9-10 AE 8-9	No
Atlantic Ocean	137	Approximately 3,050 feet north of the intersection of Highway 12 and Green Lantern Court	4.4	5.7	8.9[2]	7.5	N/A	VE 11-14 AE 9-11	Yes
			5.3	6.2	6.9	7.6	N/A	AE 8-9	N/A
Atlantic Ocean / Pamlico Sound	138*	Approximately 1.25 miles northwest of the intersection of Highway 12 and Green Lantern Court	5.4	6.2	6.9	7.6	N/A	VE 9-10 AE 9	No
Atlantic Ocean	139	Approximately 1.52 miles northwest of the intersection of Highway 12 and Green Lantern Court	4.4	5.7	8.9[2]	7.5	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound	140*	Approximately 2.18 miles northwest of the intersection of Highway 12 and Green Lantern Court	5.4	6.2	6.9	7.6	N/A	VE 9-10 AE 8-9	No
Atlantic Ocean	141	Approximately 2.40 miles northwest of the intersection of Highway 12 and Green Lantern Court	4.4	5.7	8.9[2]	7.5	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	142	Approximately 3.33 miles northwest of the intersection of Highway 12 and Green Lantern Court	4.4	5.7	8.9[2]	7.6	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	143	Approximately 4.21 miles northwest of the intersection of Highway 12 and Green Lantern Court	4.4	5.7	8.9[2]	7.6	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	144	Approximately 5.12 miles northwest of the intersection of Highway 12 and Green Lantern Court	4.5	5.7	9.0[2]	7.6	N/A	VE 11-14 AE 9-11	Yes
			5.4	6.2	6.9	7.6	N/A	AE 8-9	N/A
Atlantic Ocean	145	Approximately 5.36 miles southeast of the intersection of Highway 12 and Lifeboat Station Road	4.5	5.7	9.0[2]	7.7	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	146	Approximately 4.44 miles southeast of the intersection of Highway 12 and Lifeboat Station Road	4.5	5.7	9.0[2]	7.7	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	147	Approximately 3.49 miles southeast of the intersection of Highway 12 and Lifeboat Station Road	4.5	5.8	9.0[2]	7.7	N/A	VE 11-14 AE 9-11	Yes
			5.4	5.7	7.1	7.9	N/A	AE 8-9	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	148	Approximately 2.61 miles southeast of the intersection of Highway 12 and Lifeboat Station Road	4.5	5.8	9.0[2]	7.8	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	149	Approximately 1.72 miles southeast of the intersection of Highway 12 and Lifeboat Station Road	4.5	5.8	9.0[2]	7.8	N/A	VE 10-14 AE 9-11	Yes
Atlantic Ocean	150	Approximately 4,265 feet southeast of the intersection of Highway 12 and Lifeboat Station Road	4.6	5.8	9.1[2]	7.8	N/A	VE 11-14 AE 9-11	Yes
			5.8	6.5	7.3	8.1	N/A	AE 9	N/A
Atlantic Ocean	151	Approximately 1,060 feet northeast of the intersection of Highway 12 and Lifeboat Station Road	4.6	5.8	9.1[2]	7.9	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	152	Approximately 2,240 feet northwest of the intersection of Highway 12 and Lifeboat Station Road	4.6	5.8	9.1[2]	7.9	N/A	VE 10-14 AE 9-10	Yes
			5.9	6.2	7.4	8.3	N/A	AE 8-9	N/A
Atlantic Ocean	153	Approximately 1.29 miles northwest of the intersection of Highway 12 and Lifeboat Station Road	4.6	5.8	9.1[2]	7.9	N/A	VE 11-14	Yes
			6.0	6.9	7.5	8.4	N/A	VE 11	N/A
Atlantic Ocean	154	Approximately 1.56 miles northwest of the intersection of Highway 12 and Lifeboat Station Road	4.6	5.8	9.1[2]	7.9	N/A	VE 10-14 AE 9-10	Yes
			6.0	6.9	7.5	8.4	N/A	AE 9	N/A
Atlantic Ocean	155	Approximately 2.09 miles northwest of the intersection of Highway 12 and Lifeboat Station Road	4.6	5.9	9.1[2]	8.0	N/A	VE 10-14 AE 9-11	Yes
			6.1	7.0	7.6	8.5	N/A	AE 9	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	156	Approximately 2.30 miles southeast of the intersection of Highway 12 and Bodie Island Light-house Road	4.6	5.9	9.1[2]	8.0	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	157	Approximately 1.90 miles southeast of the intersection of Highway 12 and Bodie Island Light-house Road	4.7	5.9	9.2[2]	8.0	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	158	Approximately 1.45 miles southeast of the intersection of Highway 12 and Bodie Island Light-house Road	4.7	5.9	9.2[2]	8.0	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	159	Approximately 5,100 feet southeast of the intersection of Highway 12 and Bodie Island Light-house Road	4.7	5.9	9.2[2]	8.0	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean / Roanoke Sound	160	Approximately 2.56 miles south of the intersection of Chief Wanchese Road and Thicket Lump Drive	6.2	7.3	7.7	8.7	N/A	VE 10-12 AE 10	No
Atlantic Ocean	161	Approximately 2,675 feet southeast of the intersection of Highway 12 and Bodie Island Light-house Road	4.7	5.9	9.2[2]	8.1	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	162	Approximately 780 feet east of	4.7	5.9	9.2[2]	8.1	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
		the inter-section of Highway 12 and Bodie Island Light-house Road	6.4	7.6	8.1	9.2	N/A	AE 10	N/A
Atlantic Ocean	163	Approximately 2,190 feet north of the intersection of Highway 12 and Bodie Island Light-house Road	4.7	5.9	9.2[2]	8.1	N/A	VE 11-14 AE 9-11	Yes
			4.7	7.8	8.2	9.3	N/A	AE 8-9	N/A
Atlantic Ocean	164	Approximately 2,065 feet southeast of the intersection of Highway 12 and S. Old Oregon Inlet Road	4.7	5.9	9.2[2]	8.1	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean / Roanoke Sound	165	Approximately 2,395 feet southeast of the intersection of Chief Wanchese Road and Thicket Lump Drive	6.2	7.3	7.7	8.7	N/A	VE 10-12 AE 9-10	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	166	Approximately 715 feet northeast of the intersection of S. Old Oregon Inlet Road and E. McCall Court	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 10-11	Yes
			6.6	8.0	8.4	9.6	N/A	AE 10	N/A
Atlantic Ocean / Roanoke Sound	167	Approximately 1,060 feet northeast of the intersection of Chief Wanchese Road and Moon Tillett Fish House	6.2	7.3	7.7	8.7	N/A	VE 10-12 AE 9-10	No
Atlantic Ocean	168	Approximately 655 feet northeast of the intersection of E. Sea Gull Drive and S. Bodie Isle Court	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Roanoke Sound	169	Approximately 2,265 feet northeast of the intersection of Mill Landing Road and Emma Road	6.1	7.3	7.7	8.7	N/A	VE 10-12 AE 8-10	No
Atlantic Ocean	170	Approximately 260 feet southeast of the intersection of E. Limulus Drive and E. Surfside Drive	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 10-11	Yes
			6.5	7.9	8.4	9.4	N/A	AE 10	N/A
Atlantic Ocean / Roanoke Sound	171	Approximately 1.16 miles northeast of the intersection of Mill Landing Road and Tillett Road	6.1	7.3	7.7	8.7	N/A	VE 10-12 AE 9-10	No
Atlantic Ocean	172	Approximately 315 feet east of the inter-section of E. Spencer Street and S. Abrams Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Roanoke Sound	173	Approximately 1.53 miles northeast of the intersection of Highway 345 and Baumtown Road	6.1	7.3	7.7	8.7	N/A	VE 10-12 AE 9-10	No
Atlantic Ocean	174	Approximately 720 feet east of the inter-section of S. Old Oregon Inlet Road and E. James Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 10-11	Yes
			6.5	7.9	8.4	9.4	N/A	AE 10	N/A
Atlantic Ocean / Roanoke Sound	175	Approximately 1.72 miles northeast of the intersection of Highway 345 and Baumtown Road	6.1	7.3	7.7	8.7	N/A	VE 10-12 AE 9-10	No
Atlantic Ocean	176	Approximately 740 feet northeast of the intersection of S. Old Oregon Inlet Road and Indigo Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 10-11	Yes
			6.5	7.9	8.4	9.4	N/A	AE 10	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Roanoke Sound	177	Approximately 1.92 miles southeast of the intersection of Highway 345 and Skyco Road	6.1	7.3	7.8	8.7	N/A	VE 10-12 AE 8-10	No
Atlantic Ocean	178	Approximately 680 feet southeast of the intersection of S. Old Oregon Inlet Road and E. Ida Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
			6.5	7.9	8.4	9.4	N/A	AE 10	N/A
Atlantic Ocean / Roanoke Sound	179	Approximately 1.57 miles east of the intersection of Highway 345 and Skyco Road	6.2	7.5	7.9	9.1	N/A	VE 10-12 AE 8-10	No
Atlantic Ocean	180	Approximately 850 feet southeast of the intersection of S. Old Oregon Inlet Road and E. Harvest Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 10-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect No.	Transect Location	Stillwater Elevations in feet NAVD 88: 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Wave Runup Analysis Zone Designation and BFE in feet NAVD 88	Wave Height Analysis Zone Designation and BFE in feet NAVD 88[1]	Primary Frontal Dune Identified
Atlantic Ocean / Roanoke Sound	181	Approximately 1.30 miles east of the intersection of Highway 345 and Water Plant Road	6.3	7.7	8.0	9.6	N/A	VE 10-12 AE 8-10	No
Atlantic Ocean	182	Approximately 680 feet northeast of the intersection of S. Old Oregon Inlet Road and E. Hargrove Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 10-11	Yes
			6.6	8.0	8.4	9.6	N/A	AE 10	N/A
Atlantic Ocean	183	Approximately 780 feet northeast of the intersection of S. Old Oregon Inlet Road and E. Huron Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
			6.6	8.0	8.4	9.6	N/A	AE 10	N/A
Atlantic Ocean / Roanoke Sound	184*	**	6.4	7.9	8.2	9.8	N/A	VE 10-11 AE 8-10	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	185	Approximately 550 feet north-east of the intersection of S. Virginia Dare Trail and E. Gray Eagle Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
			6.6	8.0	8.4	9.6	N/A	AE 10	N/A
Atlantic Ocean / Roanoke Sound	186*	**	6.4	7.9	8.2	9.8	N/A	VE 10-11 AE 8-10	No
Atlantic Ocean	187	Approximately 525 feet north-east of the intersection of S. Virginia Dare Trail and E. Grouse Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
			6.6	8.0	8.4	9.6	N/A	AE 8-9	N/A
Atlantic Ocean / Roanoke Sound	188*	**	6.4	7.9	8.2	9.8	N/A	VE 10-11 AE 8-10	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	189	Approximately 530 feet north-east of the intersection of S. Virginia Dare Trail and E. Oceanwatch Court	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
			6.6	8.0	8.4	9.6	N/A	AE 8-9	N/A
Atlantic Ocean / Roanoke Sound	190*	**	6.4	7.9	8.2	9.8	N/A	VE 10-11 AE 8-10	No
Atlantic Ocean	191	Approximately 700 feet southeast of the intersection of S. Virginia Dare Trail and E. Blue Water Drive	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
			6.6	8.0	8.4	9.6	N/A	AE 8-9	N/A
Atlantic Ocean	192	Approximately 2,475 feet southeast of the intersection of Mother Vineyard Road and Scupper-nong Road	3.5	4.8	5.0	6.3	N/A	VE 11-12	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	193	Approximately 2,040 feet southeast of the intersection of Mother Vineyard Road and Scupper-nong Road	3.5	4.8	5.0	6.3	N/A	VE 11-12	No
Atlantic Ocean	194	Approximately 1,670 feet southeast of the intersection of Mother Vineyard Road and Scupper-nong Road	3.5	4.8	5.0	6.3	N/A	VE 10-12 AE 10	No
Atlantic Ocean	195	Approximately 1,310 feet southeast of the intersection of Mother Vineyard Road and Scupper-nong Road	3.5	4.8	5.0	6.3	N/A	VE 10-12 AE 10	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	196	Approximately 905 feet southeast of the intersection of Mother Vineyard Road and Scuppernong Road	3.5	4.8	5.0	6.3	N/A	VE 10-12 AE 10	No
Atlantic Ocean	197	Approximately 1,000 feet northeast of the intersection of S. Croatan Highway and W. Seachase Drive	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
			6.0	8.0	8.4	9.6	N/A	AE 8-9	N/A
Atlantic Ocean / Roanoke Sound	198*	**	6.4	7.9	8.2	9.8	N/A	VE 10-11 AE 8-10	No
Atlantic Ocean	199	Approximately 435 feet east of the intersection of S. Virginia Dare Trail and E. Enterprise Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Roanoke Sound	200*	**	6.4	7.9	8.2	9.8	N/A	VE 10-11 AE 8-10	No
Atlantic Ocean	201	Approximately 665 feet northeast of the intersection of S. Virginia Dare Trail and E. Danube Street	4.7	6.0	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
			6.0	8.0	8.4	9.6	N/A	AE 8-9	N/A
Atlantic Ocean / Roanoke Sound	202*	**	6.4	7.9	8.2	9.8	N/A	VE 10-11 AE 8-10	No
Atlantic Ocean	203	Approximately 520 feet north-east of the intersection of S. Virginia Dare Trail and E. Dune Street	4.7	6.1	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
			6.0	8.0	8.4	9.6	N/A	AE 8-9	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	204	Approximately 1,585 feet north of the intersection of S. Virginia Dare Trail and E. Sound Side Road	4.7	6.1	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	205	Approximately 970 feet northeast of the intersection of S. Virginia Dare Trail and E. Conch Street	4.7	6.1	9.2[2]	8.2	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	206	Approximately 480 feet northeast of the intersection of S. Virginia Dare Trail and Bainbridge Street	4.7	6.1	9.2[2]	8.3	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	207	Approximately 490 feet northeast of the intersection of S. Virginia Dare Trail and E. Bonnett Street	4.7	6.1	9.2[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	208	Approximately 620 feet southeast of the intersection of S. Virginia Dare Trail and E. Abalone Street	4.7	6.1	9.2[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	209	Approximately 590 feet northeast of the intersection of S. Virginia Dare Trail and E. Albatross Street	4.7	6.1	9.2[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	210	Approximately 620 feet northeast of the intersection of S. Virginia Dare Trail and Carolyn Drive	4.7	6.2	9.2[2]	8.3	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	211	Approximately 790 feet east of the inter-section of S. Virginia Dare Trail and E. Martin Street	4.7	6.2	9.2[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	212	Approximately 700 feet northeast of the intersection of S. Virginia Dare Trail and E. Baum Street	4.7	6.2	9.2[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	213	Approximately 830 feet southeast of the intersection of N. Virginia Dare Trail and Raleigh Avenue	4.7	6.2	9.3[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	214	Approximately 760 feet east of the intersection of N. Virginia Dare Trail and Windsong Way	4.7	6.2	9.3[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
			6.4	7.8	8.3	9.7	N/A	AE 8-9	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	215	Approximately 550 feet northeast of the intersection of N. Virginia Dare Trail and E. First Street	4.7	6.2	9.3[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
			6.3	7.7	8.3	9.7	N/A	AE 8-9	N/A
Atlantic Ocean	216	Approximately 830 feet northeast of the intersection of N. Virginia Dare Trail and E. Third Street	4.7	6.2	9.3[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
			6.3	7.7	8.3	9.7	N/A	AE 8-9	N/A
Atlantic Ocean	217	Approximately 620 feet southeast of the intersection of N. Virginia Dare Trail and E. Avalon Drive	4.7	6.2	9.3[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
			6.3	7.7	8.3	9.7	N/A	AE 8-9	N/A
Atlantic Ocean	218	Approximately 315 feet east of the intersection of N. Virginia Dare Trail and E. Sothel Street	4.7	6.2	9.3[2]	8.3	N/A	VE 11-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect No.	Transect Location	Stillwater Elevations in feet NAVD 88: 10% Annual Chance	Stillwater Elevations in feet NAVD 88: 2% Annual Chance	Stillwater Elevations in feet NAVD 88: 1% Annual Chance	Stillwater Elevations in feet NAVD 88: 0.2% Annual Chance	Wave Runup Analysis: Zone Designation and BFE in feet NAVD 88	Wave Height Analysis: Zone Designation and BFE in feet NAVD 88[1]	Primary Frontal Dune Identified
Atlantic Ocean	219	Approximately 260 feet northeast of the intersection of N. Virginia Dare Trail and E. Arch Street	4.7	6.2	9.3[2]	8.3	N/A	VE 11-14 AE 9-11	Yes
Atlantic Ocean	220	Approximately 385 feet southeast of the intersection of N. Virginia Dare Trail and White Street	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	221	Approximately 270 feet northeast of the intersection of N. Virginia Dare Trail and Perry Street	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	222	Approximately 200 feet southeast of the inter-section of N. Virginia Dare Trail and Starfish Lane	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	223	Approximately 275 feet southeast of the inter-section of N. Virginia Dare Trail and E. Balchen Street	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	224	Approximately 250 feet southeast of the intersection of N. Virginia Dare Trail and Bleriot Street	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	225	Approximately 325 feet southeast of the intersection of N. Virginia Dare Trail and E. Bennett Street	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	226	Approximately 425 feet southeast of the intersection of N. Virginia Dare Trail and Byrd Street	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	227	Approximately 580 feet southeast of the intersection of Ocean Blvd. and Ocean View LP	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	228	Approximately 2,090 feet southeast of the intersection of Ocean Blvd. and Chicahauk Trail	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	229	Approximately 800 feet northeast of the intersection of Ocean Blvd. and Chicahauk Trail	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	230	Approximately 550 feet north-east of the intersection of Ocean Blvd. and Porpoise Run	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	231	Approximately 450 feet northeast of the intersection of Ocean Blvd. and E. Dog-wood Trail	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	232	Approximately 630 feet northeast of the intersection of Ocean Blvd. and Hickory Trail	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	233	Approximately 1,530 feet northeast of the intersection of Duck Road and Sixth Avenue	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	234	Approximately 1,700 feet northeast of the intersection of Duck Road and Eleventh Avenue	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	235	Approximately 450 feet northeast of the intersection of E. Tuckahoe Drive and Sea Eider Court	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	236	Approximately 475 feet northeast of the intersection of Four Seasons Lane and Lala Court	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	237	Approximately 850 feet south-east of the intersection of Marlin Drive and Marlin Court	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	238	Approximately 950 feet north-east of the intersection of Dune Road and Speckle Trout Drive	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean	239	Approximately 2,355 feet northeast of the intersection of Duck Road and Sandy Ridge Road	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	240	Approximately 570 feet east of the intersection of Nor Banks Drive and Spindrift Court	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	241	Approximately 370 feet north-east of the intersection of Pintail Road and Buffell Head Road	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
Atlantic Ocean	242	Approximately 580 feet east of the intersection of Trinitie Drive and Quarter-deck Drive	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes

Table 8—Summary of Coastal Analyses

Flooding Source	Transect No.	Transect Location	Stillwater Elevations in feet NAVD 88: 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Wave Runup Analysis: Zone Designation and BFE in feet NAVD 88	Wave Height Analysis: Zone Designation and BFE in feet NAVD 88[1]	Primary Frontal Dune Identified
Atlantic Ocean / Currituck Sound	243	Approximately 620 feet east of the intersection of Oyster Catcher Lane and Skimmer Way	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
			4.2	5.6	6.2	7.4	N/A	AE 7-9	N/A
Atlantic Ocean / Currituck Sound	244	Approximately 780 feet northeast of the intersection of Duck Road and Ruddy Duck Lane	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
			4.2	5.6	6.2	7.4	N/A	AE 7-9	N/A
Atlantic Ocean / Currituck Sound	245	Approximately 730 feet north-east of the intersection of Duck Road and Quail Way	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
			4.2	5.6	6.2	7.4	N/A	AE 7-9	N/A
Atlantic Ocean / Currituck Sound	246	Approximately 980 feet south-east of the intersection of Duck Road and Baum Trail	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
			4.2	5.6	6.2	7.4	N/A	AE 8-9	N/A

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Currituck Sound	247	Approximately 1,845 feet north of the intersection of Duck Road and Baum Trail	4.8	6.2	9.4[2]	8.6	N/A	VE 12-14 AE 9-11	Yes
			4.2	5.6	6.2	7.4	N/A	AE 7-9	N/A
Atlantic Ocean / Pamlico Sound / Croatan Sound	248	**	2.0	2.7	3.0	3.8	N/A	AE 3	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	249	**	2.0	2.7	3.0	3.8	N/A	AE 3	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	250	**	2.0	2.7	3.0	3.8	N/A	AE 3	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound / Croatan Sound	251	**	3.2	3.9	4.4	5.4	N/A	VE 6-7 AE 4-6	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	252	**	2.0	2.7	3.0	3.8	N/A	AE 3	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	253	**	3.2	3.9	4.4	5.4	N/A	VE 6-7 AE 4-6	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	254	**	3.2	3.9	4.4	5.4	N/A	VE 6-7 AE 4-6	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound / Croatan Sound	255	**	3.2	3.9	4.4	5.4	N/A	VE 6-7 AE 4-6	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	256	**	3.8	4.8	5.1	5.7	N/A	VE 7-8 AE 6-7	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	257	**	3.8	4.8	5.1	5.7	N/A	VE 7-8 AE 6-7	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	258	Approximately 1,835 feet northeast of the intersection of Shipyard Road and Hassell Road	3.8	4.8	5.1	5.7	N/A	AE 7	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound / Croatan Sound	259	Approximately 2,865 feet northeast of the intersection of Highway 64/264 and Shipyard Road	3.8	4.8	5.1	5.7	N/A	VE 7-8 AE 5-7	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	260	Approximately 875 feet northeast of the intersection of Old Manns Harbor Road and Richard Drive	3.8	4.8	5.1	5.7	N/A	AE 5-6	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	261	Approximately 3,070 feet northeast of the intersection of Highway 64/264 and Mashoes Road	4.1	5.2	5.5	6.2	N/A	AE 6	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	262*	**	4.3	5.7	6.0	6.8	N/A	VE 9 AE 6-7	No

Table 8—Summary of Coastal Analyses

Flooding Source	Transect		Stillwater Elevations in feet NAVD 88				Wave Runup Analysis	Wave Height Analysis	Primary Frontal Dune Identified
	No.	Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	Zone Designation and BFE in feet NAVD 88	Zone Designation and BFE in feet NAVD 88[1]	
Atlantic Ocean / Pamlico Sound / Croatan Sound	263*	**	4.3	5.8	6.3	7.2	N/A	VE 9 AE 6-8	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	264*	**	4.3	5.8	6.3	7.2	N/A	VE 9 AE 6-8	No
Atlantic Ocean / Pamlico Sound / Croatan Sound	265*	**	2.0	2.7	3.0	3.8	N/A	AE 3	No

* Transect analyzed from across the sound to the barrier island
** Data not available
[1] Because of map scale limitations, BFEs shown on FIRM represent average elevations for zones depicted
[2] Includes wave setup of 2.6 feet

Section 6.0 – Mapping Methods

6.1 Vertical and Horizontal Control

Vertical Datum

All FISs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FISs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the finalization of the North American Vertical Datum of 1988 (NAVD 88), many FISs are being prepared using NAVD 88 as the referenced vertical datum.

All flood elevations shown on the FIRM for Dare County are referenced to NAVD 88. Structure and ground elevations in the county must, therefore, be referenced to NAVD 88. It is important to note that FISs for adjacent communities may be referenced to NGVD 29. This may result in BFE differences across political boundaries between the communities.

Prior versions of this FIS were referenced to NGVD 29. When a datum conversion is effected for an FIS, the Flood Profiles, BFEs, and bench marks reflect the new datum values. To compare structural and ground elevations to 1% annual chance flood elevations shown in this FIS, the subject structural and ground elevations must be referenced to the new datum values.

As noted above, the elevations shown in this FIS are referenced to NAVD 88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD 29 by applying a standard conversion factor. The conversion factor for Dare County is -0.99 foot. The locations used to establish the conversion factor were USGS quadrangle corners that fell within the county, as well as those that were within 2.5 miles outside the county. The benchmarks are referenced to NAVD 88. Table 9, "Datum Conversion Locations and Values," is shown below.

Table 9—Datum Conversion Locations and Values

Latitude	Longitude	Conversion from NGVD 29 to NAVD 88 (feet)
75.750	36.250	-0.94
75.750	36.125	-0.95
75.875	36.000	-0.95
75.750	36.000	-0.96
75.625	36.000	-0.98
76.000	35.875	-1.01
75.875	35.875	-0.80
75.750	35.875	-0.95
75.625	35.875	-0.98
76.000	35.750	-0.99
75.875	35.750	-0.94
75.750	35.750	-1.03
75.500	35.750	-1.02
76.000	35.625	-0.97
75.875	35.625	-0.98
75.750	35.625	-1.01
75.500	35.625	-1.03

Table 9—Datum Conversion Locations and Values

Latitude	Longitude	Conversion from NGVD 29 to NAVD 88 (feet)
75.500	35.500	-1.04
75.500	35.375	-1.05
75.625	35.250	-1.07
75.500	35.250	-1.07
Average conversion in Dare County from NGVD 29 to NAVD 88 = -0.99 foot		

The BFEs shown on the FIRM represent whole-foot rounded values. For example, a 1% annual chance water-surface elevation of 102.4 feet will appear as 102 on the FIRM and 102.6 feet will appear as 103. Therefore, users who wish to convert the elevations in this FIS to NGVD 29 should apply the stated conversion factor(s) to elevations shown on the Flood Profiles and supporting data tables in the FIS Report, which are shown, at a minimum, to the nearest 0.1 foot.

For more information on NAVD 88, see *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988*, or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (http://www.ngs.noaa.gov).

Vertical Control Monuments

Qualifying bench marks within Dare County that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical, with a vertical stability classification of A, B, or C, are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier (PID).

The National Geodetic Survey establishes precisely located monuments on the North Carolina Grid System and Bench Marks referenced to a vertical datum (NGVD 1929 and NAVD 1988).

Bench marks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)
- Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)
- Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monument below frost line)
- Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line, or steel witness post)

In addition, when local jurisdictions have established their own vertical monument network, these monuments may also be shown on the FIRM with the appropriate designations. Local monuments will be placed on the FIRM if the community has requested that they be included and if the monuments meet the aforementioned criteria.

North Carolina Geodetic Survey (NCGS) and contractor surveyed vertical control monuments will be shown on the FIRM panels. Those cataloged by NCGS meet similar requirements to the NGS monuments as described above. Most monuments that have been cataloged by NCGS have been established to NGS standards, but have not been submitted to NGS for inclusion into the NSRS. The qualifying criteria for depicting bench marks established by the State's contractors on the new digital FIRM panels include:

- GPS surveying of permanent 3-D survey monuments to 5-centimeter or better local network accuracy guidelines, in accordance with NOAA Technical Memorandum NOS NGS-58 "Guidelines for Establishing GPS-Derived Ellipsoid Heights (Standards: 2 cm and 5 cm)," and conversion to NAVD 88 orthometric heights using NGS' latest geoid mode;
- Requiring a stability classification of "C" or better; and
- Submitting GPS files and station descriptions to NCGS.

To obtain current information for cataloging local bench marks in the NSRS, please visit the Data Sheet page of the NGS website at http://www.ngs.noaa.gov/datasheet.html, or contact the NGS Information Services Branch at (301) 713-3242. Information regarding the NCGS or State contractor bench marks can be obtained through the NCGS website at www.ncgs.state.nc.us, or by phone at (919) 733-3836.

It is important to note that temporary vertical monuments, sometimes called Elevation Reference Marks, are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, interested individuals may contact FEMA to access this information.

Horizontal Datum and Control

The digital files that comprise the FIRM are georeferenced to an established coordinate system. The coordinate system used for the production of this FIRM is North Carolina State Plane (FIPSZONE 3200) referenced to the North American Datum of 1983 (NAD83), GRS80 ellipsoid.

6.2 Base Map

County aerials collected in 2002 are used as the base map for Dare County. The base maps are supplemented with stream centerlines, shoreline, and political boundaries, and road name data from other sources.

The projection used in the preparation of this map was the North Carolina State Plane Coordinate System. The horizontal datum was NAD83, GRS80 spheroid. Differences in datum, spheroid, or projection used in the production of FIRMs for adjacent states may result in slight positional differences in map features across the state boundary. These differences do not affect the accuracy of this FIRM.

As part of the North Carolina CTS Initiative, North Carolina digital FIRM panel numbers are consistent with the North Carolina Land Records Management Program (LRMP).

The 11-digit digital FIRM panel numbering system for North Carolina is: SS MM LLLL PP X, where SS = State Federal Information Processing Code (37); MM = Easting-Northing (EN) 1,000,000-foot coordinates; LLLL = LRMP map numbers to include the EN 100,000-foot coordinates, and the EN 10,000-foot coordinates; PP = place holders for additional EN 1,000-foot coordinates; and X = suffix ("J" for the initial edition). North Carolina's State Plane Coordinate System origin is outside the State boundary to the southwest (in Georgia), the eastings range from approximately 0,404,000 (Tennessee border) to 3,040,000 (Atlantic Ocean); and the northings range from approximately 0,045,000 (South Carolina border) to 1,043,000 (Virginia border). Digital FIRM panels were compiled at either 1"=1,000', covering an area of 20,000 feet x 20,000 feet (20" x 20" panels); or at 1"=500', covering an area of 10,000 feet x 10,000 feet (20" x 20" panels). An additional 2 digits (both zeros) are held in reserve as a "place holder" in the event that future FIRMs are printed at a larger scale; e.g., 1"=250', covering an area of 5,000 feet x 5,000 feet for which the 1,000-foot coordinates would either be 0 or 5.

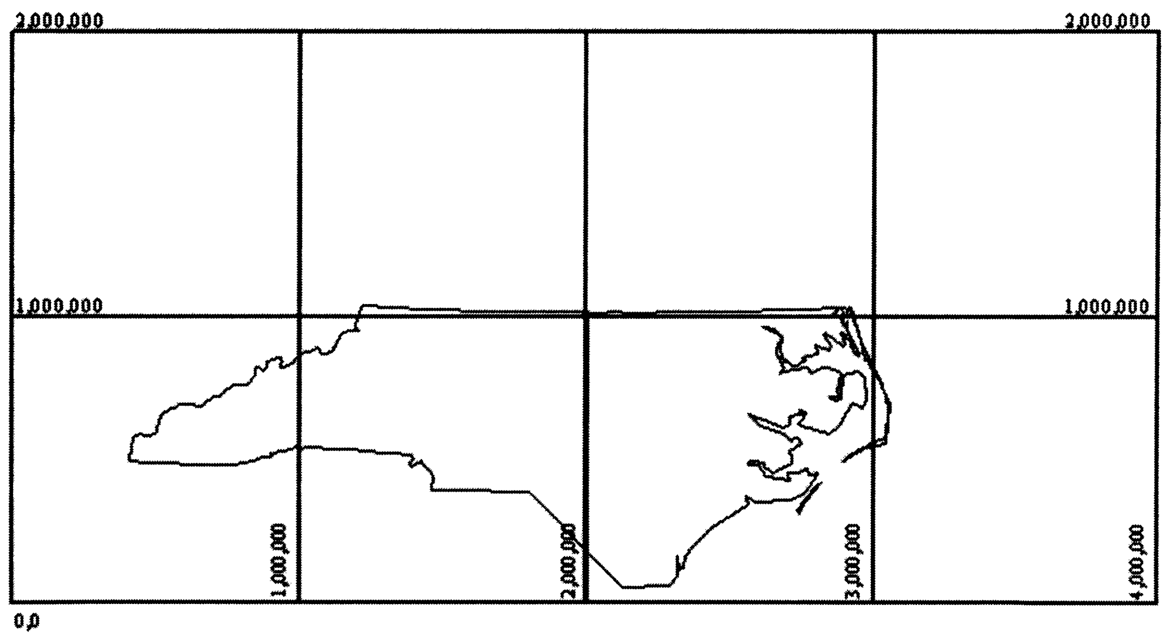


Figure 4—North Carolina's State Plane Coordinate System

6.3 Floodplain and Floodway Delineation

Floodplain Delineation

For streams restudied by detailed and limited detailed methods, the 1% and 0.2% annual chance floodplains were delineated using flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic data acquired using airborne Light Detection and Ranging (LIDAR). This LIDAR data was acquired during the winter 2000-2001 flying season.

The topographic data satisfies a vertical root-mean-square error (RMSE) accuracy standard of 20 cm (1.3 feet accuracy at the 95% confidence limit) for the Outer Banks and 25 cm (1.6 feet accuracy at the 95% confidence limit) for those portions of the basin lying west of the Outer Banks. These data could be contoured at roughly a 2-foot vertical contour interval. All elevations were referenced to the NAVD 88 and reflect orthometric heights. Variably spaced, bare-earth digital topographic data in ASCII point file format were combined with imagery (either flown concurrently with the LIDAR data or using existing digital orthophotos) to establish a Triangulated Irregular Network (TIN) of digital elevation points, which include selected breaklines to be used for hydraulic modeling. Furthermore, a uniformly spaced sampling of the TIN resulted in uniformly spaced Digital Elevation Models (DEMs), with 20 ft x 20 ft post spacing, which was generated in multiple file formats.

For coastal floodplains, after analyzing wave heights along each transect, wave elevations were interpolated between transects. Various source data were used in the interpolation, including topographic data described above. Controlling features affecting the elevations were identified and considered in relation to their positions at particular transect and their variation between transects.

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones VE, AO, AH, A99, AR, A, and AE), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundaries have been shown.

Section 7.0 – Revising the FIS

This FIS is based on the most up-to-date data available to FEMA or the State at the time of production; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time; certain types of revisions will require the submission of supporting data. FEMA or the State may also initiate a revision. FIS revisions may take several forms; these include Letters of Map Amendment (LOMAs), Letters of Map Revision - based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs), Physical Map Revisions (PMRs), and FEMA or the State-contracted restudies.

7.1 Letters of Map Amendment and Letters of Map Revision - Based on Fill

LOMAs and LOMR-Fs are documents issued by FEMA that officially remove a property and/or a structure from a Special Flood Hazard Area (SFHA), if data supporting the removal are submitted. LOMAs and LOMR-Fs are generally determinations regarding areas that are too small to be shown on a FIRM panel; consequently, the changes they describe become official without revising the FIRM or the FIS Report.

NFIP regulations require that the lowest adjacent grade (the lowest ground touching the structure) be at or above the 1% annual chance flood elevation for a LOMA to be issued. Currently, there is no fee for FEMA's review of a LOMA request, but the requester of a LOMA is responsible for providing all the information needed for the review, which may include structure and/or property elevations certified by a licensed land surveyor or professional engineer. Therefore, LOMA requesters may need to retain the services of a land surveyor or engineer.

A LOMA cannot be used for property on which fill has been placed. For those situations, a LOMR-F must be used. As a participant in the NFIP, a local government must adopt ordinances that meet the minimum Federal floodplain management standards, which are outlined in Section 60.3 of the NFIP regulations. For a number of reasons, these ordinances generally vary from community to community. Nonetheless, because the placement of fill within the floodplain can affect flood hazards in the surrounding area, additional information is needed before FEMA can process a LOMR-F request. Among the data required for a LOMR-F is the community acknowledgment form. This form is FEMA's assurance that all appropriate Federal, State, and local floodplain management requirements have been met. Furthermore, NFIP regulations require that the lowest adjacent grade (the lowest ground touching the structure) be at or above the 1% annual chance flood elevation for a LOMR-F to be issued removing the structure from the floodplain. Because LOMR-F requests are the result of changed physical conditions rather than limitations of scale or topographic definition, FEMA charges a fee for the review of a LOMR-F request. As with the LOMA, the requester of a LOMR-F is responsible for providing all supporting information, including structure and/or property elevation data.

In cases where property owners plan to add fill in the SFHA, NFIP regulations require plans and technical information to be submitted for review by FEMA before construction takes place. FEMA will issue a conditional LOMR-F stating how flood hazards would change and what portions of the property, if any, would remain in the SFHA if the project were built according to the submitted plans.

The issuance of a LOMA or LOMR-F ends the property owner's obligation to purchase flood insurance as a condition of Federal or federally backed financing. However, the property owner's mortgage company maintains the prerogative to require flood insurance as a condition of providing financing. Before attempting to obtain a LOMA or LOMR-F, property owners are advised to consult their mortgage companies regarding this policy. Even if the mortgage company indicates that it will require flood insurance if a LOMA or LOMR-F is issued, it may be advantageous for property owners to request a LOMA or LOMR-F because flood insurance premiums are lower for properties removed from the SFHA than for properties that remain within the SFHA.

For additional information regarding LOMAs, LOMR-Fs, conditional LOMR-Fs, or current application fees, please call the FEMA Map Assistance Center toll-free information line at 1-877-FEMA MAP (1-877-336-2627).

7.2 Letters of Map Revision

A Letter of Map Revision (LOMR) is a document issued by FEMA that revises an FIS Report and/or FIRM. A LOMR is used to change flood risk zones, floodplain and/or floodway delineations, flood elevations, or planimetric features such as road systems or corporate limits. A LOMR provides FEMA with a cost-effective means of revising the FIS information without physically changing and reprinting the map or report itself. A portion of the FIRM panel or FIS Report showing the revised information is issued with the LOMR. The LOMR is sent to all affected communities and is archived in the communities' NFIP map repository for public reference.

In cases where a proposed project (such as construction in the 1% annual chance floodplain) would result in a significant rise in 1% annual chance water-surface elevations, NFIP regulations require the community to submit plans and technical information for review by FEMA before construction takes place. This assures communities participating in the NFIP that proposed projects meet minimum NFIP requirements. The result of FEMA's review is documented in a conditional LOMR.

For additional information regarding LOMRs, conditional LOMRs, or current application fees, please call the FEMA Map Assistance Center toll-free information line at 1-877-FEMA MAP (1-877-336-2627).

7.3 Physical Map Revisions

Physical Map Revisions (PMRs) are processed to incorporate information concerning conditions present in the community that are not reflected in the FIS, and involve distributing republished FISs that supersede the most current NFIP data in the community repository. PMRs may be initiated by a request from a community resident or agency, or FEMA may initiate a PMR to incorporate one or more LOMRs, to reflect significant changes in corporate limits, to correct errors, or to update flood hazards to match new information from an adjacent community's FIS. Due to the costs associated with updating and distributing FISs, map revisions will be processed as LOMRs rather than PMRs whenever possible. For more information regarding PMRs, please contact the FEMA Map Assistance Center toll-free information line at 1-877-FEMA MAP (1-877-336-2627) or the FEMA Regional Office at the address listed on the Notice to Flood Insurance Study Users page at the front of this report.

7.4 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards in a given community. FEMA accomplishes this through a national mapping needs assessment process that assigns priorities and allocates funds to sponsor or subsidize new flood hazard analyses used to update

FIS Reports. For more information regarding FEMA-contracted restudies, please contact the FEMA Map Assistance Center toll-free information line at 1-877-FEMA MAP (1-877-336-2627) or the FEMA Regional Office at the address listed on the Notice to Flood Insurance Study Users page at the front of this report.

7.5 Map Revision History

The current FIRM is a subset of the Statewide FIRM, showing flood hazard information for the entire geographic area of Dare County. Previously, separate Flood Hazard Boundary Maps (FHBMs), Flood Boundary and Floodway Maps (FBFMs), and/or FIRMs were prepared for each identified flood prone jurisdiction within the county. Historical data relating to the NFIP maps prepared for each community prior to and including the September 20, 2006 North Carolina Statewide FIRM, which includes Dare County, are presented in Table 10, "Community Map History."

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Dare County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS Reports, FHBMs, FIRMs, and/or FBFMs for all of the incorporated and unincorporated jurisdictions within Dare County.

Table 10—Community Map History

Community Name	Initial Identification Date	FHBM Revision Date	FIRM Effective Date	FIRM Revision Date
Dare County (Unincorporated Areas)	April 8, 1971	July 1, 1974	October 6, 1978	October 1, 1983 February 19, 1986 April 2, 1993 April 3, 1995 December 20, 2000 September 20, 2006
Duck, Town of[1]	April 8, 1971	July 1, 1974	October 6, 1978	October 1, 1983 February 19, 1986 April 2, 1993 April 3, 1995 December 20, 2000 September 20, 2006
Kill Devil Hills, Town of	May 4, 1973	None	May 4, 1973	July 1, 1974 March 5, 1976 February 19, 1986 April 2, 1993 September 20, 2006
Kitty Hawk, Town of	October 1, 1983	None	October 1, 1983	March 18, 1986 April 2, 1993 September 20, 2006

[1]This community did not have its own FIRM prior to this countywide FIS. Portions of the land area for this community were previously shown on the FIRM for the unincorporated areas of Dare County. Therefore, the map history dates associated with this community were taken from the FIRM for Dare County.

Table 10—Community Map History

Community Name	Initial Identification Date	FHBM Revision Date	FIRM Effective Date	FIRM Revision Date
Manteo, Town of	January 5, 1973	None	January 5, 1973	July 1, 1974 March 19, 1976 September 10, 1976 September 8, 1978 December 4, 1985 September 20, 2006
Nags Head, Town of	November 10, 1972	None	November 10, 1972	July 1, 1974 October 17, 1975 February 19, 1986 April 2, 1993 February 4, 1994 July 3, 1995 March 5, 1996 March 6, 1996 December 20, 2000 September 20, 2006
Southern Shores, Town of	May 13, 1972	None	May 13, 1972	January 9, 1981 May 4, 1987 April 2, 1993 September 20, 2006

Section 8.0 – Study Contracting and Community Coordination

8.1 Authority and Acknowledgments

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

This FIS revises and updates previous FISs for the geographic area of Dare County. Table 11, "Authority and Acknowledgments," includes information for the single-jurisdiction FISs published for each community included in this countywide FIS. The table also includes information for this revision.

Table 11—Authority and Acknowledgments

Community	FIS Dated	Study Contracted by	Data Source *(Study Contractor or Source of Data)*	Contract or Inter-Agency Agreement (IAA) Number	Work Completed in *(month and/or year)*
Dare County and Incorporated Areas	September 20, 2006	FEMA	North Carolina Floodplain Mapping Program	N/A	January 2005
Dare County (Unincorporated Areas)	April 2, 1993	FEMA	FEMA	N/A	March 1991
Kill Devil Hills, Town of	April 2, 1993	FEMA	FEMA	N/A	March 1991
Kitty Hawk, Town of	April 2, 1993	FEMA	FEMA	N/A	March 1991
Manteo, Town of	December 4, 1985	FEMA	Tetra Tech, Inc.	EMW-C-0344	January 1983
Nags Head, Town of	April 2, 1993	FEMA	FEMA	N/A	March 1991
Southern Shores, Town of	April 2, 1993	FEMA	FEMA	N/A	March 1991

N/A – Not Applicable

This FIS Report was produced through a unique cooperative partnership between the State of North Carolina and FEMA. The State of North Carolina, through FEMA's Cooperating Technical Partner (CTP) Initiative, has become the first Cooperating Technical State (CTS) and will assume primary ownership of the NFIP FIRM panels for all North Carolina communities. This role has traditionally been fulfilled by FEMA. The North Carolina Floodplain Mapping Program is conducting flood hazard analyses and producing updated, digital FIRM panels. The hydrologic and hydraulic analyses and the FIRM panels were produced by Watershed Concepts, under contract with the State of North Carolina.

In August 2000, the North Carolina General Assembly allocated $23 million to Phase I of the Program. FEMA has contributed an additional $10.0 million towards the Program, as well as in-kind contributions of engineering, mapping, and program management services.

8.2 Consultation Coordination Officer's Meetings/Scoping Meetings

In general, for each FIS an initial Consultation Coordination Officer's (CCO) meeting is held with representatives from FEMA, the communities, and the study contractors to explain the nature and purpose of the FIS and to identify the streams to be studied by detailed methods. A final CCO meeting is held with representatives from FEMA, the communities, and the study contractors to review the results of the study.

For each FIS produced by the State of North Carolina and FEMA's unique partnership, an Initial Scoping Meeting is held with representatives from FEMA, the county, the incorporated communities, and the State of North Carolina. A Final Scoping meeting is held to review the Draft Basin Plan and finalize the streams to be studied by detailed methods. This information is then used to create the Final Basin Plan.

The dates of the initial and final CCO meetings held for Dare County were compiled from their previous FIS Reports and are shown in Table 12, "Consultation Coordination Officer's Meetings."

Table 12—Consultation Coordination Officer's Meetings

Community Name	For FIS Dated	Initial CCO Date	Attended by	Final CCO Date	Attended by
Dare County (Unincorporated Areas)	April 2, 1993	*	*	April 29, 1992	Representatives from Dare County and FEMA
Kill Devil Hills, Town of	April 2, 1993	*	*	April 30, 1992	Representatives from the Town of Kill Devil Hills and FEMA
Kitty Hawk, Town of	April 2, 1993	*	*	April 28, 1992	Representatives from the Town of Kitty Hawk and FEMA
Manteo, Town of	December 4, 1985	*	*	January 8, 1985	Representatives from the Town of Manteo, Tetra Tech, Inc., and FEMA
Nags Head, Town of	April 2, 1993	*	*	April 29, 1992	Representatives from the Town of Nags Head and FEMA
Southern Shores, Town of	April 2, 1993	*	*	April 27, 1992	Representatives from the Town of Southern Shores and FEMA

*Data Not Available

Section 8.0 – Study Contracting and Community Coordination

A Preliminary Meeting was held in the Town of Manteo, County Commissioner's Building, North Carolina, on June 6, 2005, to disseminate and review the FIS Report and FIRM panels for the Pasquotank and Tar-Pamlico River Basin portions of Dare County. This meeting was attended by community officials from Dare County and the Incorporated Communities, Towns of Duck, Kill Devil Hills, Kitty Hawk, Manteo, Nags Head, and Southern Shores, along with representatives from the State of North Carolina, and Watershed Concepts (the study contractor). Public Participation Meetings were held on June 23, 2005, July 13, 2005, and July 14, 2005, to review and discuss the FIS Report and FIRM panels for the Pasquotank and Tar-Pamlico River Basin portions of Dare County.

The dates of the Initial and Final Scoping Meetings held for Dare County are shown in Table 13, "Scoping Meetings."

Table 13—Scoping Meetings

Community Name	Basin	Initial Scoping Date	Attended by	Final Scoping Date	Attended by
Dare County (Unincorporated Areas)	Pasquotank	November 14-15, 2000	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry	May 18, 2001	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry
Kill Devil Hills, Town of	Pasquotank	November 14, 2000	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry	May 18, 2001	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry
Kitty Hawk, Town of	Pasquotank	November 15, 2000	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry	May 18, 2001	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry
Manteo, Town of	Pasquotank	November 14, 2000	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry	May 18, 2001	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry

Table 13—Scoping Meetings

Community Name	Basin	Initial Scoping Date	Attended by	Final Scoping Date	Attended by
Nags Head, Town of	Pasquotank	November 14, 2000	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry	May 18, 2001	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry
Southern Shores, Town of	Pasquotank	November 15, 2000	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry	May 18, 2001	Representatives of Dare County and Incorporated Communities, FEMA, NCDEM, CGIA, and Dewberry

Section 9.0 – Guide to Additional Information

FISs have been prepared for Hyde County and Incorporated Areas (FEMA, 2004), Tyrrell County and Incorporated Areas (FEMA, 2004), and Currituck County and Incorporated Areas (FEMA, 2005). All FIRM panels created for the State of North Carolina are produced in a seamless statewide format; however, FIS Reports are produced for individual counties.

Copies of FIRM panels are available for a nominal fee. To obtain a copy of the current flood map for a specific community, contact the FEMA Map Service Center at 1-800-358-9616. To facilitate the processing of your request, please review the current flood map on file at your local community repository and obtain the panel number in which you are interested. If necessary, users may also order a FIRM Index from the Map Service Center to determine the appropriate panel numbers. The Map Service Center also accepts orders for the Community Status Book and the Flood Insurance Manual. The FIS Report, FIRM panels, and digital data used to produce the FIRM panels are available online at www.ncfloodmaps.com.

Information concerning the data used in the preparation of this FIS, contained in an Engineering Study Data Package, may be obtained by contacting the FEMA Regional Office at the address listed on the Notice to Flood Insurance Study Users page at the front of this report.

Table 14, "Additional Information," contains useful contact information regarding this FIS, the FIRM, and data.

Table 14—Additional Information

FEMA and the NFIP	
FEMA website	www.fema.gov
NFIP Internet website	www.fema.gov/nfip/
Other Federal Agencies	
USGS website	www.usgs.gov/
Hydraulic Engineering Center website	www.hec.usace.army.mil/
State Agencies and Organizations	
CGIA website	www.cgia.state.nc.us/cgia/
NCGS website	www.ncgs.state.nc.us/
NCFMP website	www.ncfloodmaps.com

Section 10.0 – Bibliography and References

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