

## CHAPTER 3: NATURAL SYSTEMS ANALYSIS

Protecting and enhancing Ocean Isle Beach’s natural systems is critical to the quality of life of residents and visitors. Previous land use plans demonstrate a strong commitment to preserving the beautiful and abundant natural resources of the Town. Accordingly, any residential, commercial or other development activities permitted by the Town of Ocean Isle Beach shall be compatible with current regulations, development patterns, Areas of Environmental Concern (AEC) and wetlands requirements. This section of the land use plan describes and analyzes the natural features and environmental conditions within the jurisdiction of the Town of Ocean Isle Beach.

One of the basic purposes of North Carolina’s Coastal Area Management Act (CAMA) is to establish provisions capable of rational and coordinated management of coastal resources. Development of local land use plans and the designation and regulation of AECs provide the foundation for North Carolina’s coastal resource management program. In combination, these mechanisms allow state and local governments to preserve and enhance the state’s coastal resources. State guidelines have been adopted to ensure uniformity and consistency in land use plans and in the regulation of AECs; local governments, however, are granted significant flexibility when developing policies and taking actions to protect them. Accordingly, an important component of the land use plan is to identify those AECs present within the Town of Ocean Isle Beach’s jurisdiction.

### AREAS OF ENVIRONMENTAL CONCERN

The State Guidelines for Areas of Environmental Concern (15A NCAC 7H, or regulations governing development for AECs) require that local land use plans give special attention to the protection of appropriate AECs. CAMA charges the Coastal Resources Commission (CRC) with the responsibility for identifying the areas—water and land—in which uncontrolled or incompatible development might result in irreversible damage. CAMA further instructs the CRC to determine what development activities are appropriate in such areas, and local governments are required to give special attention to these areas when developing land use plans. An AEC is an area of natural importance designated by the CRC. An AEC may be easily destroyed by erosion or flooding. It may also have environmental, social, economic or aesthetic values worthy of protection. AECs have also been designated for protection from uncontrolled development that causes irreversible damage to property, public health or the environment.

To limit detrimental impacts on AECs, CAMA established a permitting program. The intent of the permitting program is not to stop development, but rather to ensure the compatibility of development with continued productivity and value of critical land, waters and natural resources. Responsibility for the permitting program is shared between the CRC and local governments. Local governments permit “Minor” development activities

while “Major” development activities require permits from the CRC (Division of Coastal Management (DCM) personnel are the staff representatives of the CRC).

The CRC established four categories of AECs:

- Estuarine and Ocean Systems
- Ocean Hazard Systems
- Public Water Supplies
- Natural and Cultural Resource Areas

Two categories of AECs are not present within the Town of Ocean Isle Beach’s jurisdiction, public water supplies and natural and cultural resources areas. The two categories found within the Town’s jurisdiction are Estuarine and Ocean Systems, and Ocean Hazard Systems. As a result, shoreline erosion is an important issue for residents in the Town of Ocean Isle Beach.

## ESTUARINE AND OCEAN SYSTEM

The estuarine and ocean system AEC is a broad category that includes the Town’s sounds, marshes and surrounding shorelines. The system includes the following components:

- Estuarine waters;
- Estuarine shorelines;
- Coastal wetlands; and,
- Public trust areas.

### *ESTUARINE WATER*

Estuarine waters include all waters of the Atlantic Ocean with the boundary of North Carolina and all waters of the bays, sounds, rivers and tributaries seaward of the dividing line between coastal fishing waters and inland fishing waters (*GS 113A-113(b)(2)*). Ocean Isle Beach’s estuarine waters include the Intracoastal Waterway (ICWW), Shallotte River, Eastern Channel, Old Sound Creek, canal waters and others. The Gold Mine Creek and Gause Landing Creek are located in the Town’s ETJ. Estuaries are extremely productive natural systems. See Map 3.1 Areas of Environmental Concern.

Estuarine waters in and around Ocean Isle Beach provide important habitat for a diverse range of shellfish, birds and other forms of marine wildlife. Important habitat features of an estuarine system include its mud and sand flats, eel grass beds, salt marshes, submerged vegetation flats and clam and oyster beds. They provide nursery areas and serve as habitat for a variety of marine and benthic species. Generally speaking, development activities which are water dependent and require water access and cannot function elsewhere (e.g. simple access structures, structures to prevent erosion, boat docks, marinas, wharves and mooring piling) may be allowed within this AEC.

### *ESTUARINE SHORELINE*

The estuarine shoreline is the non-ocean shoreline, extending from the normal high water level or normal water level along the estuarine waters, estuaries, sounds, bays, fresh and brackish waters and public areas (15NCAC 7H.0209). For non-Outstanding Resource Waters (ORW), the estuarine shoreline is defined as 75-feet landward from mean high water line (MHWL) [See Map 3.1]. For ORW waters the distance is 575 feet, however, there are no ORW waters within Ocean Isle Beach. CAMA permits control development within the shoreline areas. Generally, development in this area may not weaken natural barriers to erosion, must have limited hard surfaces, and must take steps to prevent pollution of the estuary by sedimentation and runoff.

### *COASTAL WETLANDS*

The U.S. Army Corps of Engineers (COE) defines wetlands as those areas inundated and saturated by surface or ground water at a frequency and duration to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands have significant values that support the unique lifestyle and quality of life enjoyed by Ocean Isle Beach residents and visitors. These values include:

- **Water Storage:** wetlands are able to store heavy rain, surface runoff, and flood waters, thereby reducing downstream flooding.
- **Shoreline Stabilization:** ground cover and roots of wetland plants help hold soil in place and prevent sedimentation and nutrient transport.
- **Water Quality:** wetlands plants can enhance water quality by removing pollutants from surface water runoff.
- **Wildlife and Aquatic Habitat:** the variety of plants, hydrologic and soil conditions associated with wetlands provide abundant food and cover for animal populations and support a number of endangered species and other rare plants and animals
- **Recreation and Education:** the rich array of plants and animals supported by wetlands provide significant consumptive and non-consumptive use values such as hunting, fishing, bird watching, kayaking, etc.

CAMA defines coastal wetlands as any salt marsh or other marsh subject to regular or occasional flooding by tides and contains some, but not necessarily all of the following marsh plant species: Cord Grass, Black Needlebrush, Glasswort, Salt Grass, Sea Lavender, Bulrush, Saw Grass, Cat-tail, Salt Meadow Grass, and Salt Reed Grass. This definition does not include flooding by tides associated with hurricanes, tropical storms, or severe weather events (15A NCAC 07H.0206).

According to mapping developed by the DCM, Ocean Isle Beach has coastal wetlands of the brackish saltwater variety. There are 1,314.9 acres of wetlands within the Town's planning

jurisdiction. Throughout the corporate limits and the ETJ, 517 acres are coastal wetlands or salt water marsh and 797.9 acres are non-coastal wetlands. See Map 3.1 Areas of Environmental Concern. Coastal wetlands are considered to be unsuitable for all development activities and other land uses that alter their natural functions.

### *PUBLIC TRUST AREAS*

Public trust areas include coastal waters and the submerged tidal lands below the mean high water line. The water and submerged tidal lands are held in trust for the public to use through such activities as fishing, swimming, and boating. These areas will often overlap with estuarine waters, but they also include many inland fishing waters. As general guidance, the following lands and waters are considered to be public trust areas:

- All waters of the Atlantic Ocean and the lands underneath, from the MHWL seaward to the state's official boundary three miles offshore;
- All tidally influenced waters below and associated submerged lands below the MHWL;
- All navigable natural water bodies and the lands underneath from the normal high water line seaward (Navigable waters include anything you can float a canoe in). This does not include privately owned lakes where the public doesn't have access rights;
- All water in artificially created water bodies that have significant public fishing resources and are accessible to the public from other waters; and,
- All waters in artificially created water bodies where the public has acquired rights by prescription, custom, usage, dedication or any other means (CAMA Handbook for development in coastal North Carolina).

Accordingly, the Town of Ocean Isle Beach's public trust waters include all estuarine waters, their tributaries, and the Atlantic Ocean. Since the submerged tidal waters are held in trust for the public, the state's policy is to ensure that the public is able to maintain access to these waters. All development, structures, and land uses that interfere with the public's right to the access and use of these waters is inconsistent with state policy. Conversely, navigation channels, piers, marinas, and bulkheads to control erosion are examples of uses that are frequently considered to enhance the public's use of these public trust areas.

### OCEAN HAZARD SYSTEM

Ocean Hazard AECs are areas where potential erosion and the adverse impact of sand, wind and water make uncontrolled or incompatible development unreasonable and hazardous to life and property. The Ocean Hazard category at Ocean Isle Beach includes three areas:

- Ocean erodible area;
- Inlet hazard area; and
- Unvegetated beach area.

### *OCEAN ERODIBLE AREA*

Ocean erodible areas are located along the beach strand where there is significant risk of excessive beach erosion and significant shoreline fluctuation due to natural processes such as hurricanes and tropical storms (15 NCAC 07H.0304). The seaward boundary of this area is the mean low water line (MLWL).

The ocean erodible area is defined on a lot-by-lot basis due to the significant variation in the first line of stable natural vegetation. The extent of the AEC is determined by multiplying the long-term annual erosion rate by 60 (15 NCAC 7H.0304). The first line of stable natural vegetation and/or the static vegetation line are utilized to determine the required CAMA oceanfront setback for structures.

### *INLET HAZARD AREA*

The inlet hazard area AEC covers the land at the eastern and western ends of the island [See Map 3.1]. The *Inlet Hazard Area* extends inland a sufficient distance to encompass the area where the state reasonably expects the inlet could migrate in the future (15 NCAC 7H .0304). Development within the inlet hazard area must comply with three key use standards: (1) it must comply with setbacks for the ocean hazard area found in the preceding section; (2) the density for commercial and residential structures is limited to no more than three units per acre; and, (3) only residential structures of four units or less, or commercial structures less than 5,000 square feet or less, are allowed.

### *UNVEGETATED BEACH AREA*

The final ocean hazard system AEC is the unvegetated beach area. This is defined as land within the ocean hazard system where no stable natural vegetation is present. This area is subject to rapid and unpredictable landform change from wind and wave action. Currently, there is no unvegetated beach area within the Ocean Isle Beach planning jurisdiction.

## SOIL CHARACTERISTICS

Soils found on Ocean Isle Beach have limited development potential for onsite sewage disposal systems (OSDS) due to poor filtration or being wet with poor filter. However, these soil conditions are of limited importance because Ocean Isle Beach is served by a central sewer system. Soils found on the Island include Newhan Fine Sand, consisting of gently sloping, excessively drained sands located mostly along the oceanfront and along the northern portion of the Island. These soils also consist of dredge spoil that are often found along the edges of the mainland and in the areas where the canals were dredged to create the current Island configuration. Corolla fine sands are present in small areas in the central portion of the Island; these soils are typically nearly level, and are somewhat poorly drained. Corolla soil is mostly found in native vegetation areas adapted to alternate wet

and dry periods. Tidal marsh soils are Bohicket silty clay loam, are nearly level, and are very poorly drained. Generally, tidal marsh areas have limited suitability for development.

## HAZARDS

The Town of Ocean Isle Beach is located along the southern coast of Brunswick County. It is a barrier island bordered by the Atlantic Ocean and the ICWW. Due to its geographic location, the Town is susceptible to a variety of natural and manmade hazards such as flooding, hurricanes, nor'easters, severe thunderstorms, tornadoes, tsunamis, and urban fires. These hazards are summarized in the following sections.

### *FLOOD HAZARD AREAS*

The 100-year flood plain is the accepted benchmark for defining flood hazard areas. The majority of Ocean Isle Beach lies within the 100-year flood plain [See Special Flood Hazard Areas Map 3.2]. The flood plain in Ocean Isle Beach is mapped including:

- **AE zones:** Special flood hazard areas inundated by the 100-year flood (one percent chance of a hundred year flood event); base flood elevations are determined;
- **VE zones:** Special flood hazard areas inundated by the 100-year flood (one percent chance of a hundred year flood event); coastal floods with velocity hazards (wave action); base flood elevations are determined.

The majority of Ocean Isle Beach is located in the VE zone. The central portion of the island surrounding West Third Street is classified as AE. The eastern tip at the end of the island is comprised of primarily AE zones. According to the 2016 Southeastern NC Regional Hazard Mitigation Plan, there are 2,289 parcels with a total building value of \$593,404,480 that are impacted by a special Flood Hazard Area (SFHA). In addition, there are more than 1,200 undeveloped parcels that are also located within the SFHA.

Draft preliminary flood maps have been prepared for all of Brunswick County. Once adopted, development within the Town shall be subject to the flood zones identified on the new maps. According to the preliminary maps, substantial portions of the Island will change from a coastal VE zone to a coastal AE zone. Furthermore, much of the portions of the Island changing from VE zones to AE zones will include a reduction in the base flood elevation from 17/18 feet to 12/13 feet. It is anticipated that the preliminary flood maps will be adopted within the next calendar year.

**Table 3.1: Housing Units within a Special Flood Hazard Area (Town Limits and ETJ)**

Special Flood Hazard Area	
AE	239
VE	3,175

Source: Cape Fear Council of Governments GIS; Brunswick County GIS, NC Flood Maps.

### *FEMA FLOOD INSURANCE*

According to the Federal Emergency Management Agency (FEMA), there are 4,406,664 flood insurance policies in force. Flood insurance is available in 19,859 participating communities nationwide including Ocean Isle Beach, where 2,555 policies are in force valued at \$634,595,900. Since 1978, there have been over 1,595 documented losses with payments exceeding \$7,679,138.

One way to help minimize these losses and lower flood insurance premiums is to participate in the National Flood Insurance Program's (NFIP) Community Rating System (CRS). The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premiums are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

For CRS participating communities, flood insurance premiums are discounted in increments of five percent. A class 1 community receives a 45 percent premium discount, while a Class 9 community gets a five percent discount (a Class 10 is not participating in the CRS and receives no discount). The CRS classifications for local communities are based on 18 creditable activities, organized under four categories: (i) public information; (ii) mapping and regulations; (iii) flood damage reduction; and (iv) flood preparedness. There are 994 communities receiving flood insurance premium discounts based on their implementation of local mitigation, outreach, and educational activities that go beyond minimum NFIP requirements. While premium discounts are one benefit of participating in the CRS, the real benefit is that these activities help save lives and reduce property damage. Ocean Isle Beach participates in the CRS; the Town is a Class 8, which allows property owners to receive a 10 percent savings on their flood insurance policy.

**Table 3.2: Flood Insurance Policies (As of July 31, 2016)**

	Policies In-Force	Insurance In-Force
Ocean Isle Beach	2,555	\$634,595,900
North Carolina	128,754	\$31,602,207,300

Source: FEMA, Insurance Policies: <https://bsa.nfipstat.fema.gov/reports/1011.htm>

**Table 3.3: Loss Statistics for Ocean Isle Beach, Brunswick County & North Carolina (1978 – September 2016)**

	Total Losses	Total Payment
Ocean Isle Beach	1,595	\$7,679,138.24
Wilmington	271	\$3,410,339.69
Brunswick County	392	\$4,105,307.77
North Carolina	76,736	\$1,014,700,833.34

Source: FEMA, Loss Statistics: <http://bsa.nfipstat.fema.gov/reports/1040.htm#37>

### *HURRICANES*

One of the main flooding threats is from hurricanes. A hurricane is a cyclonic storm that originates in tropical ocean waters. As a hurricane develops, barometric pressure at its center falls while its winds increase. Winds at or exceeding 39 miles per hour result in a named tropical storm that is closely monitored by the National Oceanic and Atmospheric Administration's (NOAA's) National Hurricane Center [Table 3.4]. When winds exceed 74 miles per hour, it becomes a hurricane.

Hurricanes are judged by their power according to the Saffir-Simpson Scale. This measure of the power of a hurricane classifies hurricanes according to a sliding scale from 1 to 5 (with category 5 storms as the most severe) [Table 3.4]. Since hurricanes derive their strength from warm ocean waters, they generally deteriorate in intensity when they make landfall. The forward momentum at the time of landfall can range from just a few miles per hour to upwards of 40 miles per hour. The forward motion, combined with the counterclockwise surface flow make the front right quadrant of the hurricane the most dangerous in terms of damaging winds and storm surge.

**Table 3.4: Hurricanes & the Saffir-Simpson Scale**

Category	Wind Speed (mph)	Types of Damage	Storm Surge
1	74-96	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.	Storm surge 3 to 5 feet above normal. Low lying roads inundated. Minor pier damage.
2	96-110	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.	Storm surge 6 to 8 feet above normal. Low lying roads inundated. Low lying escape routes cut by rising water two to four hours before storm's arrival. Considerable pier damage. Marinas flooded. Evacuation of some shoreline and low lying areas required.
3	111-129	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.	Storm surge 8 to 12 feet above normal. Serious flooding at coast and many smaller structures near the coast destroyed. Larger structures near the coast damaged by battering waves and floating debris.
4	130-156	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.	Storm surge 13 to 18 feet above normal. Major damage to lower floors of structures near the shore due to flooding and battering by waves and floating debris. Major beach erosion.
5	157+	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.	Storm surge possibly greater than 18 feet above normal. Major damage to lower levels of all structures less than 15 feet above mean sea level

Source: National Hurricane Center: <http://www.nhc.noaa.gov/aboutsshws.php> & Hurricane Zone.net <http://www.hurricanezone.net/articles/saffirsimpsonscale.html>

### *STORM SURGE AREAS*

Since Ocean Isle Beach is located mostly within the 100-year floodplain, it is particularly vulnerable to storm surges and corresponding erosion, wave action, flooding, high winds, and beach washover associated with hurricanes. Storm surge is water pushed toward the shore by the force of winds swirling around the hurricane or low- pressure meteorological system. The advancing surge combines with the normal tides to create the hurricane storm tide otherwise known as the storm surge. As a result, the MHWL can rise by 15 feet or more. The rise in water level causes severe flooding in coastal areas, particularly when a storm surge coincides with high tide. Wind and wave action is then superimposed on this storm surge water level.

Wind is a major determinant in the classification of a hurricane. Any tropical storm with sustained winds of 74 mph is classified as a hurricane. Hurricanes are judged by their power according to the Saffir-Simpson scale. This measure of the power of a hurricane classifies hurricanes according to a sliding scale from 1 to 5 (with category 5 storms as the most severe). The speed and strength of the storm is important in estimating the impact of the storm that can be determined by the National Oceanic and Atmospheric Administration (NOAA) Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model. Waves and currents associated with the storm surge may cause extensive damage. Water weighs approximately 1,700 pounds per cubic yard; periods of prolonged wave action can demolish any structure not specifically designed to withstand such forces. Table 3.5 shows the acreage of land impacted by storm surge for a fast moving hurricane at various storm levels. The areas subject to storm surges are depicted graphically on the Map of Storm Surge Inundation from a Fast Moving Hurricane (SLOSH) in Map 3.3.

**Table 3.5: Approximate Impact of Various Storm Levels (Acres Impacted)**

Storm Level	ETJ Additional Land Impacted (Acres)	ETJ Total Land Impacted (Acres)
1-2	355	355
3	159	514
4-5	547	1061
Storm Level	Island Additional Land Impacted (Acres)	Island Total Land Impacted (Acres)
1-2	1,361	1,361
3	71	1,432
4-5	80	1,441

Source: SLOSH – NOAA; Cape Fear Council of Governments GIS.

*NOR'EASTERS*

Another type of storm event with the potential for damage and severe beach erosion is what is known as a nor'easter. Unlike hurricanes, these storms are extra-tropical, deriving their strength from horizontal gradients in temperature. Although nor'easters are more diffuse and less intense than hurricanes, they occur more frequently, cover much larger stretches of shoreline, and can last much longer. As a result, they can occur more frequently than hurricanes and while their damage is less, they can cause coastal flooding, wind damage, and severe beach erosion. A number of nor'easters have impacted North Carolina in recent decades.

*TORNADOES/WATERSPOUTS*

The national weather service defines a tornado as a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm. The Fujita-Pearson Tornado Scale rates tornadoes based on path, length, width, and intensity [Table 3.6]. Historical tornado activity on Ocean Isle Beach is 27% below the North Carolina state average. Although tornadoes can occur throughout the year, most occur during the spring months of March (13 percent), April (11 percent), May (22 percent), and June (14 percent). Beginning in 2007, the Enhanced Fujita Scale, or EF Scale, replaced the now-obsolete Fujita scale. The scale has been revised to reflect better examinations of tornado damage surveys, so as to align wind speeds more closely with associated storm damage. "EF" categories associated with the Enhanced Fujita Scale are listed in Table 3.6.

Tornadic waterspouts are tornadoes that form over water, or move from land to water. They have the same characteristics as a land tornado. They are associated with severe thunderstorms, and are often accompanied by high winds and seas, large hail, and frequent dangerous lightning. If a waterspout moves onshore, the National Weather Service issues a tornado warning, as some of them can cause significant damage and injuries to people.

**Table 3.6: Fujita-Pearson Tornado Scale**

EF-Scale	Damage	Winds (mph)	Path Length (mi)	Mean Width (mi)
EF 0	Light	65-85	<1	<0.01
EF 1	Moderate	86-110	1-3.1	0.01 – 0.03
EF 2	Considerable	111-135	3.2 – 9.9	0.04 – 0.09
EF 3	Severe	136-165	10 – 31	0.1 – 0.31
EF 4	Devastating	166-200	32 – 99	0.32 – 0.99
EF 5	Incredible	>200	>100	>1

Source: NOAA, Fujita Tornado Scale: <http://www.spc.noaa.gov/faq/tornado/f-scale.html> & NOAA, Enhanced F Scale for Tornado Damage: <http://www.spc.noaa.gov/faq/tornado/ef-scale.html>

## URBAN FIRES

Urban fires are a manmade hazard. They occur in populated areas and usually involve buildings, structures, or outside areas. The potential for the spread of urban fires depends upon surface and fuel characteristics, recent climatic conditions, and current meteorological conditions, particularly wind. The likelihood of an urban fire in Ocean Isle Beach is not much different than other Towns. However, the likelihood of an urban fire spreading rapidly is high given the limited setbacks and the large number of structures with wooden patio style sundecks, which can act as fuel to spread urban fires. Other combustible items such as landscaping materials, stairs, lattices, HVAC mounting structures, fences, and cars located in setbacks can further increase the likelihood of a fire spreading to adjacent structures. Moreover, if a fire starts to spread, the fact that many houses are located on dead end streets that are not easily accessible can hinder or delay rescue and firefighting efforts.

## WATER QUALITY

Surface waters should contain a balanced amount of nutrients and have normal fluctuations in salinity and temperature. They should also have plenty of oxygen and little suspended sediment so that marine life can breathe and receive enough sunlight to grow. Monitoring changes in North Carolina's water quality is important. Data collected helps scientists evaluate changing water quality conditions. Factors affecting water quality include:

- **Nutrients:** While essential for plants and animals, they can be harmful if there is an overabundance;
- **Sediments:** Can cloud the water and hamper the growth or even kill aquatic plants;
- **Water temperature:** Changes in normal water temperatures can affect when animal and plants feed, reproduce and migrate;
- **Salinity:** Changes in salinity can adversely affect a wide range of marine life;
- **Dissolved oxygen:** Is essential for animals living within the estuary. Reduced levels of dissolved oxygen (e.g., due to an algae bloom or eutrophic conditions) can adversely affect marine life;
- **Contaminants and other pollutants:** There are a variety of other contaminants and pollutants that can adversely affect the growth, survival, and reproduction of marine and benthic organisms.

As a strategy for the management of North Carolina's waters, the NC Department of Environment Quality's (DEQ) Division of Water Resources (DWR) assigns classifications to water bodies [See Map 3.4]. The primary classifications are:

- **SC:** All tidal salt waters protected for secondary recreation such as fishing, boating, and other activities involving minimal skin contact; fish and

noncommercial shellfish consumption; aquatic life propagation and survival; and wildlife.

- **SB:** Tidal salt waters protected for all SC uses in addition to primary recreation. Primary recreational activities include swimming, skin diving, water skiing, and similar uses involving human body contact with water where such activities take place in an organized manner or on a frequent basis.
- **SA:** Tidal salt waters that are used for commercial shellfishing or marketing purposes and are also protected for all Class SC and Class SB uses. All SA waters are also High Quality Waters (HQW) by supplemental classification.

Additional water quality classifications include:

- **High Quality Waters (HQW):** Supplemental classification intended to protect waters which are rated excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, primary nursery areas designated by the Marine Fisheries Commission, and other functional nursery areas designated by the Marine Fisheries Commission.
- **Outstanding Resource Waters (ORW):** All outstanding resource waters are a subset of High Quality Waters. This supplemental classification is intended to protect unique and special waters having excellent water quality and being of exceptional state or national ecological or recreational significance. No ORW are located in Ocean Isle Beach's jurisdiction.
- **Swamp Waters (SW):** Supplemental classification intended to recognize those waters which have low velocities and other natural characteristics which are different from adjacent streams.
- **Nutrient Sensitive Waters (NSW):** Supplemental classification intended for waters needing additional nutrient management due to being subject to excessive growth of microscopic or macroscopic vegetation.

See Map 3.4 and Table 3.7 displaying the surface water classifications.

There are no areas within the jurisdiction of Ocean Isle Beach known to have chronic waste treatment malfunctions. This is due to the centralized sewage treatment system. The system has no chronic malfunctions and operates within its National Pollution Discharge Elimination System (NPDES) permit conditions.

**Table 3.7 Receiving Streams Adjacent to Ocean Isle Beach**

Receiving Stream Name	Stream Segment	Water Quality Classification	Use Support Rating	Water Quality Issues
Shalotte River	From source to NC Highway 130	SW, HQW	Supporting	Supporting Aquatic Life due to a Good-Fair benthic rating. These are not classified as shellfish waters.
Shalotte River	From NC Highway 130 US Highway 17	SC	No data	
Shalotte River	From US Highway 17 to the mouth of the Mill Pond	SC, HQW	No data	
Shalotte River	From the mouth of the Mill Pond to the Intracoastal Waterway	SA, HQW	Impaired for shellfish harvesting	Waters are classified as SA, but are impaired for shellfish harvesting due to Division of Environmental Health shellfish ratings.
Intracoastal Waterway (includes Island canals)	From the Cape Fear River Basin Buoy to the North Carolina-South Carolina State line	SA, HQW	Impaired for shellfish harvesting (partial, see figure 3.1)	Waters are classified as SA, but are impaired for shellfish harvesting due to Division of Environmental Health shellfish ratings.
Eastern Channel	From source to Intracoastal Waterway including tributaries	SA, HQW	Impaired for shellfish harvesting	Waters are classified as SA but are subject to closure for shell-fishing based on Division of Marine Fisheries classification. Bacterial pollution from stormwater runoff is the primary water quality problem.

Source: 2014 303(d) list.

### *SHELLFISHING & PRIMARY NURSERY AREAS*

There are a number of waters in and adjacent to the Town of Ocean Isle Beach that are closed to shellfishing. These areas are illustrated graphically on the figure below as well as on the NCDEQ Division of Marine Fisheries website. These closures are due primarily to stormwater runoff and other nonpoint sources of pollution, both from within the Town of Ocean Isle Beach and surrounding areas in the County located within the watershed.



Closed shellfish areas are areas where shellfish harvesting is prohibited by law due to unsafe levels of pollutants caused by conditions such as wastewater discharge and non-point source stormwater run-off. Within the planning jurisdiction of Ocean Isle Beach, shellfishing is prohibited in portions of the Intracoastal Waterway and Conditionally Closed (shown in red hatching) in all estuaries west of the black line seen in image on left. Also see the image depicting the Conditionally Approved Open to the east of the black line to Shallotte Inlet (no hatching). Areas around Tubbs Inlet are

also Conditionally Approved Open. See the NCDEQ Division of Marine Fisheries website to view the entire shellfish closure map.

Salt marshes and estuaries along the North Carolina coast also serve as nursery grounds for 90 percent of fish species. North Carolina was the first state to protect these fragile ecosystems. The nursery system in North Carolina contains three categories:

- Primary nursery areas;
- Secondary nursery areas; and,
- Special secondary nursery areas.

*Primary nursery areas* are found within the Town of Ocean Isle Beach. Primary nursery areas are generally located in the upper portions of creeks and bays. These areas are usually shallow with soft muddy bottoms and are surrounded by marshes and wetlands [See Map 3.6]. Low salinity levels and abundance of food make these areas ideal for young fish and shellfish. To protect juveniles, many commercial fishing activities are prohibited in primary nursery areas including the use of trawl nets, seine nets, dredges, or any mechanical devices used to harvest clams and oysters. Violators face substantial penalties. There are approximately 750 acres of primary fish nursery areas within Ocean Isle Beach's corporate limits.

*Secondary nursery areas* are located in the lower portions of creek and bays. Young fish and shellfish (primarily blue crabs and shrimp) move into these waters as they grow and develop. Trawling is not allowed in secondary nursery areas.

*Special secondary nursery areas* are located adjacent to secondary nursery areas but are closer to open waters of sounds and the ocean. When juvenile species are abundant, these waters are closed to trawling for a majority of the year.

## NON-COASTAL WETLANDS

Section 404 of the Federal Water Pollution Control Act (“the Clean Water Act”) defines wetlands as “areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted to life in saturated soil conditions.”

“Any person, firm, or agency (including Federal, state, and local government agencies) planning to work in navigable waters of the United States, or discharge (dump, place, deposit) dredged or fill material in waters of the United States, including wetlands, must first obtain a permit from the Army Corps of Engineers (COE).” If an activity requires an ACOE ‘404’ permit, the state of North Carolina requires that a ‘401’ water quality certification be obtained as well. The ‘401’ certification is basically a verification by the state that a given project will not degrade waters of the State or otherwise violate water quality standards.

Within the planning jurisdiction of the Town of Ocean Isle Beach, there are 797.9 acres of non-coastal wetlands. The largest type of non-coastal wetland is managed pineland, which makes up approximately 62% of the total non-coastal wetlands. Estuarine shrub/scrub and pine flat both have the same amount of acres, together equaling approximately 24% of the non-coastal wetlands in the area. The remaining types of non-coastal wetlands and their acres can be found in Table 3.8.

A description of the types of wetlands found in the planning jurisdiction is below can be seen on Map 3.5.

Bottomland Hardwood/Riverine Swamp Forest – Riverine forested or occasionally scrub/shrub communities usually occurring in floodplains, that are semi-permanently to seasonally flooded. In bottomland hardwood systems, typical species include oaks (overcup, water, laurel, swamp chestnut), sweet gum, green ash, cottonwoods, willows, river birch, and occasionally pines. In swamp forest systems, typical species include cypress, black gum, water tupelo, green ash and red maple.

Depressional Swamp Forest – Very poorly drained non-riverine forested or occasionally scrub/shrub communities that are semi-permanently or temporarily flooded. Typical species include cypress, black gum, water tupelo, green ash and red

maple. These are distinguished from riverine swamp forests in the data by having a hydrogeomorphic (hgm) class of flat (f).

Hardwood Flat – Poorly drained interstream flats not associated with rivers or estuaries. Seasonally saturated by a high water table or poor drainage. Species vary greatly but often include sweet gum and red maple.

Pine Flat – Palustrine (non-tidal), seasonally saturated pine habitats on hydric (saturated) soils that may become dry for part of the year, generally on flat or nearly flat areas that are not associated with a river or stream system. This category does not include managed pine systems.

Pocosin – Palustrine (non-tidal) scrub/shrub communities (i.e. non-Estuarine Scrub/Shrub) dominated by evergreen shrubs, often mixed with pond or loblolly pines. Typically occur on saturated, acid, nutrient poor, sandy or peaty soils; usually removed from large streams; and subject to periodic burning.

Estuarine Forest – A forested wetland community subject to occasional flooding by tides, including wind tides (whether or not the tide water's reach these areas through natural or artificial watercourses). Examples include pine-dominated communities with rushes in the understory or fringe swamp communities such as those that occur along the Albemarle and Pamlico sounds.

Estuarine Shrub/Scrub - Any shrub/scrub vegetation dominated habitat subject to occasional flooding by tides, including wind tides (whether or not the tidewaters reach the marshland areas through natural or artificial watercourses).

Human Impacted Wetlands - Areas of human impact have physically disturbed the wetland, but the area is still a wetland. Impoundments and some cutovers are included in this category, as well as other disturbed areas such as power lines.

Managed Pineland - Seasonally saturated, managed pine forests occurring on hydric soils. This wetland category may also contain non-managed pine forests occurring on hydric soils. Generally these are areas that were not shown on National Wetland Inventory maps. These areas may or may not be jurisdictional wetlands.

**Table 3.8: Types of Wetlands in Ocean Isle Beach, NC**

Types	Acres	Percent of Total
Bottomland Hardwood/Riverine Swamp Forest	32.09	4.02%
Depressional Swamp Forest	2.29	0.29%
Hardwood Flat	4.41	0.55%
Headwater Swamp	12.24	1.53%
Pine Flat	97.72	12.25%
Pocosin	51.39	6.44%
Estuarine Shrub/Scrub	101.19	12.68%
Managed Pineland	494.80	62.01%
Freshwater Marsh	1.77	0.22%
Total	797.91	100%

Source: National Wetlands Inventory.

## WATER SUPPLY AND WELLHEAD PROTECTION AREAS

There are no surface water supply waters or watersheds in the vicinity of Ocean Isle Beach. Drinking water is provided by Brunswick County. See Chapter 4 for a discussion of the water supply.

## ENVIRONMENTALLY FRAGILE AREAS

Fragile areas are defined as sensitive areas that are easily destroyed by inappropriate or poorly planned development. Fragile areas include: AECs; coastal wetlands; non-coastal wetlands; sand dunes; ocean beaches and shorelines; estuarine waters; estuarine shorelines; public trust waters; complex natural areas; prime wildlife habitats; areas that sustain remnant species; areas with unique geologic formations; natural areas identified by the North Carolina Natural Heritage Program; and archeological and historical resources as well as other sensitive areas not currently protected under existing rules. Given its location, almost all of Ocean Isle Beach is located within or adjacent to fragile areas. Many of these areas have previously been discussed. This section describes natural heritage areas and the areas containing endangered species.

### *NATURAL HERITAGE AREAS*

The North Carolina Natural Heritage Program inventories, catalogues, and facilitates protection of the rarest and most outstanding elements of the natural diversity of our state. This includes plants and animals that are rare, or natural communities that merit special consideration as land use decisions are made. The information generated by this program supports informed evaluations of the trade-offs between biological diversity and

development projects before plans are finalized. The information also facilitates the establishment of priorities for protecting North Carolina's most significant natural areas.

There are no significant natural heritage areas identified within the planning jurisdiction of Ocean Isle Beach. However, Brantley Island located east of 904 is a Natural Heritage Area [See Map 3.6].

#### *AREAS CONTAINING ENDANGERED SPECIES*

Endangered species describe plant or animal species in danger of extinction within the foreseeable future throughout a significant portion of its range. The term "threatened species" is used when a plant or animal is deemed likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Areas that contain, or are likely to contain, endangered species in the Town of Ocean Isle Beach include the dry sand areas of the oceanfront beach, dunes, and the marshes along the estuarine shoreline. Endangered animals identified on Ocean Isle Beach include various types of birds including the piping plover, a variety of sea turtles, and other transitory wildlife. In order to help preserve endangered wildlife, turtle nesting areas are marked each year in order to protect the nests. It is important to keep in close contact with state and local agencies charged with protecting endangered species and sightings of rare and endangered plants and animals should be reported.

## GOALS, OBJECTIVES, AND POLICIES

### *INTRODUCTION*

The Town has established a set of land use and development related policies to act as guidelines during any official decision making process. These policies and goals provide citizens, property owners, and developers with a predictability of official actions. Town policies in this chapter relate to natural systems. Two CAMA management topics are covered in the policy section herein: Water Quality and Natural Hazard Areas.

It should be noted that these topic areas are developed as part of the Division of Coastal Management's 7B Land Use Planning Guidelines.

Refer to Appendix A for Definitions of actions words contained within the policy section.

### *WATER QUALITY AND NATURAL ENVIRONMENT*

**Goal 3.1:** Maintain, protect and where possible enhance the natural environment and water quality in all coastal wetlands, rivers, streams, and estuaries.

**Objective 3.1.A: Protect the Natural Environment of Ocean Isle Beach:** The Town shall take actions designed to protect and where possible enhance and restore the sensitive natural resources located in and adjacent to the Town of Ocean Isle Beach.

**Policy 3.1.A.1: Surface Water Quality:** The Town of Ocean Isle Beach shall continue to take actions that protect and enhance the water quality of the estuarine system.

**Recommended Action 3.1.A.1.a:** The Town will continue to ensure that it treats its wastewater in at a tertiary level to protect surface and groundwater quality.

**Recommended Action 3.1.A.1.b:** The Town will work with County and state officials to improve the quality of surface waters that drain to the Intracoastal Waterway.

**Policy 3.1.A.2: Sewage Treatment:** The Town will continue to partner with Brunswick County Utilities for tertiary wastewater treatment within its incorporated area as a means to preserve water quality.

**Policy 3.1.A.3: Stormwater Runoff:** The Town will continue to enforce the stormwater management ordinance with requirements for engineered plans, stormwater controls, and maintenance agreements for all new development and redevelopment.

**Policy 3.1.A.4: Reduction of Existing Stormwater Discharges:** The Town shall utilize structural and non-structural BMPs designed to reduce the quantity and increase the quality of existing stormwater discharges.

**Recommended Action 3.1.A.4.a:** When state roads are repaired or resurfaced, the Town shall require the Department of Transportation (DOT) to use infiltration systems and other structural or nonstructural BMPs necessary to treat stormwater generated from road surfaces. When Town roads are repaired or resurfaced, the Town shall seek state funding to assist with its efforts to treat stormwater generated by road surfaces using infiltration devices and other structural and nonstructural BMPs.

**Recommended Action 3.1.A.4.b:** The Town will establish a percent reduction goal in overall stormwater runoff volume. For example, the Town will reduce stormwater runoff volumes by 10% by 2025.

**Recommended Action 3.1.A.4.c:** The Town will establish partnerships with Brunswick County and adjacent municipalities (if necessary) to develop a Watershed Restoration Plan.

**Recommended Action 3.1.A.4.d:** The Town will pursue grant funds to assist in developing a Watershed Restoration Plan. Pursuant to Section 205(j)/604(b) of the Clean Water Act, the Division of Water Resources will award grant funds to Regional Commissions and Councils of Government for to carry out water quality management and planning projects.

**Policy 3.1.A.5: Stormwater Retrofits for Existing Development:** Where appropriate, the Town shall use economic incentives to encourage existing development to retrofit properties and install structural or nonstructural BMPs that reduce stormwater runoff.

**Policy 3.1.A.6: Stormwater Discharges from Municipal Sources:** Where practicable, the Town shall eliminate stormwater discharges resulting from municipal activities. Where elimination is not possible, the Town shall mitigate the sources of stormwater discharges to the maximum extent practicable.

**Recommended Action 3.1.A.6.a:** The staff of the Public Utilities Department shall expand its efforts to identify and eliminate stormwater discharges resulting from the Town's municipal activities.

**Policy 3.1.A.7: Low Impact Development (LID).** The Town supports Low Impact Development practices implemented in the Lockwood's Folly watershed and other similar coastal watersheds. Such LID practices may include retaining/infiltrating most of the runoff on-site, maximizing the use of permeable pavements, reducing the amount of impervious coverage, and clustering housing to allow a profitable development density while maximizing open space.

**Policy 3.1.A.8: Development Along Finger Canals:** Due to the sensitive nature of the finger canals located within the Town, only single-family residential structures are encouraged adjacent to the canals.

**Policy 3.1.A.9: Estuarine System:** The Town shall continue to give priority to those uses which are compatible with appropriate management of the Estuarine System; development occurring within the Town should be compatible so as to minimize the likelihood of significant loss of private property and public resources.

**Policy 3.1.A.10: Personal Watercraft and Public Trust Resources:** The Town shall seek to ensure the responsible use of jet skis and other watercraft within the Public Trust Areas of Ocean Isle Beach to protect the marshes and other shallow water estuaries where damage to the resource is likely.

**Policy 3.1.A.11: Development of Sound and Estuarine System Islands:** The Town discourages the development of “conservation spoil” islands; however, the Town believes that existing structures in the spoil easement area (generally now known as Laurinburg, Monroe, Fairmont, Wilmington, Craven and Concord Street areas) would be recognized and protected.

**Policy 3.1.A.12: Commercial and Residential Fisheries:** The Town supports federal and state projects which increase the productivity of coastal and estuarine waters. Projects such as dredging to increase flushing along tidal waters, oyster reseeded programs, and properly constructed artificial reefs will be supported.

**Policy 3.1.A.13: Shellfishing Waters:** The Town supports and promotes the activities of the State’s Shellfish Management Program. The Town promotes estuarine water quality through its soil erosion and sedimentation provisions and by supporting the CAMA major permitting regulations.

**Policy 3.1.A.14: Trawling Activities in Estuarine Waters:** The Town of Ocean Isle Beach urges the State of North Carolina to prohibit trawling and purse seine fishing including fishing for menhaden within one nautical mile of the Ocean Isle Beach coastline and to ban gill net fishing throughout the year.

**Policy 3.1.A.15: Local Clean Up Efforts:** The Town supports the “Big Sweep” beach cleanup program through the local “Trash Bash” program and all similar efforts to enhance the cleanliness of the natural environment.

**Policy 3.1.A.16: Solid Waste Disposal & Recycling:** The Town supports measures to recycle and reduce the amount of solid waste generated by residents, visitors, and businesses.

**Recommended Action 3.1.A.16.a:** Implement an island-wide recycling program to reduce solid waste generation.

**Policy 3.1.A.17: Areas that Sustain Remnant Species:** All development plans for areas that contain remnant species will be carefully reviewed prior to the issuance of development permits.

**Policy 3.1.A.18: Prime Wildlife Habitats:** The Town will continue to protect its prime wildlife habitats by enforcing the CAMA major and minor permitting program.

**Policy 3.1.A.19: Turtle Nesting Areas:** The Town shall work to protect habitat areas used for turtle nesting.

**Policy 3.1.A.20: Protection of Wetlands of Highest Functional Significance:** It is Town policy to protect freshwater wetlands, marshes, and 404 wetlands within its planning jurisdiction in accordance with applicable laws and regulations.

**Policy 3.1.A.21: Marsh Damage from Bulkhead Installation:** Damage to existing marshes or beaches by bulkhead installation, or seawalls should be minimized where possible. Maintenance and repair of existing bulkheads is required.

#### *NATURAL HAZARD AREAS*

**Goal 3.2:** Conserve and maintain barrier dunes, beaches, flood plains, coastal wetlands, and other coastal features for their natural storm protection functions and their natural resources giving recognition to public health, safety, and welfare issues.

**Objective 3.2.A: Protect Against Damage from Hurricanes, Severe Weather or Other Hazards:** The Town will be proactive in its efforts to minimize damage and threats to public health and safety associated with hurricanes, severe weather, and other hazards and work to implement the *Southeastern NC Regional Hazard Mitigation Plan (2016)*.

**Policy 3.2.A.1: Discouragement of Hazardous Development:** The Town shall use a variety of methods, including CAMA setback requirements and the Flood Damage Prevention Ordinance, to discourage the development of property that can be reasonably foreseen as potentially hazardous. This policy shall have deference for the rights of private property owners.

**Policy 3.2.A.2: Flood Prone Areas:** All uses allowed in the Town's Zoning Ordinance shall be permissible in the 100-year flood zones, provided that all new construction and substantial improvements comply strictly to the Town's Flood Damage Prevention Ordinance, which has been adopted in conjunction with Ocean Isle Beach's participation in the National Flood Insurance Program.

**Recommended Action 3.2.A.2.a:** Ocean Isle Beach will continue to participate in the National flood Insurance Program, enforce the Flood Damage Prevention Ordinance, and enforce height limits based upon base flood elevations.

**Policy 3.2.A.3: Flood Insurance:** The Town shall take actions necessary to reduce the cost of flood insurance to property owners by maintaining or improving the Community Rating System Status (CRS).

**Recommended Action 3.2.A.3.a:** Continue to train Town staff on the steps that can be taken to improve the CRS rating for Ocean Isle Beach.

**Policy 3.2.A.4: Wave Action and Shoreline Erosion:** Ocean Isle Beach will continue compliance with the CAMA development permit process for estuarine shoreline areas and the requisite development standards which may encourage both shoreline stabilization and facilitation of proper drainage.

**Recommended Action 3.2.A.4.a:** The Town will continue to look for ways to stabilize the Inlet Hazard Areas.

**Policy 3.2.A.5: Land Acquisition:** The Town supports the acquisition of property that is unsuitable for development due to coastal hazards when such acquisition serves a useful public purpose such as access to the beach or sound. Acquisition of appropriate properties is also encouraged by federal and state agencies.

**Policy 3.2.A.6: Funding for Land Acquisition:** The Town shall investigate outside funding sources for land acquisition and shall encourage gifts and donations for tax credits as a mitigation measure for future storm events.

**Policy 3.2.A.7: High Winds:** Ocean Isle Beach supports enforcement of the NC State Building Code. The Town will continue to require construction design standards to meet the minimum required wind loads.

**Policy 3.2.A.8: Manmade Hazards:** The Town of Ocean Isle Beach strives to reduce the hazards of the airport through implementation of its airport zoning ordinance which restricts land uses and building heights in the surrounding vicinity.

**Policy 3.2.A.9: Minimize Potential Fire Damage:** Reduce the risk of damage from urban fires as a result of future development.

**Policy 3.2.A.10: Coastal Storm Damage Reduction:** The Town of Ocean Isle Beach supports all coastal storm damage reduction programs, including the use of terminal groins and sandbag revetment. Such activities must be done in an environmentally sensitive fashion and with respect to impacts on surrounding properties.

**Recommended Action 3.2.A.10.a:** Town officials will continue to lobby federal, state, and county officials to provide financial support for coastal storm damage reduction activities.

**Recommended Action 3.2.A.10.b:** The Town will develop a strategy for sustainable, long-term sources for funding ongoing coastal storm damage

reduction in the event that federal or state funding for coastal storm damage reduction projects is reduced.

**Policy 3.2.A.11: 30-Year Beach Management Plan:** The Town supports the findings of the 2015 Ocean Isle Beach 30-Year Beach Management Plan.

**Recommended Action 3.2.A.4.a:** The Town will implement the recommendations of the island-wide management program outlined in the 2015 30-Year Beach management Plan.

**Recommended Action 3.2.A.4.b:** The Town will initiate efforts to complete the required environmental documents necessary for the receipt of permits for construction of projects identified within the 30-Year Beach management Plan.

**Policy 3.2.A.12: Spoil Sites:** Ocean Isle Beach will continue to provide direct assistance to the US Army Corps of Engineers by helping obtain or provide spoil sites for coastal storm damage reduction projects. Ocean Isle Beach is generally supportive of keeping new development out of designated spoil sites; however, the Town believes that existing structures in the original spoil easement areas should be recognized and protected.

**Policy 3.2.A.13: Bulldozing:** The Town shall continue to enforce its ordinance on the prohibition of beach bulldozing with the exception of the following circumstances:

- When such work is performed as a part of a hurricane or erosion protection project or beach nourishment project sponsored by the town or any local, state or federal governmental agency;
- When such work is performed at the direction of the town for the purpose of beach maintenance;
- When such work is performed by any nongovernmental person or entity to protect primary structures (not including walkways to the ocean beach, swimming pools, or accessory use structures), that are imminently threatened as a result of severe erosion of the ocean beaches or the sand dune structure, but only upon receipt of a permit for such work from the local CAMA permitting officer after a finding by such officer that the structure is imminently threatened ("imminently threatened" means that the foundation of the structure is less than 20 feet from the tow of the erosion scarp and/or the sewer system is exposed); or
- When such work is authorized by the board of commissioners following a natural disaster or other extreme weather event. The property owner shall file an application with the town setting forth the reasons why this action is necessary to protect the property of the owner or is in the public interests. In the event that the board authorizes the requested action, the board may

place any conditions or requirements upon the authorization that it deems to be in the best interest of the town and public.

**Policy 3.2.A.14: Emergency Response Plan:** The Town shall update its Emergency Response Plan yearly in concert with county and state emergency management officials, and with input from Town residents. The plan shall encompass pre-storm and immediate post storm activities and policies of the Town. Issues addressed in the Hurricane Management Plan include:

- Criteria for issuing building permits in a post storm setting
- Orderly issuance of building permits in a post-storm setting
- Sequence of restoration for public utilities and services
- Public infrastructure repair and replacement
- Beach re-entry
- Debris pick-up
- Damage assessment
- Evacuation procedures
- Recovery Task Force membership and duties
- Public health and safety issues

**Policy 3.2.A.15: Evacuation Shelters:** In conjunction with the Brunswick County Emergency Management Department, the Town will ensure that all evacuation shelters are well-publicized, accessible, and meet national standards for public safety and supplies.

**Policy 3.2.A.16: Public Education:** Ensure that the public is aware of the risks of different types of natural hazards in order to reduce their personal exposure to natural hazards.

**Recommended Action 3.2.A.16.a:** The Planning Department shall implement a public education program designed to help inform the public about their exposure to natural hazards and actions they can take to mitigate potential damage to public health, safety, and property from natural disasters. This includes, but is not limited to:

- Ensure the local library maintains documents about flood insurance, flood protection, floodplain management, and natural and beneficial functions of floodplains. Many documents are available free of charge from the Federal Emergency Management Agency (FEMA);
- Encourage builders, developers and architects to become familiar with the NFIP's land use and building standards;
- Provide local real estate agents with handouts advising potential buyers to investigate potential flood hazards for the property they are considering purchasing;
- Advertise the availability of flood insurance on an annual basis; and,

- Post hazard related information on the Town's website and distribute appropriate educational materials.

**Objective 3.2.B: Post-Storm Recovery:** In the period following a hurricane, severe weather event, or other disaster, the Town will work as quickly as possible to restore essential services related to public health, safety and welfare.

**Policy 3.2.B.1: Municipal Emergency Center:** The Town supports the concept of an off-island emergency Town center to assist during the recovery process associated with natural disasters.

**Recommended Action 3.2.B.1.a:** The Town has purchased land for the construction of a new Town Hall on the mainland. It should be designed in a manner that allows it to be used as an emergency Town center in the event that the Island has to be evacuated.

**Policy 3.2.B.2: Redevelopment of Developed Areas:** It is the policy of the Town to allow redevelopment of previously developed areas including the relocation of endangered structures. It is the Town's policy that density allowances for redevelopment areas conform to existing Town building and zoning requirements.

**Policy 3.2.B.3: Mutual Aid:** The Town shall maintain established mutual aide agreements and where necessary develop new agreements to assist with post-storm event clean-up, damage assessment, and reconstruction activities.

**Policy 3.2.B.4: Staging Schedule for Reconstruction and Repair:** The staging schedule for the re-establishment of essential services and the reconstruction and repair of properties damaged in a storm event depends on the severity of the storm and the damage inflicted. The Town will work to restore essential services related to public health, safety and welfare first. Properties suffering minor damage will be issued permits as expeditiously as possible. Properties suffering major damage will generally be allowed to implement temporary protective measures designed to protect their property from further damage or to correct public safety problems.

**Policy 3.2.B.5: Building Permits:** The Town shall issue building permits as expeditiously as possible to property owners who have received minor damage after storm events. If a structure is damaged more than 50% of the value of the structure, the property owner will have to rebuild or modify the structure to meet current ordinances and building standards.

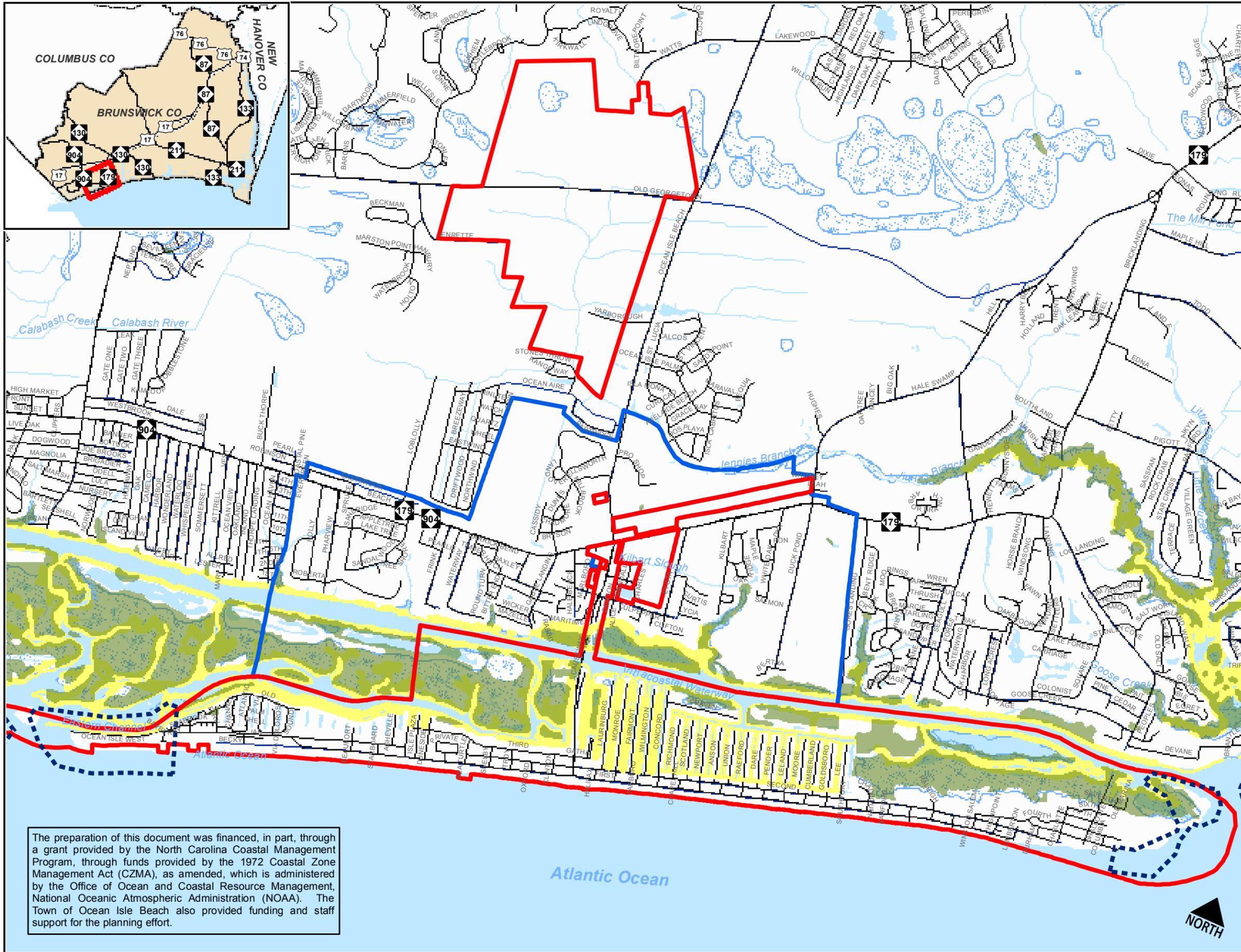
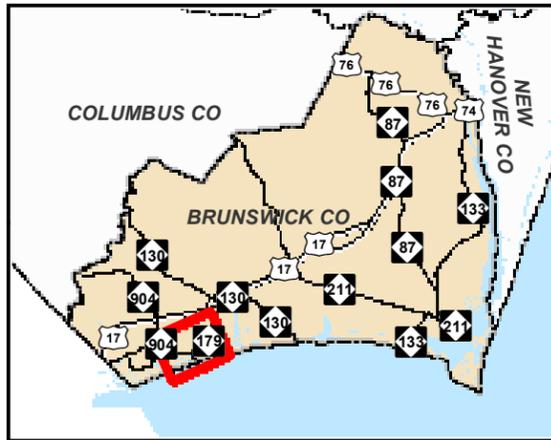
**Policy 3.2.B.6: Public Infrastructure Repair and Replacement:** The Town shall maintain assessments of current infrastructure usage and need for expansion, repair, or replacement. Following major storm events, the Town will work with all applicable agencies to assess damage to public infrastructure at the earliest possible time. Damage that affects public health and safety will be corrected as soon as practicable. Damage to existing infrastructure will also be evaluated for potential

opportunities for repair or expansion consistent with existing capital improvement and repair needs. Long term repair or replacement of infrastructure will be prioritized based on resources available, impact on the integrity of the infrastructure, mitigation of future hazard situations, the Town's capital improvement program.

**Policy 3.2.B.7: Electrical Outages:** Reduce the frequency of electrical outages and length of time such outages last after hurricanes and severe storm events.

**Policy 3.2.B.8: Post-Storm Hazard Mitigation:** Develop specific and timely recommendations for implementing hazard mitigation measures contained in the *Southeastern NC Regional Hazard Mitigation Plan (2016)* following a state or federally declared natural disaster.

**Recommended Action 3.2.B.8.a:** In the event that the President declares Ocean Isle Beach a disaster area, the Planning Department shall apply for funding from the Hazard Mitigation Grant Program (HMGP) for priority projects.

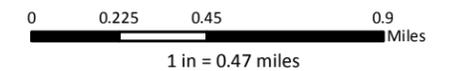


# Town of Ocean Isle Beach

## 2016 Land Use Plan Map 3.1 Areas of Environmental Concern (AECs)

- Legend**
- Corporate Limits
  - Extra-territorial Jurisdiction (ETJ)
  - Waterbody
  - Swamp/Marsh
  - Coastal Wetlands
  - 75' Estuarine Shoreline AEC
  - Inlet Hazard Area

Map is to be used for general purposes only. Spatial data used to generate this map was gathered from disparate sources and represent a condition at a fixed period in time. 100% accuracy of spatial data to current circumstances cannot be guaranteed. The Cape Fear Council of Governments is not legally responsible for the misuse of this map.

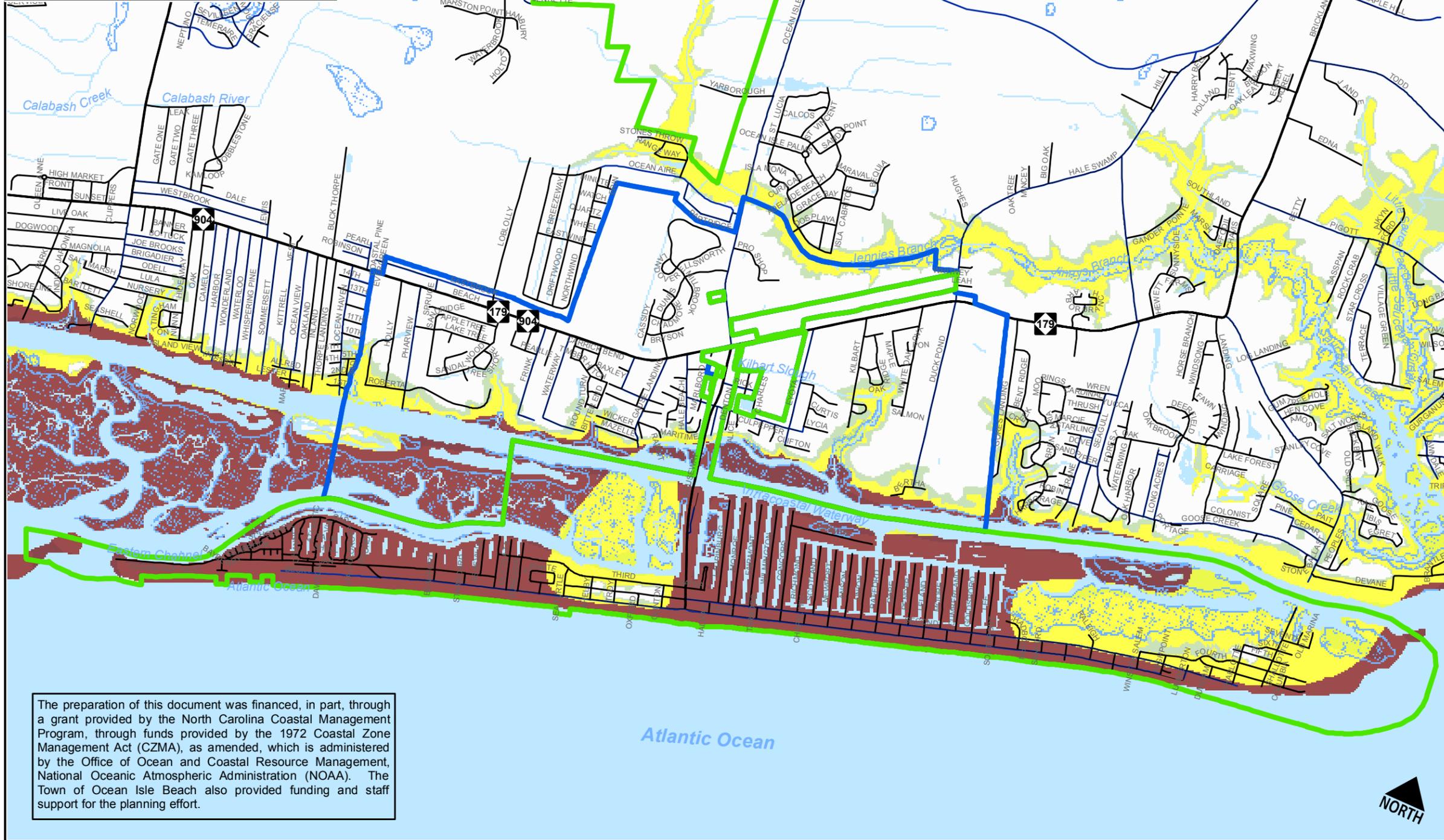
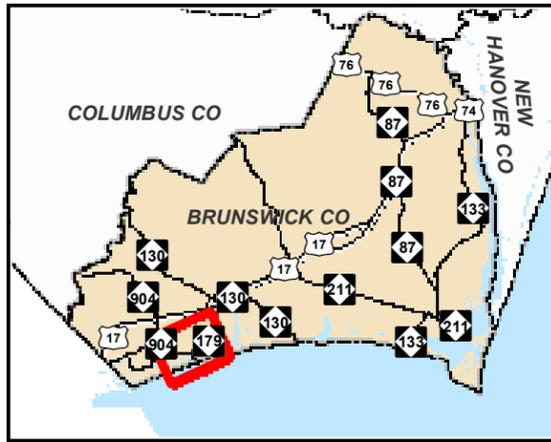


The preparation of this document was financed, in part, through a grant provided by the North Carolina Coastal Management Program, through funds provided by the 1972 Coastal Zone Management Act (CZMA), as amended, which is administered by the Office of Ocean and Coastal Resource Management, National Oceanic Atmospheric Administration (NOAA). The Town of Ocean Isle Beach also provided funding and staff support for the planning effort.



Map prepared by Cape Fear Council of Governments. Data sources: Brunswick Co., NCDEQ, NCDOT, USGS.

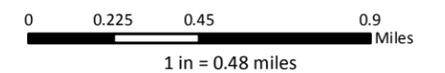




**Legend**

- Waterbody
- Swamp/Marsh
- Corporate Limits
- Extra-territorial Jurisdiction (ETJ)
- Special Flood Hazard Area (SFHA)**
- 0.2% Annual Chance
- AE Zone
- VE Zone

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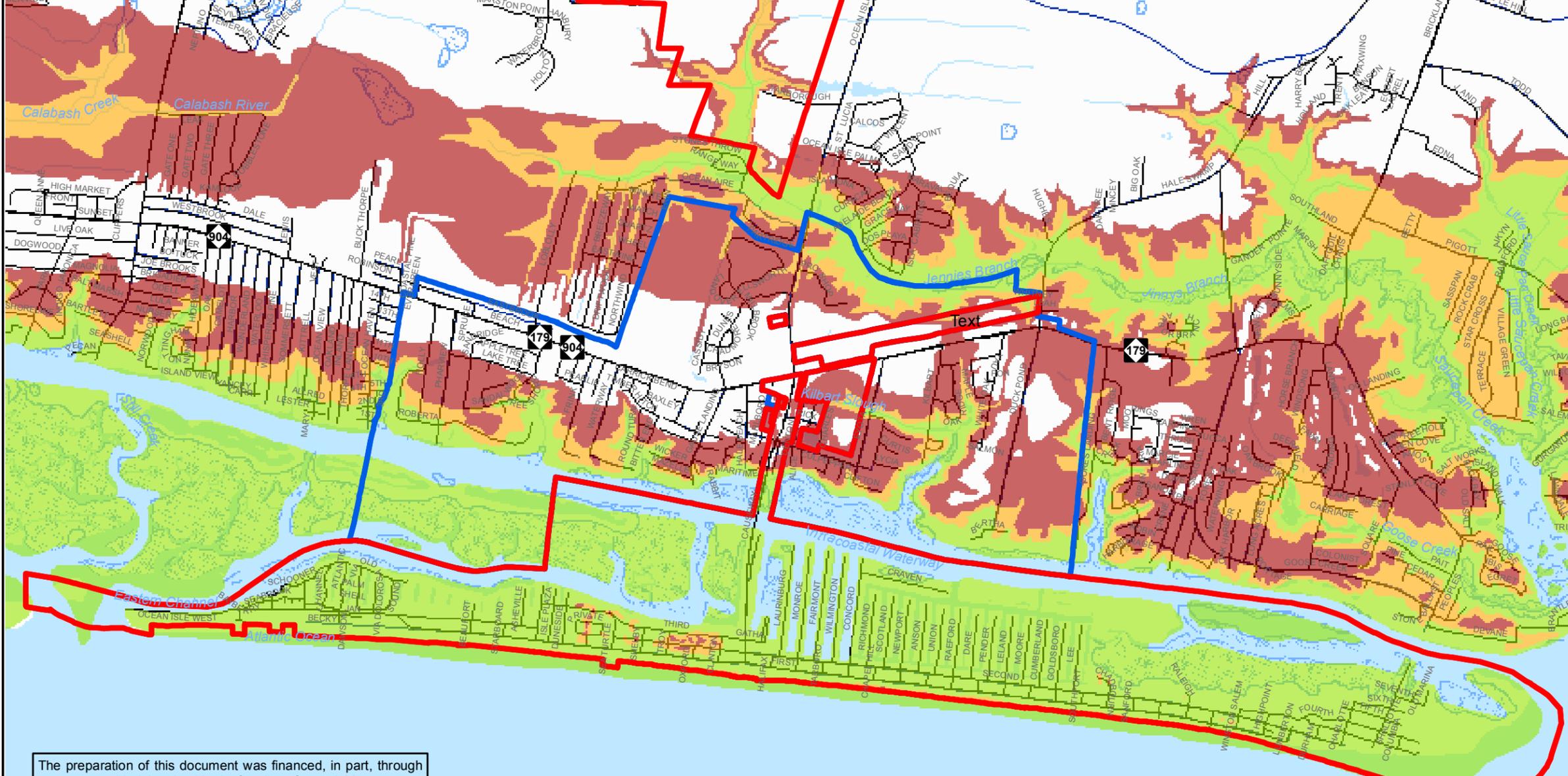
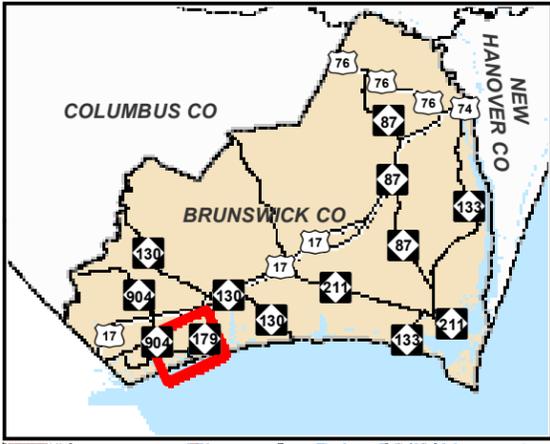
Map prepared by Cape Fear Council of Governments. Data sources: Brunswick Co., NC Floodmaps, NCDEQ, NCDOT, USGS.

# Town of Ocean Isle Beach



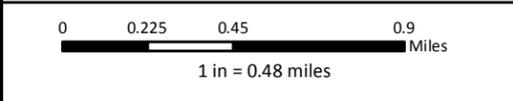
## 2016 Land Use Plan Map 3.3 Storm Surge Inundation (Fast Storm)

The National Hurricane Center, in cooperation with the North Carolina Center for Geographic Information and Analysis, developed the GIS dataset, Hurricane Storm Surge Inundation Areas (1993), to reevaluate the extent of the areas affected by hurricane inundation along the North Carolina coast. The data depicts the extent of hurricane storm surge inundation areas based on SLOSH (Sea, Lake, and Overland Surges from Hurricanes) models, for the North Carolina coast. This is the FAST model (those with forward velocities greater than 15mph). Storm surge is the abnormal rise in water level caused by wind and pressure forces of a hurricane or tropical storm. The SLOSH model was developed using various combinations of hurricane strength (based on the Saffir-Simpson scale), wind speed, and direction of movement. Rainfall produced by a hurricane is not taken into account. This data is stored in a county library by county extent.



- Legend**
- Waterbody
  - Swamp/Marsh
  - Municipal**
  - Corporate Limits
  - Extra-territorial Jurisdiction (ETJ)
  - Storm Surge Inundation (SLOSH) Hurricane (Fast Moving Storm)**
  - Category 1 & 2
  - Category 3
  - Category 4 & 5

Map is to be used for general purposes only. Spatial data used to generate this map was gathered from disparate sources and represent a condition at a fixed period in time. 100% accuracy of spatial data to current circumstances cannot be guaranteed. The Cape Fear Council of Governments is not legally responsible for the misuse of this map.

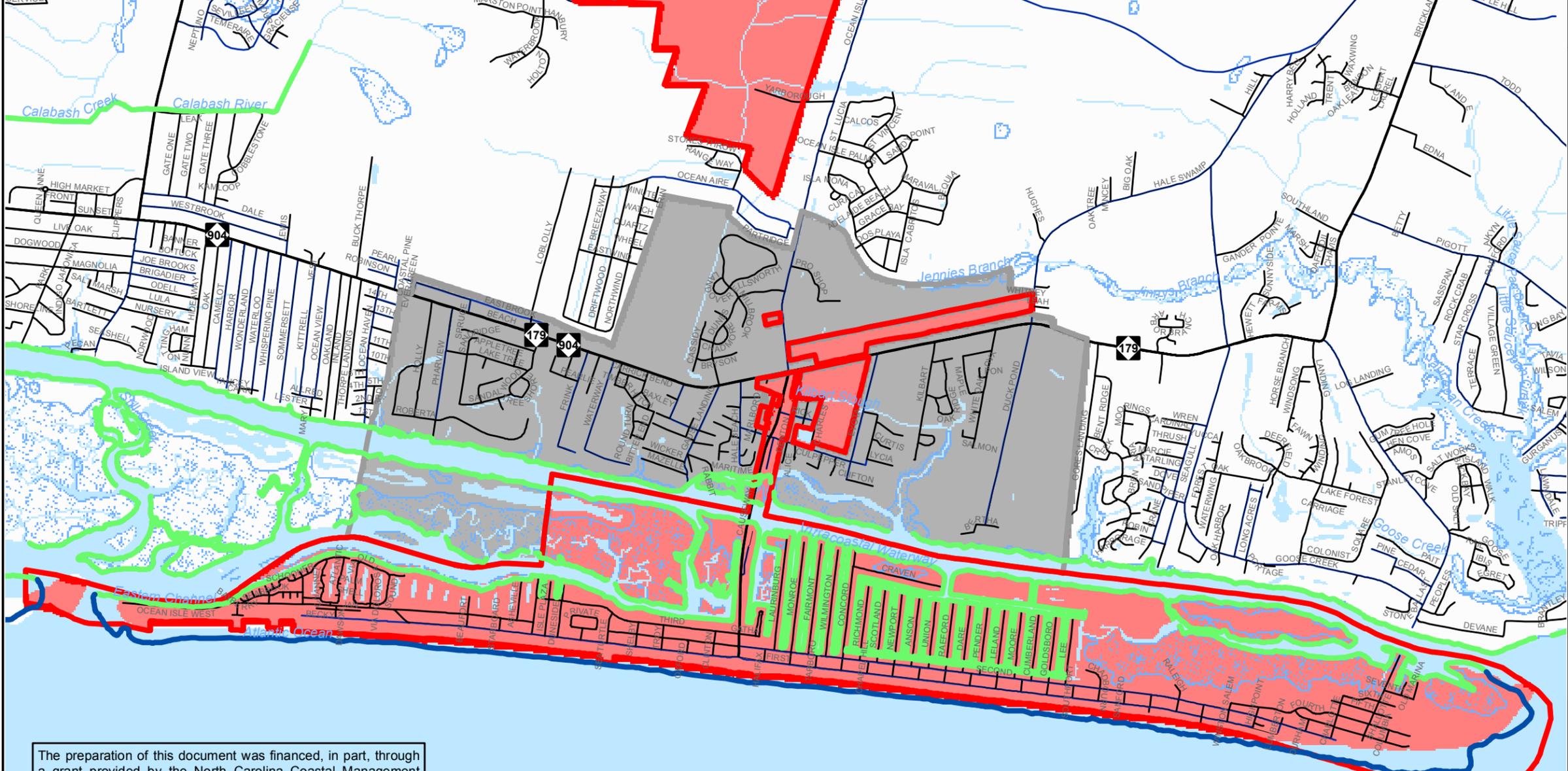
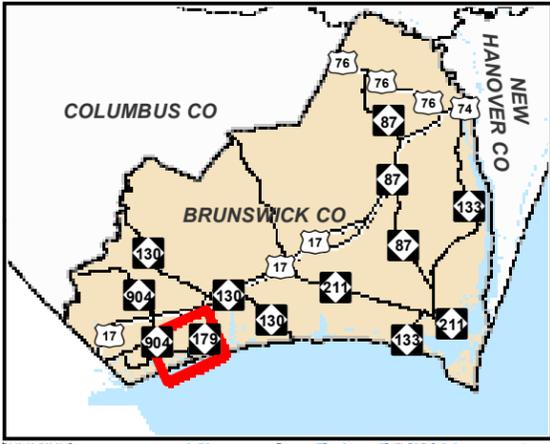


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Map prepared by Cape Fear Council of Governments. Data sources: Brunswick Co., NOAA, NCDEQ, NCDOT, USGS.





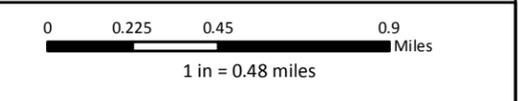
SA; HQW = Market Shellfishing and High Quality Water  
 SB = Primary Saltwater Recreation

# Town of Ocean Isle Beach

## 2016 Land Use Plan Map 3.4 Surface Water Classifications

- Legend**
- Waterbody
  - Swamp/Marsh
  - Municipal Boundaries**
  - Corporate Limits
  - Extra-territorial Jurisdiction (ETJ)
  - Surface Water Classification**
  - SA; HQW
  - SB

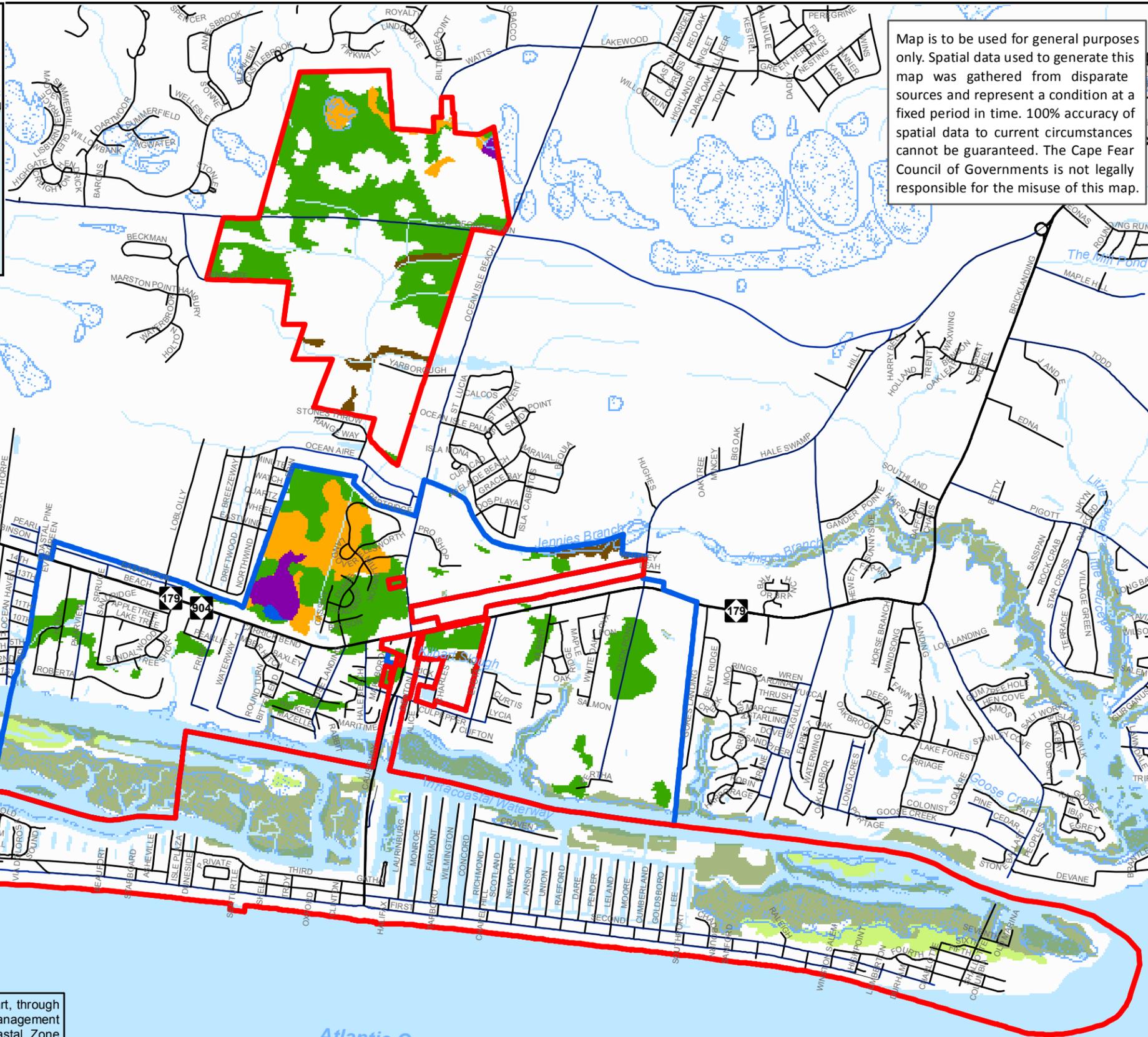
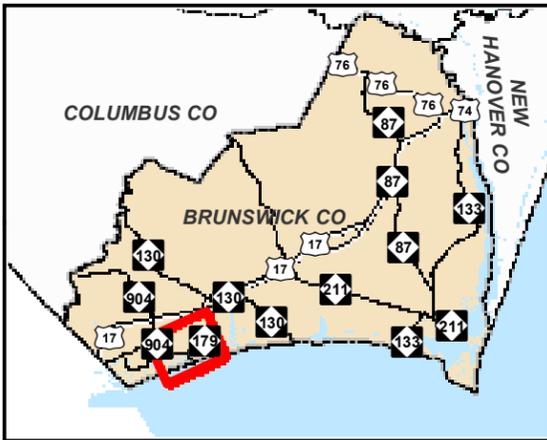
Map is to be used for general purposes only. Spatial data used to generate this map was gathered from disparate sources and represent a condition at a fixed period in time. 100% accuracy of spatial data to current circumstances cannot be guaranteed. The Cape Fear Council of Governments is not legally responsible for the misuse of this map.



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Map prepared by Cape Fear Council of Governments. Data sources: Brunswick Co., NC Floodmaps, NCDEQ, NCDOT, USGS.

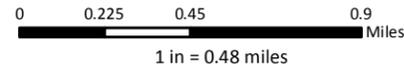




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**Legend**

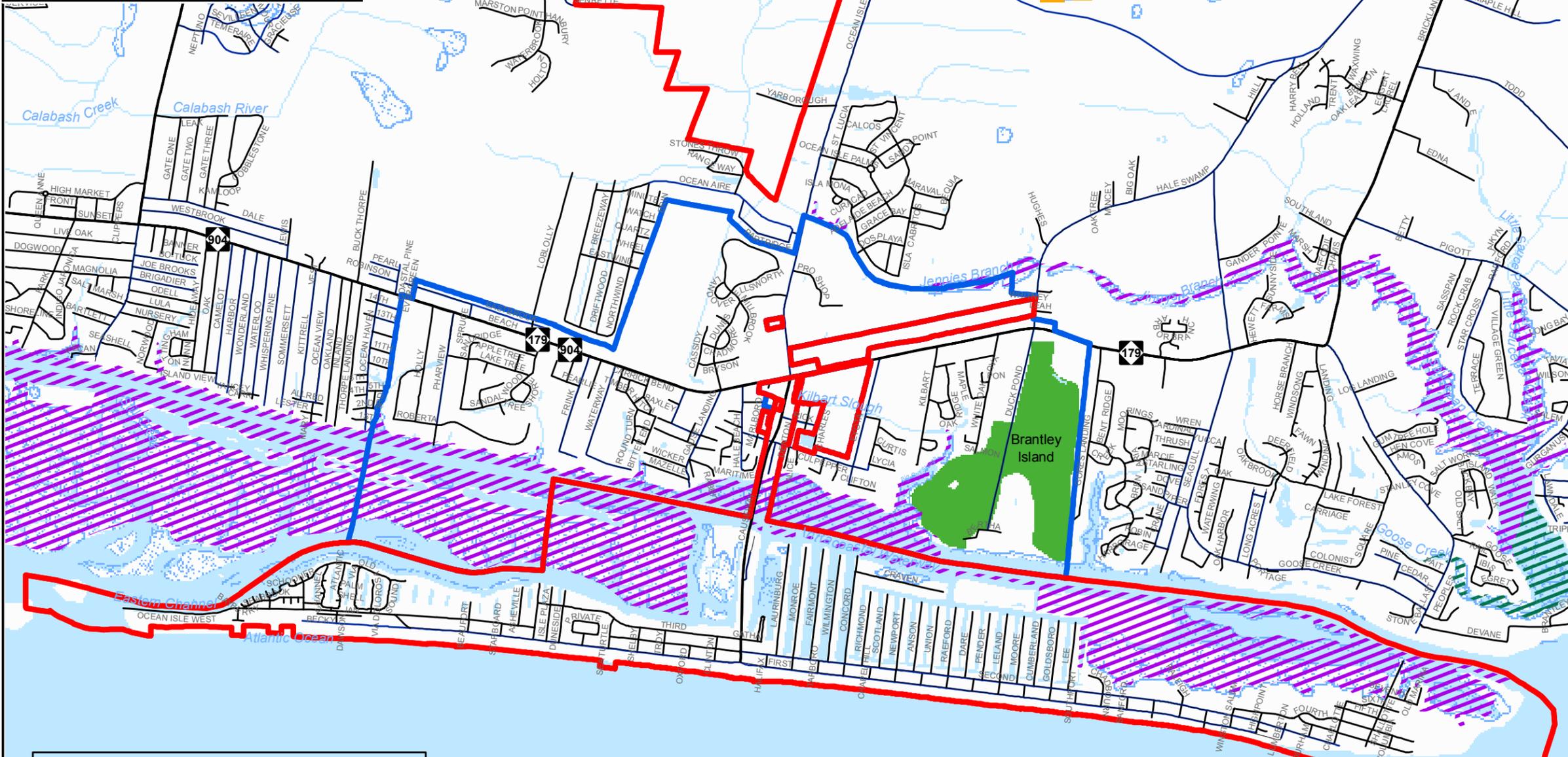
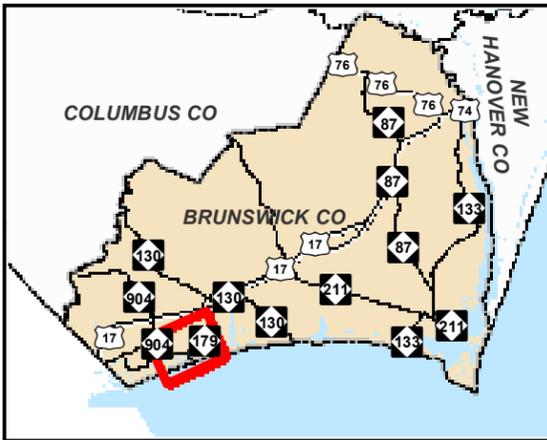
- Waterbody
- Swamp/Marsh
- Municipal**
- Corporate Limits
- Extra-territorial Jurisdiction (ETJ)
- Coastal Wetlands**
- Coastal Wetlands
- Non-Coastal Wetlands**
- Bottomland Hardwood/Riverine Forest
- Depressional Swamp
- Hardwood Flat
- Pine Flat
- Pocosin
- Estuarine Forest
- Estuarine Shrub/Scrub
- Human Impacted
- Managed Pineland



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Map prepared by Cape Fear Council of Governments. Data sources: Brunswick Co., National Wetlands Inventory, NCDEQ, NCDOT, USGS.





# Town of Ocean Isle Beach



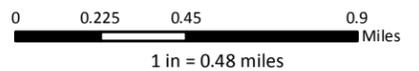
## 2016 Land Use Plan

Map 3.6 Primary Nursery Areas & Significant Natural Heritage Areas

### Legend

- Waterbody
- Swamp/Marsh
- Municipal**
- Corporate Limits
- Extra-territorial Jurisdiction (ETJ)
- Fish Nursery Areas**
- Primary Nursery Areas
- Secondary Nursery Areas
- Significant Natural Heritage Area**
- Brantley Island
- Sandy Branch Sand Ridge

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