

B. NATURAL SYSTEMS ANALYSIS

1. **Mapping and Analysis of Natural Features**

The purpose of this section of the CAMA Land Use Plan Update is to describe, analyze, and map the natural features and environmental conditions currently found in the Town of Atlantic Beach and to assess their capabilities and limitations for development.

**What are Hydrological Units?**

The United States is divided and sub-divided into successively smaller hydrologic units which are classified into six levels. The first of these four are established by the U.S. Geological Survey and are as follows: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system.

The Natural Resources Conservation Service (NRCS) has further subdivided the aforementioned cataloging units into smaller units - the 11-digit HUC (watershed) and the 14-digit HUC (sub watershed or local watershed). This smallest level of analysis - the 14-digit HUC - is the best level of analysis since it allows for the assessment of localized conditions and impacts, particularly in regards to water quality.

As required by CAMA regulations at Chapter 15A of the North Carolina Administrative Code, a primary unit of analysis to be used is the 14-digit hydrological unit code (HUC) delineated by the Natural Resources Conservation Service (NRCS). The entire Town and planning jurisdiction of Atlantic Beach is located within HUC number 03020106030082, the boundaries of which are provided on Map 4. Please see the adjacent text box for a definition of the HUC and a description of its significance.

a. *Topography/Geology*

The Town of Atlantic Beach ranges in elevation from sea level at the coast to approximately 45 feet above sea level at some primary dune areas. The majority of the dune areas are between 10 and 20 feet above sea level. The highest elevation in a developed area is approximately 20 feet above sea level, just east of the Atlantic Beach Circle.

Whereas large areas of the Town have been filled for development, a majority of the Town is completely level and slopes range primarily from zero to four percent throughout Town. Within dune areas, slopes can range up to 30 percent, with the steepest slopes found in the Beaches-Newhan, Fripp fine sand, and Newhan fine sand complex soils (see Map 8, page 54).

MAP 4 - HYDROLOGIC CODE

The Town of Atlantic Beach (and all of Carteret County) is underlain by a thick wedge of sedimentary deposits of the Pleistocene era. This material, however, is overlain by approximately 80 to 120 feet of shell fragments, calcareous materials and loamy soils, with a thick layer of limestone below 120 feet. The upper reaches of this limestone layer are probably part of the Yorktown geological formation of the Pliocene era.

Two primarily limestone aquifers underlay Atlantic Beach and serve as the source of its water supply - the Yorktown and Castle Hayne aquifers, which will be discussed in further detail in Section 5(B)(1)(f) below.

The primary ramifications of the Town's topography and geology are:

- 1) The susceptibility of the Town's beaches to erosion due to the effects of alongshore sediment transport and other features of the coastal geomorphology of the Town. Without beach nourishment, the Town can expect continued erosion into the indefinite future. In 1998, the North Carolina Division of Coastal Management (DCM) estimated the natural (i.e., without beach nourishment) average erosion rate of the Town's beaches as 2 feet per year (Source: Long-Term Average Annual Shoreline Change study, DCM, 1998).
- 2) The flat, low-lying topography of the Town coupled with its location directly on the Atlantic Ocean exposes the Town to significant risks from hurricanes and other tropical/extra-tropical weather systems and the potential impacts of sea level rise or tsunamis. Hurricane and other weather system impacts on flooding will be discussed in detail in section 5(B)(1)(c) below.

Flooding resulting from sea level rise may be a long-term problem for the Town of Atlantic Beach. Over the last 100 years, the sea level has risen approximately one foot. Most experts agree that the rate of sea level rise will increase over the next 100 years. The most reliable current estimate of sea level rise over the next century is approximately 2 feet, with a maximum increase of as much as 4 to 7 feet. (Source: *The Probability of Sea Level Rise*. James G. Titus and Vijay Narayanan. 1995. Washington, D.C.: U.S. Environmental Protection Agency. 186 pp. EPA 230-R95-008).

An increase of that magnitude (i.e., 4 to 7 feet) would be a serious problem for Atlantic Beach. Approximately 50% or more of the Town could be inundated. The impact of sea level rise has serious adverse transportation and access implications for all of Bogue Banks. Many inland Carteret County roads could be inundated and impede access to Bogue Banks.

In addition to transportation, sea level rise could have serious implications for the construction of public utilities. The following excerpt from the Environmental Impact Statement, Town of Atlantic Beach Wastewater Treatment and Disposal provides an example of the potential effects of sea level rise on the Town's plans to construct a wastewater treatment plant and collection system:

"The present rate of rise in sea level has been reported to be approximately 23 cm/100 years (Orrin Pilkey, Duke University, Durham, North Carolina). Other estimates of higher rates of rise in sea level are not uncommon. Since the life of a typical treatment plant is anticipated to be approximately 20-25 years and the life of a typical collection system 40-50 years, the present rate of rise is not expected to significantly affect these components. Discharge is not anticipated to be significantly affected by the anticipated rise in sea level. Land application sites could be significantly affected in the long run by a rise in sea level since the number of days the water table would be at minimum depth below the land surface should be reduced, thereby reducing the number of days during which land application could be accomplished. The life of irrigation equipment is typically 10-15 years. Irrigation equipment is moveable and may be relocated if necessary. The rise in sea level will have far greater impacts on land use than on any of the three alternatives under consideration. Artificial methods of lowering the water table could be employed at land application sites if necessary due to problems encountered by a rise in sea level." (Note: 23 cm is approximately nine inches.)

The rate of sea level rise should be carefully monitored.

- 3) The aforementioned Castle Hayne aquifer, because of its geological composition, is susceptible to salt water intrusion. This condition is exacerbated by the expected sea level rise described above.

**What are the CCPCUA Water Withdrawal Rules?**

The Central Coastal Plain Capacity Use Area (CCPCUA) rules took effect on August 1, 2002, administered by the NC Division of Water Resources. The rules regulate water withdrawals within a 15-county area of east-central North Carolina, including the Town of Atlantic Beach.

**Who Must Comply with the Rules?**

All those within the region who withdraw more than 10,000 gallons per day of groundwater and/or surface water.

**What Does the New Rule Require?**

- \* Users of more than 10,000 gallons per day of groundwater and/or surface water must register and report their annual water use.
- \* Users of more than 100,000 gallons per day of groundwater must apply for a water use permit, and those permitted users of the Cretaceous Aquifer System in critical areas must reduce withdrawals in staged amounts over the next 16 years (at years 6, 11, and 16).
- \* Well pump intakes must be placed above the top of the aquifer from which water is withdrawn.
- \* Permitted users must monitor and report water levels and withdrawal amounts to the State.
- \* Owners of mines, sandpits, and quarries are required to apply for withdrawal permits and develop dewatering or depressurization monitoring plans. (Source: NC Rural

Salt water is present in the eastern portion of the Castle Hayne aquifer. The top of the salt water ranges from 250 to 800 feet below ground surface. There does not appear to be any impermeable strata separating the fresh and salt water. The US Marine Corps base at Camp Lejeune in Onslow County, the Town of Wrightsville Beach in New Hanover County, and the PCS Phosphate mining operations in Beaufort County have witnessed increases in chloride concentrations in groundwater which had been fresh water.

Because of the concerns regarding salt water intrusion and aquifer recharge rates, approximately 2,500 square miles of the Castle Hayne aquifer, including the portion underlying Carteret County, have been designated as a capacity use area by the NC Groundwater Section due primarily to large groundwater withdrawals by the PCS Phosphate mine near Aurora and to increased withdrawals associated with urban development. A capacity use area is defined as an area where the use of water resources threatens to exceed the replenishment ability to the extent that regulation may be required (see text box to the left).

According to DWR Hydrologist Nat Wilson, since PCS Phosphate shifted its mining operations and decreased pumping activities from approximately 68 MGD in 1990 to 35 MGD in 2003, the cone of depression centered on the mine has

lessened, showing that the aquifer is capable of recharging itself fairly quickly. Wilson said these developments indicate that it may be possible to manage the resources of the Castle Hayne aquifer by methods other than limiting withdrawals (Source: Water Resources Research Institute). In any case, salt water intrusion will continue to be a serious problem confronting the town, and must be closely monitored.

b. *Climate*

Owing to the proximity of the Atlantic Ocean, the climate of Atlantic Beach is mild throughout the year (see Table 21 below). The sea breezes along the coast during the hot summers and the mild winters make this an ideal climate. Cover crops and hardy vegetables can be grown during the winter, and outdoor work can be carried on. The ground very seldom freezes and then only a thin crust forms which thaws very quickly. The snowfall is very light and lasts only a short time.

The average annual rainfall is 51.26 inches. It is well distributed throughout the year.

Table 21: Climatic Conditions by Month at Atlantic Beach, NC

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average temp. (°F)	46.3	47.9	54.1	61.3	69.4	76.4	80.5	79.6	75.4	65.8	57.3	49.6
High temperature (°F)	57.0	59.0	65.1	72.0	78.8	84.9	88.6	88.0	84.5	76.5	68.3	60.3
Low temperature (°F)	35.5	36.8	43.0	50.6	59.9	67.8	72.3	71.1	66.2	55.1	46.3	38.9
Precipitation (in)	5.4	4.0	4.3	2.9	4.7	4.0	5.9	7.5	6.5	4.4	4.1	4.5
Days with precip.	11	10	10	8	9	10	13	12	10	8	8	9
Wind speed (mph)	10.1	10.4	10.7	10.7	9.6	9.2	8.7	8.1	8.7	8.9	9.0	9.5
Morning humidity (%)	81	80	81	80	83	84	86	88	88	86	83	81
Afternoon humidity (%)	61	57	56	53	59	63	66	66	64	59	58	60
Sunshine %)	53	56	62	69	66	65	64	63	62	62	60	54
Days clear of clouds	10	9	10	11	8	7	6	7	9	12	11	10
Partly cloudy days	6	6	8	8	11	11	11	11	10	7	7	7
Cloudy days	15	13	14	11	12	12	13	12	12	11	11	14
Snowfall (in)	0.5	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6

Source: National Weather Service.

c. *Flood Zones*

Approximately 95% of Atlantic Beach lies within Special Flood Hazard Areas (SFHAs). A SFHA is defined as a land area with a greater than 1% chance per year of flooding and is also known as a “floodplain” (Source: Federal Emergency Management Agency or “FEMA”). SFHA are indicated on Flood Insurance Rate Maps (FIRMs), which are considered the most reliable and consistent source for delineating SFHAs and are the source used to determine whether or not the purchase of flood insurance is mandatory for developed properties with mortgages. According to FEMA, a home located within an SFHA has a 26% chance of suffering flood damage during the term of a 30-year mortgage.

SFHAs are broken into “A” zones and “V” zones. “A” zones are areas subject to risk of flooding by standing or relatively static flood waters, while “V” zones are areas subject to wave action. Shaded X is a supplemental flood hazard area in which there is a 0.2% per year chance of flooding, also known as the “500-year floodplain” (Source: FEMA). Flood hazard areas are depicted graphically on Map 5 and characterized in Table 22 below.

Table 22: Town of Atlantic Beach  
Land Area by SFHA

Flood Hazard Areas	Acres	% from Total
A zone	1,037.6	62.9%
V zone	195.9	11.9%
Shaded X	341.2	20.7%
X (Outside of SFHA)	75.9	4.6%
<b>TOTAL</b>	<b>1,650.6</b>	<b>100.0%</b>

\*Please note that road rights-of-way and water are included in this figure.  
Source: Holland Consulting Planners, Inc.

The greatest threat of flooding in the Town of Atlantic Beach is from storm surge. The majority of Atlantic Beach’s land area lies below ten feet above mean sea level and is potentially subject to storm surge related flooding. Storm surge is ocean overwash associated with hurricanes or other tropical or extra-tropical weather events.



**Oceanana Fishing Pier in Atlantic Beach during Hurricane Isabel, September 2003 (Source: Carteret County News-Times)**

Map 6 shows the general areas of Atlantic Beach which may be affected by hurricane-generated storm surge based on the SLOSH (Sea, Lake, and Overland Surges from Hurricanes) model developed by the National Oceanic and Atmospheric Administration (NOAA), which computes storm surge heights from tropical cyclones, such as hurricanes. The SLOSH model estimates the extent of storm surge inundation for “fast-moving” storms (forward velocity greater than 15 miles per hour) and for “slow-moving” storms (forward velocity less than 15 miles per hour).

MAP 5 - FLOOD HAZARD AREAS

MAP 6 - STORM SURGE INUNDATION

Table 23 below provides a tabular representation of the area in the Town inundated by storm surge flooding at different category events.

Table 23: Town of Atlantic Beach  
Storm Surge Inundation at Different Magnitude Storm Events based on SLOSH Model

<b>Fast Storm Inundation</b>	<b>Acres*</b>	<b>% of Total Town Land Area</b>
Category 1/2	1,102.9	66.8%
Category 3	1,241.4	75.2%
Category 4/5	1,409.0	85.4%

<b>Slow Storm Inundation</b>	<b>Acres*</b>	<b>% of Total Town Land Area</b>
Category 1/2	611.3	37.0%
Category 3	891.7	54.0%
Category 4/5	1,246.8	75.5%

\*Please note that road rights-of-way and water are included in these figures.  
Source: Holland Consulting Planners, Inc.

The various categories of storm surge areas and a description of expected damages are provided below:

Category 1. Winds of 74 to 95 miles per hour. Damage primarily to shrubbery, trees, foliage, and unanchored mobile homes. No appreciable wind damage to other structures. Some damage to poorly constructed signs. Storm surge possibly 4 to 5 feet above normal. Low-lying roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings.

Category 2. Winds of 96 to 110 miles per hour. Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes. Extensive damage to poorly constructed signs. Some damage to roofing materials of buildings; some window and door damage. No major wind damage to buildings. Storm surge possibly 6 to 8 feet above normal. Coastal roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying island areas required.

Category 3. Winds of 111 to 130 miles per hour. Foliage torn from trees; large trees blown down. Practically all poorly constructed signs blown down. Some damage to roofing materials of buildings; some window and door damage.

Some structural damage to small buildings. Mobile homes destroyed. Storm surge possibly 9 to 12 feet above normal. Serious flooding at coast and many smaller structures near coast destroyed; larger structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives.

Category 4. Winds of 131 to 155 miles per hour. Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows, and doors. Complete failure of roofs on many small residences. Complete destruction of mobile homes. Storm surge possibly 13 to 18 feet above normal. Major damage to lower floors of structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Major erosion of beaches.

Category 5. Winds greater than 155 miles per hour. Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes. Storm surge possibly greater than 18 feet above normal. Major damage to lower floors of all structures less than 15 feet above sea level. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives.

Please note that the above data regarding storm surge presume a “direct hit” by the eye of the storm at Atlantic Beach. Actual inundation areas, damages and impacts will likely be less severe than the model if the Town receives a “glancing blow” from a storm.

The Town adopted a Hazard Mitigation Plan in January 2005. The plan is designed to enable the Town to be more prepared for natural disasters. The goals and mitigation implementation measures of that plan are included as Appendix III. If either the Land Use Plan or the Hazard Mitigation Plan are revised, a review of each plan for consistency is necessary.

Atlantic Beach also experiences intermittent flooding from high intensity rainfall and storm water runoff. The soil associations shown on Map 8 provide an indication of the locations of high water table areas. The water table depths, flooding frequency, and permeability rates for various soil types are provided in section 5(B)(1)(e) below regarding soils.

d. *Man-Made Hazards/Restrictions*

The Town of Atlantic Beach does not have any sites that have a quantity of hazardous materials sufficient to require reporting to the State, the U.S. Environmental Protection Agency (USEPA), or the County Emergency Management Office.

The only man-made hazards located in Atlantic Beach are fuel storage tanks located at marinas, retail stores, and service stations that are engaged in selling fuel. Because the town relies on groundwater for its water supply, the underground fuel tanks could pose a threat. Table 24 below provides a list of facilities with underground storage tanks registered with the Groundwater Section of the North Carolina Division of Waste Management, Department of Environment and Natural Resources. Table 24 also indicates facilities with identified UST leaks and Map 7 provides a graphic depiction of the location of these sites.

Table 24: Town of Atlantic Beach  
Registered Underground Storage Tanks

UST Number	Facility Name	Facility Address	Known Petroleum Leak? (Y or N)
0-007527	Holiday Inn (Jim Dandy)	Salter Path Rd	Y
0-023551	Town of Atlantic Beach Complex	125 West Fort Macon Rd	Y
0-004613	Scotchman #57	303 Morehead Ave	Y
0-032592	White Sand Mini Mart	701 Salter Path Rd	Y
0-011143	Kwik Mart #9 (The Pantry 908)	605 East Fort Macon Rd	Y
0-026913	Scotchman #140	Fort Macon Rd	Y
0-000205	Former Walter's Exxon Station	122 West Fort Macon Rd	Y
0-023502	Scotchman #189	2510 West Fort Macon Rd	Y
0-007194	Fort Macon Marina	Fort Macon Rd	N
0-007370	USCG Base Ft. Macon	P.O. Box 237	N
0-011143	The Pantry 918	605 East Fort Macon Rd	N
0-007520	Crows Nest Yacht Club, Inc.	407 Atlantic Beach Causeway	N
0-004858	Sea Water Marina	400 Atlantic Beach Causeway	N
0-007512	Town of Indian Beach	Salter Path Rd	N
0-032592	Handy House 5	Fort Macon Rd	N
0-036649	Island Cove	2500 West Fort Macon Rd	N
0-031783	Fort Macon State Park	2300 East Fort Macon Rd	N

Table 24 (continued)

UST Number	Facility Name	Facility Address	Known Petroleum Leak? (Y or N)
0-031490	Pilot House/DBA Jungleland	Salter Path Rd	N
0-025125	Atlantic Beach Causeway	300 Atlantic Beach Causeway	N
0-033219	Triple S Partnership	1151 East Fort Macon Rd	N
0-032899	Morehead City-Pine Knoll Shores	Roosevelt Dr	N
0-021492	Atlantic Beach RMS	Cedar Ln	N

Source: Walter Plekan, Hydrogeologist, UST Section, DENR January, 2005.

North Carolina’s underground storage tank program is administered by the Division of Waste Management’s UST Section in the North Carolina Department of Environment and Natural Resources (DENR). The UST Section enforces UST regulations and manages funds used to perform cleanups of petroleum UST discharges or releases. The program was initiated in 1988 in response to growing reports of USTs leaking petroleum into soil and drinking water supplies. All tank removal and efforts to remove ground and groundwater contamination should be coordinated with the UST Section of DENR.

Additionally, the NC Division of Waste Management’s Underground Storage Tank (UST) Section has the following recommendations for new developments:

- Remove any abandoned or out-of-use USTs. The UST Section should be notified of any USTs to be permanently closed or installed.
- Any UST installed within 500’ of a public water supply well or within 500’ of any surface water classified as HQW, ORW, WS-I, WS-II, or SA must be secondarily contained.
- Any releases from USTs must be reported to the local UST section.
- Any soils excavated during demolition or construction that show evidence of chemical or petroleum contamination, such as stained soil, odors, or free product must be reported immediately to the local Fire Marshall to determine whether explosion or inhalation hazards exist. Contaminated soils must be properly disposed and the final disposition of soils must be reported to the local UST section.

Map 7 - UST Locations

- Any above ground fuel tanks must be installed and maintained in accordance with applicable local, state, and federal regulations.
- Any chemical or petroleum spills to the land surface or “waters of the state” must be contained and the area of impact properly restored. Spills of significant quantity must be reported to the NC Division of Water Quality.

There was no offshore oil exploration or drilling underway in 2005. However, future exploration and/or drilling could pose a threat for the Atlantic Beach shoreline if it were to occur.

The North Carolina Division of Waste Management’s Superfund Section investigates uncontrolled and unregulated hazardous waste sites by identifying risks, prioritizing them for clean up, and directing cleanup. The Section urges developers to examine site maps to locate the proximity of CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System) or hazardous waste sites to proposed project locations. There are no hazardous waste sites identified in Atlantic Beach, but one is located close to the Town. That site, the ANT US Coast Guard Fort Macon Station Site (NC5 690 308 262), is located 3.2 miles east of Atlantic Beach. The site has been removed from the CERCLIS list and the NC Inactive Hazardous Sites Branch granted it a status of No Further Action.

*e. Soils*

The most reliable information regarding soils in the Town of Atlantic Beach comes from the US Department of Agriculture (USDA) and National Cooperative Soil Survey (NCSS) soil survey completed in 1978. All data in this section is derived from this source unless otherwise noted.

According to the aforementioned USDA/NCSS survey, there are 11 different soil associations located within Atlantic Beach. These associations are delineated on Map 8. Table 25 provides a tabular representation of the soil coverages depicted on Map 8, as well as the range of slopes found and the flooding prevalence in each soil association.

Table 25: Town of Atlantic Beach  
Prevalence of Soil Types and Range of Slopes Within Each Soil Type

Map Symbol	Soil Name/Range of Slopes/Flood Prevalence	Acres	% from Total
Bn	Beaches-Newhan complex, 0 to 30 percent slopes	79.2	6.0%
CH	Carteret sand, frequently flooded	58.1	4.4%
CL	Carteret sand, low, frequently flooded	224.1	16.9%
Co	Corolla fine sand	34.4	2.6%
Cu	Corolla-Urban land complex	181.6	13.7%
Du	Duckston fine sand, frequently flooded	103.4	7.8%
Fr	Fripp fine sand, 2 to 30 percent slopes	70.9	5.3%
Nc	Newhan fine sand, 2 to 30 percent slopes	145.5	11.0%
Nd	Newhan fine sand, dredged, 2 to 30 percent slopes	10.4	0.8%
Ne	Newhan-Corolla complex, 0 to 30 percent slopes	177.8	13.4%
Nh	Newhan-Urban land complex, 0 to 8 percent slopes	133.3	10.1%
w	Water	106.9	8.1%
TOTAL		1,325.6*	100.0%

\*Please note that road rights-of-way and water are excluded from consideration.  
Source: Soil Survey of Carteret County, North Carolina, USDA/NCSS, 1978.

Most soils within Atlantic Beach are poorly suited for development. The Beaches-Newhan complex, Carteret sand (both high and low), and Duckston fine sand associations, collectively accounting for 34.6% of the land area in the Town, are hydric soils. Hydric soils are those that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

Although areas with hydric soils are not necessarily wetland areas, they almost always have consistently wet conditions that make the installation of septic systems difficult and costly, and are poorly suited for the construction of dwellings, streets, or roads due to their propensity to flood. Whereas the Town of Atlantic Beach relies exclusively on septic systems and package treatment plants for wastewater disposal, the prevalence of such a large amount of wet soils constitutes a significant limitation to the density and intensity of development.

MAP 8 - SOILS

All of the remaining non-hydric soils are very loamy soils that percolate quickly and thus risk contamination to the underlying water supply aquifers (see Table 26). Therefore, mound systems, package treatment systems and other similar systems are necessary for waste disposal, which raises the cost of development. Furthermore, if these systems are improperly designed, maintained or operated, it can result in groundwater contamination and diminution in water quality in nearby estuaries and sounds. The issue of wastewater disposal will be explored in more detail in Section V(1)(E)(7) of this plan.

Table 26: Town of Atlantic Beach  
Soil Types and Septic Tank Conditions

Map Symbol	Soil Name/Description	Septic Tank Conditions
Bn	Beaches-Newhan complex, 0 to 30 percent slopes	Severe: poor filter, high slopes
CH	Carteret sand, frequently flooded	Severe: flooding, ponding, poor filter
CL	Carteret sand, low, frequently flooded	Severe: flooding, ponding, poor filter
Co	Corolla fine sand	Severe: wetness, poor filter
Cu	Corolla-Urban land complex	Severe: wetness, poor filter
Du	Duckston fine sand, frequently flooded	Severe: flooding, ponding, poor filter
Fr	Fripp fine sand, 2 to 30 percent slopes	Severe: poor filter, slope
Nc	Newhan fine sand, 2 to 30 percent slopes	Severe: poor filter, slope
Nd	Newhan fine sand, dredged, 2 to 30 percent slopes	Severe: poor filter, slope
Ne	Newhan-Corolla complex, 0 to 30 percent slopes	Severe: poor filter
Nh	Newhan-Urban land complex, 0 to 8 percent slopes	Severe: poor filter, slope

Source: Soil Survey of Carteret County, North Carolina, USDA/NCSS, 1978.

*f. Water Supply*

As mentioned in Section 5(1)(A) above, the Town of Atlantic Beach relies on groundwater for its water supply (see text box for discussion of groundwater). Two primarily limestone aquifers underlay Atlantic Beach and serve as the source of its water supply - the Yorktown and Castle Hayne aquifers. Water supply wells have been constructed to penetrate both aquifers.

### Groundwater - What Is it?

The ground beneath our feet is not completely solid. It is more like a sponge with pores of many shapes and sizes. When rain falls, it soaks into the ground and moves throughout this pore space. Pore space may account for up to 50 percent of the total volume of some soils.

Near the soil surface, in the unsaturated zone, the pores contain a combination of air and water. Further down is the saturated zone where all of the pore space is filled with water. This water is called groundwater. The water table is the boundary between the saturated zone and the unsaturated zone. A well must reach down below the water table, into the saturated zone, to obtain groundwater.

### Groundwater

#### *Aquifers and Confining Beds*

The word aquifer comes from the Latin for “water bearing” and is used for any geologic formation that contains water in sufficient quantity and with sufficient mobility to be useful as a water source (for example, a layer of sand or gravel).

When water mobility is very limited (such as in a layer of clay or silt), the formation is called a confining bed or an aquitard.

#### *Recharge and Discharge*

Aquifer recharge is the movement of water from the surface down into an aquifer. In a recharge area, the net movement of water is downward. Recharge usually occurs in the upland areas between streams.

On the other hand, a discharge area is an area where the net movement of water is toward the surface. Groundwater discharge usually occurs in low areas close to streams and through the banks and beds of streams.

The Yorktown aquifer lies below the surficial aquifer in the northern half of the coastal plain. The Yorktown is thin toward the west, sometimes less than 20 feet. It thickens eastward, to as much as 300 feet in Dare County. The Yorktown is mostly fine sand, silty and clayey sand, and clay with shells and beds of shells throughout.

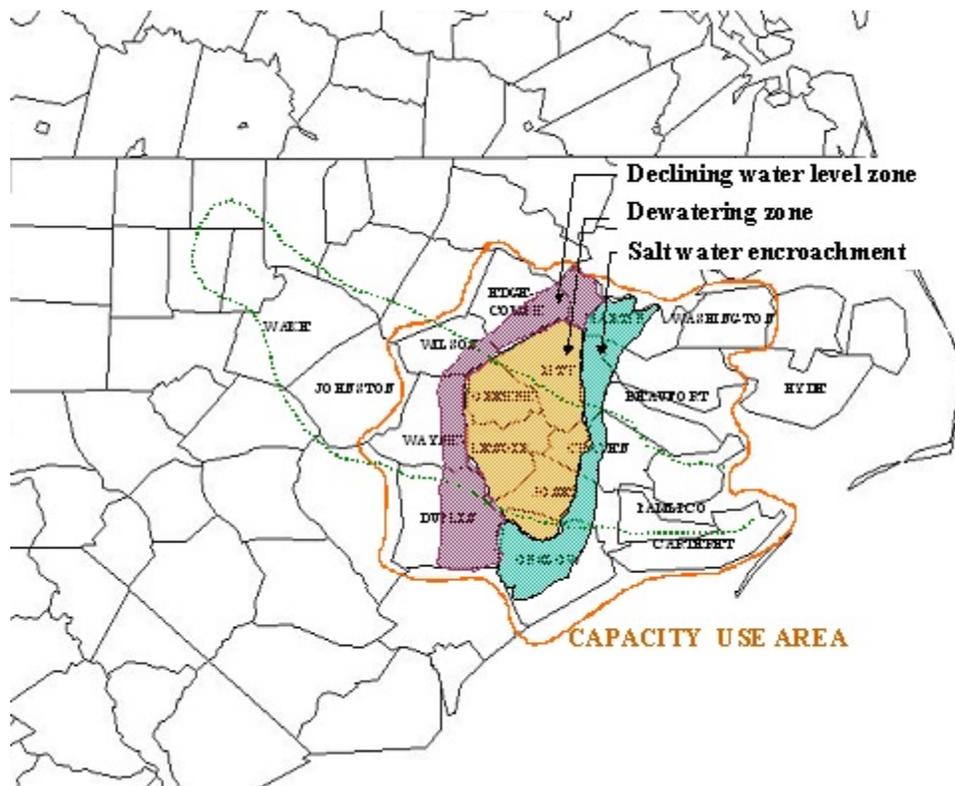
The Yorktown aquifer is an important source of water in the northeastern part of the State where deeper aquifers are too salty. It is not used as much in the western part of the State, since more productive sources are available.

The Castle Hayne aquifer, underlying the eastern half of the coastal plain, is the most productive aquifer in the state and the primary water source for the Town. It is primarily limestone and sand. The Castle Hayne aquifer is noted for its thickness (more than 300 feet in places) and the ease of water movement within it, both of which contribute to high well yields. It lies fairly close to the surface toward the south and west, deepening rapidly toward the east. Chloride content exceeds 250

parts per million east of a line between Gates and Carteret counties. Water in the Castle Hayne aquifer ranges from hard to very hard because of its limestone composition. Iron concentrations tend to be high near recharge areas but decrease as the water moves further through the limestone.

At Atlantic Beach, the Castle Hayne aquifer is subject to salt water intrusion. Because of the potential for salt water intrusion, approximately 2,500 square miles of the Castle Hayne aquifer, including the portion underlying Carteret County, have been designated as a capacity use area (CCPCUA, see page 42) by the NC Groundwater Section due to large groundwater in the Central Coastal Plain. As mentioned on page 42, a capacity use area is defined as an area where the use of water resources threatens to exceed the replenishment ability to the extent that regulation may be required. Therefore, wells are not permitted to pump more than 2.018 million gallons per day as permitted under CCPCUA.

Exacerbating the risk of salt water intrusion are declining water levels in the Castle Hayne aquifer. These declining water levels are due to dewatering activities attributable to industrial activities, particularly mining, and urbanization in areas that overlay the aquifer, particularly those areas west and north of Atlantic Beach such as Kinston, Goldsboro, Greenville and New Bern (see page 42 for additional information on this phenomenon). Water levels in the Cretaceous and Upper Aquifers, aquifers above and adjacent to the Castle Hayne, are declining between 1 and 9 feet per year on average (see graphic below).



Capacity Use Area and Areas of Declining Water Quantity and/or Quality in the Central Coastal Plain of North Carolina  
 Source: NC Division of Water Quality.

As the above graphic indicates, salt water encroachment, dewatering and declining water levels are not, at the present time, a significant concern to the Town of Atlantic Beach, but could become so over time without vigilant monitoring and regulation of groundwater supplies, particularly from the Castle Hayne aquifer. This is particularly true since the August, 2004, report from the NC Division of Water Quality entitled “Central Coastal Plain Capacity Use Area Status Report” encourages urbanizing communities in the Coastal Plain to consider developing “alternate aquifers,” especially the Castle Hayne, and reducing reliance on the Cretaceous and Upper (surficial) aquifers referenced above. Any such efforts should be carefully monitored and evaluated for their potential impact on the available water supply in the Town of Atlantic Beach.

Municipal water service in the Town will be addressed in Section V(1)(E)(6) of this Plan.

*g. Fragile Areas and Areas of Environmental Concern (AEC)*

CAMA establishes “Areas of Environmental Concern” (AECs) as the foundation of the Coastal Resources Commission's permitting program for coastal development. An AEC is an area of natural importance: It may be easily destroyed by erosion or flooding; or it may have environmental, social, economic, or aesthetic values that make it valuable.

The Coastal Resources Commission designates areas as AECs to protect them from uncontrolled development that may cause irreversible damage to property, public health or the environment, thereby diminishing their value to the entire state. Statewide, AECs cover almost all coastal waters and less than 3% of the land in the 20 coastal counties.

Fragile areas are those areas that are not explicitly defined as AECs but that could cause significant environmental damage or other diminution of quality of life if not managed. These include wetlands, natural heritage areas, areas containing endangered species, prime wildlife habitats, or maritime forests. These areas must be evaluated pursuant to State regulations at 15A NCAC 7H for the CAMA Land Use Planning process.

In this section, the Town will evaluate the following AECs and fragile areas in the Town of Atlantic Beach: estuarine waters and shorelines, public trust areas, coastal wetlands, ocean beaches and shorelines, areas of excessive erosion, natural resource fragile areas, and outstanding resource waters.

**i. Estuarine Waters and Estuarine Shorelines (AEC)**

An “estuary” can be defined as “a semi-enclosed coastal body of water which has a free connection to the open sea and within which sea water is measurably diluted with fresh water derived from land drainage.” Estuaries basically serve as transition zones between fresh and salt water and are protected from the full force of ocean wind and waves by barrier islands, mudflats, and/or sand. As illustrated in the text box below, estuaries provide significant environmental and economic benefits to the Town of Atlantic Beach.

**Why are Estuaries Important?**

The lands and waters of the estuarine system are home to fish nursery areas, spawning areas, shellfish beds, and other habitats essential to North Carolina's commercial and recreational fishing industries.

More than 90% of North Carolina's commercial and recreational seafood species (such as shrimp, flounder, and crabs) depend on the protective habitat and nutrients found in coastal wetlands and estuarine waters for much of their lives.

The stems, roots, and seeds of many coastal wetland plants provide food and nesting materials for waterfowl and other wildlife.

Marsh plants guard against erosion and flood damage: Their leaves and stems dissipate wave energy, and their root systems bind soil. The nutrients and decayed plant material the marsh plants produce also contribute to the productivity of the estuarine system.

Estuarine plants trap debris and excess nutrients and help regulate the flow of fresh water into the estuary, maintaining the system's balance.

Estuarine shorelines act as natural barriers to erosion and flooding. Certain soil formations and plant communities along estuarine shorelines also help slow erosion.

Natural buffers along the shoreline protect the water from excess sediment and pollutants, and they protect nearby developments from flooding and erosion.

Estuarine waters and public trust areas are important for tourism, because they support commercial and recreational fishing, boating, swimming, and other recreational activities.

All waters of Bogue Sound north of the Town of Atlantic Beach qualify as an estuarine water AEC under CAMA regulations (NC Division of Water Quality Stream Index #20-36-(8.5), White Oak Basin).

For regulatory purposes, the inland, or upstream, boundary of estuarine waters is the same line used to separate the jurisdictions of the Division of Marine Fisheries and the Wildlife Resources Commission. However, many of the fish and shellfish that spend parts of their lives in estuaries move between the "official" estuarine and inland waters.

Estuarine shorelines are land areas leeward of mean high tide that are immediately adjacent to or bordering estuarine waters. These areas support the ecological function of estuaries and are highly vulnerable to erosion caused by wind or water and to damage caused by development.

Under CAMA rules, all lands 75 feet leeward from the mean high tide are classified as estuarine shorelines and are subject to CAMA development regulations at 15A NCAC 7H.0205-.0208, as follows:

- The location, design and construction of your project must give highest priority to conserving the biological, economic and social values of coastal wetlands, estuarine waters and public trust areas, and protect public rights of navigation and recreation in public trust areas.
- Your project should be designed and located to cause the least possible damage to the productivity and integrity of:
  - coastal wetlands;
  - shellfish beds;
  - submerged grass beds;
  - spawning and nursery areas;
  - important nesting and wintering areas for waterfowl and other wildlife;
  - and
  - important natural barriers to erosion, such as marshes, cypress fringes, and clay soils.
- Your project must follow the air and water quality standards set by the NC Environmental Management Commission. Generally, development will not be permitted if it lowers water quality for any existing uses of the water (such as shellfishing, swimming or drinking). For more information, contact the NC Division of Air Quality or the Division of Water Quality.
- Your project must not significantly increase siltation or erosion, which can smother important habitats, block sunlight from aquatic plants, and choke fish and shellfish.
- Your project must not create a stagnant body of water, which can affect oxygen levels and accumulate sediments and pollutants that threaten fish and shellfish habitats and public health.
- You must time the construction of your project to have the least impact on the life cycles and migration patterns of fish, shellfish, waterfowl and other wildlife. The life cycles of animals that depend on the estuarine system are especially sensitive during certain times of the year. For more information, contact the Coastal Management office nearest you.
- Your project must not cause major or irreversible damage to valuable archaeological or historic resources. Archaeological resources, such as the remains of Native and Early American settlements, shipwrecks and Civil or Revolutionary War artifacts, provide valuable information about the history of the coastal region and its people. Information on the location of these sites is available from the NC Division of Archives and History in the Department of Cultural Resources.

- Your project must not reduce or prevent the use of, and public access to, estuarine waters and public trust lands and waters.
- Your project must comply with the local land use plan.

The waters of Bogue Sound adjacent to the Town are rated “Class SA” by the NC Division of Water Quality (DWQ). This means that they are high quality waters suitable for shellfishing and recreational use. This means that stormwater controls are required under CAMA. No domestic discharges are permitted in these waters.

The relationship between land use and water quality in estuarine and ocean waters near Atlantic Beach will be discussed in more detail in Section V(J) of this Plan.

**ii. Public Trust Areas**

The North Carolina Division of Coastal Management (DCM) defines “Public Trust Areas” as the coastal waters and submerged lands that every North Carolinian has the right to use for activities such as boating, swimming, or fishing. These areas often overlap with estuarine waters, but they also include many inland fishing waters. The following lands and waters are considered public trust areas:

- all waters of the Atlantic Ocean and the lands underneath, from the normal high water mark on shore to the state’s official boundary three miles offshore;
- all navigable natural water bodies and the lands underneath, to the normal high watermark on shore (a body of water is considered navigable if you can float a canoe in it). 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.

Although public trust areas must be delineated by on-site analysis, all submerged lands adjacent to Atlantic Beach along Bogue Sound and the Atlantic Ocean should be considered public trust areas.

Under CAMA regulations, all lands 30 feet leeward of public trust areas are subject to the restrictions specified in Section V(B)(g)(I) above for estuarine shoreline areas.

### iii. Coastal Wetlands

Coastal Resources Commission rules define “Coastal Wetlands” as any marsh in the 20 coastal counties (including Carteret County and Atlantic Beach) that regularly or occasionally floods by lunar or wind tides, and that includes one or more of the following 10 plant species:

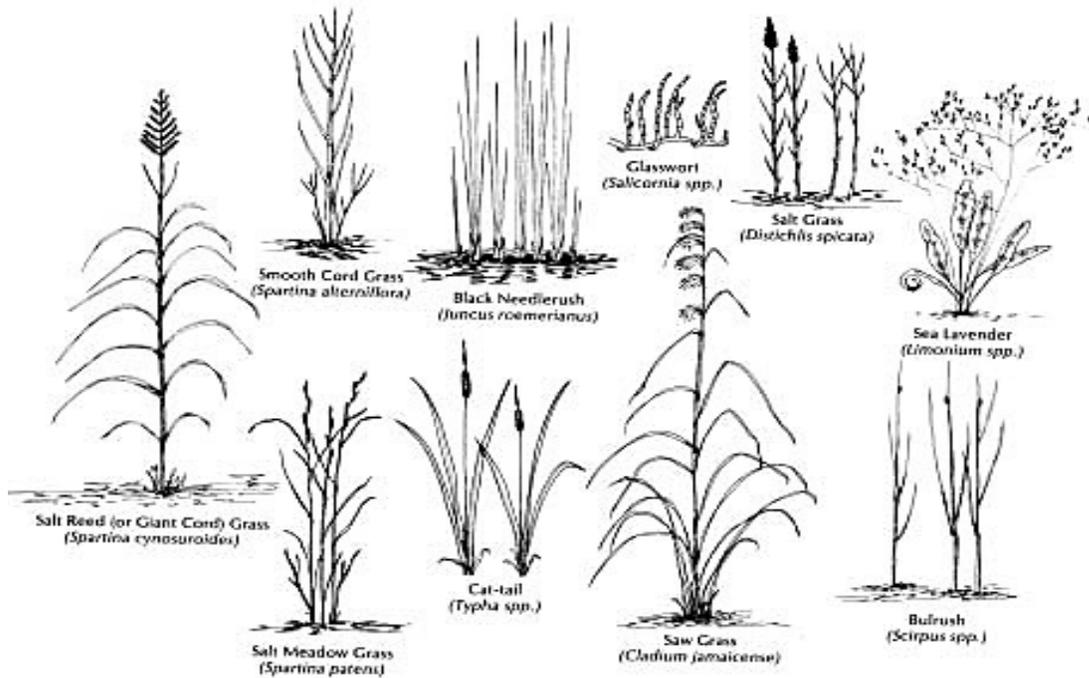
- *Spartina alterniflora*: Salt Marsh (Smooth) Cord Grass
- *Juncus roemerianus*: Black Needlerush
- *Salicornia spp.*: Glasswort
- *Distichlis spicata*: Salt (or Spike) Grass
- *Limonium spp.*: Sea Lavender
- *Scirpus spp.*: Bulrush
- *Cladium jamaicense*: Saw Grass
- *Typha spp.*: Cattail
- *Spartina patens*: Salt Meadow Grass
- *Spartina cynosuroides*: Salt Reed or Giant Cord Grass

Coastal wetlands provide significant environmental and economic benefits to Atlantic Beach. They protect against flooding, help maintain water quality, provide habitat to wildlife, and serve as part of the estuarine system described on page 58 of this plan.

In 2003, DCM classified and mapped coastal wetlands based on an analysis of several existing data sets, including aerial photographs and satellite images of coastal areas in North Carolina, including Atlantic Beach. Even though the presence of wetlands must be established by an on-site delineation and investigation of plants, DCM produced an excellent representation of wetlands in the Town, and throughout coastal North Carolina (see Map 9).

MAP 9 - WETLANDS

## COASTAL WETLAND PLANT SPECIES



### Coastal Wetland Plant Species in North Carolina

(Source: NCDWM, "CAMA Handbook for Development in Coastal North Carolina," 2002).

According to NCDWM's 2003 Coastal Wetlands Inventory, approximately 26.1% of the Town's land area, or 430.841 acres, are coastal wetlands (see Table 27).

Table 27: Town of Atlantic Beach  
Coastal Wetlands by Type and Aerial Extent

Wetlands	Acres	% of Total Town Acreage*
Cleared Estuarine Shrub/Scrub	6.417	0.4%
Cutover Estuarine Shrub/Scrub	4.881	0.3%
Cutover Maritime Forest	13.046	0.8%
Estuarine Shrub/Scrub	129.983	7.9%
Maritime Forest	34.059	2.1%
Salt/Brackish Marsh	242.455	14.7%
<b>TOTAL</b>	<b>430.841</b>	<b>26.1%</b>

\*Based on total town acreage of 1,650.6, which includes road rights-of-way and water.  
Source: NCDWM Wetlands Inventory, 2003.

The following provides the DCM descriptions of the various wetland areas found in the Town of Atlantic Beach:

*Salt/Brackish Marsh* - Any salt marsh or other marsh subject to regular or occasional flooding by tides, including wind tides (whether or not the tide waters reach the marshland areas through natural or artificial watercourses), as long as this flooding does not include hurricane or tropical storm waters. Coastal wetland plant species include: smooth cordgrass, black needlerush, glasswort, salt grass, sea lavender, salt marsh bullrush, saw grass, cattail, salt meadow cordgrass, and big cordgrass.

*Maritime Forest* - A forested community characterized by its stunted growth due to the stresses imposed by its proximity to salt spray from the ocean. Typical vegetation includes live oak, red maple, and swamp tupelo.

*Estuarine Shrub/Scrub* - Any shrub/scrub dominated community subject to occasional flooding by tides, including wind tides (whether or not the tide waters reach these areas through natural or artificial watercourses). Typical species include wax myrtle and eastern red cedar.

*Cutover Wetland* - Areas for which satellite imagery indicates a lack of vegetation. These areas are likely to still be wetlands; however, they have been recently cut over. Vegetation in these areas may be regenerating naturally, or the area may be in use for silvicultural activities. Note that marshes cannot be considered cutover.

*Cleared Wetland* - Areas of hydric soils for which satellite imagery indicates a lack of vegetation. These areas are likely to no longer be wetlands.

Areas identified as coastal wetlands are subject to CAMA regulations as specified in Section V(B)(g)(I) above for estuarine shoreline areas.

Freshwater swamps and inland, non-tidal wetlands are not in the CAMA permit jurisdiction, unless the CRC specifically designates them as AECs. However, these wetlands are protected by Section 404 of the federal Clean Water Act. An Army Corps of Engineers "Section 404" permit (USACE 404) may be required for projects taking place in these wetlands. Site-specific delineation of potential wetlands, under USACE wetland delineation guidelines, in order to determine whether a specific proposed

development project requires a USACE 404 permit. There are several different types of USACE 404 permits, which will be discussed in greater length in Section V(E) of this Plan. In general, however, the basic premise of the USACE 404 program is that no discharge of dredge or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded.

It should be noted that for purposes of this plan we have relied exclusively on State collected and analyzed data. The Town feels, however, that some areas not identified as Coastal Wetlands, such as the Hoop Hole Creek property on Fort Macon Road, should be considered for inclusion in the future and encourages the State to review and update its Coastal Wetlands inventory as soon as possible. This will help the Town, citizens, and developers know which areas will require special consideration in future development and which areas should be preserved and protected if possible.

#### **iv. Ocean Beaches/Shorelines and Areas of Excessive Erosion**

Ocean beaches and shorelines are lands consisting of unconsolidated soil materials (i.e., sand) that extend from the mean low water line landward to a point where either (a) the growth of vegetation occurs, or (b) a distinct change in slope or elevation alters the configuration of the land form, whichever is farther landward.

The entire southern boundary of the Town of Atlantic Beach - approximately 4.62 miles of shoreline - is an ocean beach. This entire area constitutes an Ocean Hazard AEC as defined by CAMA. The Ocean Hazard AEC covers North Carolina's beaches and any other oceanfront lands that are subject to long-term erosion and significant shoreline changes. The seaward boundary of this AEC is the mean low water line.

The landward limit of the AEC is measured from the first line of stable natural vegetation and is determined by adding:

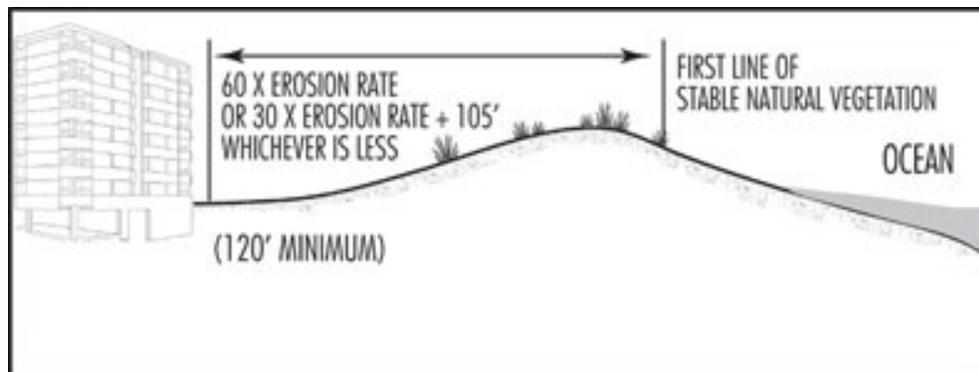
- a distance equal to 60 times the long-term, average annual erosion rate for that stretch of shoreline to
- the distance of erosion expected during a major storm.

Whereas the NC Coastal Resources Commission (CRC) has determined the average annual erosion rate in the Town of Atlantic Beach to be 2.0 feet per year, the approximate width of the AEC in Atlantic Beach is about 145 feet from the first line of stable, natural vegetation leeward of the shoreline. The specific location of the Ocean Hazard AEC must be determined by a CAMA permitting official.

The following requirements apply to all development in the Ocean Hazard AEC (15A NCAC 7H .0306):

- Your development must be located and designed to protect human lives and property from storms and erosion, to prevent permanent structures from encroaching on public beaches and reduce the public costs (such as disaster relief aid) that can result from poorly located development.
- Your development must incorporate all reasonable means and methods to avoid damage to the natural environment or public beach accessways. Reasonable means and methods include: limiting the scale of the project and the damage it causes; restoring a damaged site; or providing substitute resources to compensate for damage.
- No growth-inducing development paid for (in any part) by public funds will be permitted if it is likely to require more public funds for maintenance and continued use - unless the benefits of the project will outweigh the required public expenditures.
- Your project should be set as far back from the ocean as possible. At minimum, all buildings must be located behind the crest of the primary dune, the landward toe of the frontal dune, or the erosion setback line - whichever is the farthest from the first line of stable natural vegetation.
- Your project must not remove or relocate sands or vegetation from primary or frontal dunes. These dunes help protect structures from erosion, flooding and storm waves, and they help maintain North Carolina's barrier islands and beaches.
- If you want to move a building that is in an ocean hazard area, you will need a CAMA permit. Buildings relocated entirely with private funds should be relocated as far landward as possible. Buildings relocated with public funds must meet all AEC standards, including the setback requirement.
- Your project must meet all local minimum lot-size and setback requirements. Counties and towns often require a setback from roads, property lines, or dunes. For more information, contact your local building inspector.

- Your project must comply with the local CAMA land use plan. A land use plan contains a community's goals, management policies, and a map classifying land according to the types of development allowed.
- You must not place a mobile home within the high hazard flood area unless it is in a mobile home park that existed before June 1, 1979. Not only are mobile homes likely to be damaged by coastal storms, they are also likely to damage other buildings during storms.
- You may not interfere with or block the public's ability to reach, use, and enjoy the resources that belong to all the people of the state. These resources include the wet sand beaches and waters. No development is allowed seaward of the vegetation line, because the public has a right to use the sandy beach. Development also may not block established pathways to the beach.
- Your project must not cause major or irreversible damage to valuable archaeological or historic resources. Information on the location of these sites is available from the NC Division of Archives and History in the Department of Cultural Resources.
- The construction of publicly funded projects, such as sewers, water lines, roads, bridges and erosion control works, will be permitted only if they:
  - greatly benefit the public, nation or state;
  - don't promote additional development in ocean hazard AECs;
  - won't damage natural buffers to erosion, wave wash and flooding;
  - won't otherwise increase existing hazards.
- Meet all setback requirements for all development in the Ocean Hazard AEC.



Ocean Hazard AEC Setback Requirement Schematic (Source: NCDCM, "CAMA Handbook for Development in Coastal North Carolina," 2002)

**Why Should We Protect Ocean Beaches and Shorelines?**

At the edge of the ocean, ocean hazard AECs get the full force of any storm. Waves, wind and water can quickly change the shape of a shoreline, creating or filling inlets, flattening nearby dunes, eroding beaches and battering nearby structures. No oceanfront development can be absolutely safe from destructive natural forces, but development in ocean hazard areas can be carefully designed and located to minimize the risk to life and property, as well as to reduce the cost of relief aid.

Oceanfront beaches and dunes help protect buildings and environments behind them by absorbing the force of wind and waves, while the dense root networks of dune plants trap and anchor sand. Left uncontrolled, development can destroy these dunes and their vegetation, increasing the risk of damage to structures from erosion, flooding and waves.

The CRC updates long-term erosion rates about every five years, using aerial photographs to examine shoreline changes. General maps of erosion rates are available free from the Division of Coastal Management; detailed erosion rate maps are available for inspection at all Coastal Management field and local permitting offices (also see Map 10, page 71).

In the aforementioned CRC erosion rate study from 1998, the authors note that the 2.0 foot per year average erosion rate is “artificially low” due to the influence of beach renourishment in Atlantic Beach. In other words, without ongoing beach renourishment, the erosion rate of the ocean beach at Atlantic Beach could be much higher. The significance of this fact for the future economic well-being and safety of the Town of Atlantic Beach can hardly be understated.

In 1961, the outer channel of Beaufort Inlet was deepened to 35 feet from its natural depth of 15 to 18 feet. Twice since, the channel has been further deepened and lengthened. It is now maintained at a 45 foot depth. Sand that otherwise would have flowed westward along Bogue Banks fills in this channel. Each year the U.S. Army Corps of Engineers (USACE) removes 700,000 to 1,000,000 cubic yards of this sand and deposits it at its off-shore site on Brandt Island. Conservative estimates placed the total amount of sand dumped at this site to be at least 33 million cubic yards of sand.

The USACE has determined that the eastern end of Bogue Banks (i.e., Fort Macon State Park) and the ocean shoreline along Atlantic Beach is the least cost locale for disposal of the dredge sand from Beaufort Inlet and USACE has therefore used this sand to renourish Atlantic Beach approximately every 8 to 10 years since 1973.

This program operates at no direct cost to North Carolina or Town taxpayers. As of the writing of this Plan, a new renourishment project is underway. Since November 2004, USACE contractors have placed 2.2 million cubic yards of sand on about 2.25 miles of beach between the Triple S Pier and the west end of the Ocean Ridge subdivision under this program.

**v. Protected Lands and Significant Natural Heritage Areas**

“Protected Lands” are areas dedicated to conservation and open space based uses that are protected from development by regulation or by ownership by governments or non-profit organizations. NCDCM has identified these areas through the assistance of the NC Center for Geographic Information and Analysis (NCGIA).

In 1998, the North Carolina Coastal Federation (NCCF) used a \$2.52 million grant from the NC Clean Water Management Trust Fund (CWMTF) for the acquisition and preservation of a 35.85-acre site near Hoop Hole Creek. The maritime forest, wetlands, and saltwater marshes at this site are an effective riparian buffer between the urban development of Atlantic Beach and the clean waters and a healthy shellfish resource of Bogue Sound (see Map 10). The ownership of the property by NCCF ensures that the property will be dedicated as open space in perpetuity.

The Hoop Hole Creek property is the only area within the corporate limits of Atlantic Beach recognized as “protected,” and its 35.85 acres represent 2.2% of the Town’s total area.

Although not located within the Town’s corporate limits, Fort Macon State Park should be mentioned as a protected land. Located at the eastern end of Bogue Banks directly to the east of the Town limits, the 398-acre park is surrounded on three sides by water—the Atlantic Ocean, Beaufort Inlet, and Bogue Sound. This area of undisturbed natural beauty is the perfect place to explore salt marches and estuaries vital to the coastal ecosystem. The park is also home to a Civil War fort with a unique history.

The Park is owned by the State of North Carolina and managed by the NC Division of Parks and Recreation. The site harbors numerous flora and fauna and is particularly notable for its aquatic life. Sea urchins, sea stars, and coral may be spotted on or under rocks or other objects in the shallow water. Park flora includes live oak, yaupon, cedar and black locust.

MAP 10 - SNHA AND PROTECTED LANDS

“Significant Natural Heritage Areas” are areas containing ecologically significant natural communities or rare species. The North Carolina Natural Heritage Program of the NC Division of Parks and Recreation (NCDPR) identifies and helps facilitate the protection of these areas. DCM has identified these areas through the assistance of the NC Center for Geographic Information and Analysis (NCGIA).

A 14.97-acre portion of the aforementioned Hoop Hole Creek property contains a maritime forest that is considered a Significant Natural Heritage area by NCDPR, due to its rich estuarine habitat for aquatic life (see Map 10). This property represents 0.9% of the total land area in the Town.

**vii. Outstanding Resource Waters**

All surface waters in North Carolina are assigned a primary classification by the NC Division of Water Quality (DWQ). “Outstanding Resource Waters” (ORW) is a supplemental classification intended to protect unique and special waters having excellent water quality and being of exceptional state or national ecological or recreational significance. To qualify, waters must be rated “Excellent” by DWQ and have one of the following outstanding resource values:

- Outstanding fish habitat or fisheries,
- Unusually high level of waterbased recreation,
- Some special designation such as NC or National Wild/Scenic/Natural/Recreational River, National Wildlife Refuge, etc.,
- Important component of state or national park or forest, or
- Special ecological or scientific significance (rare or endangered species habitat, research or educational areas).

No new or expanded wastewater discharges are allowed although there are no restrictions on the types of discharges to these waters. There are also associated stormwater runoff, building density, best agricultural practices, and landfill siting controls enforced by the Division of Water Quality.

Atlantic Beach is not adjacent to any waters classified as ORW by the Division of Water Quality. However, it should be noted that the Town is adjacent to the high quality waters (HQW) and shellfish harvesting waters of Bogue Sound.

*h. Areas of Resource Potential*

**i. Regionally Significant Parks**

There are no parks of regional or statewide significance within the corporate limits of Atlantic Beach. There are, however, three regional beach access sites within the Town. Regional beach access sites are defined by the NC Division of Coastal Management as public beach access sites that are generally the largest of the access sites and that have clear signage, ample parking, and often have other facilities such as restrooms, showers and picnic tables.

Table 28: Town of Atlantic Beach  
Regional Beach Access Sites

Location	Parking Spaces Available/Other Amenities
NC Highway 58 at New Bern Avenue	50 spaces/Restroom and Showers
West Drive at Central Boulevard	303 spaces/No Restroom or Showers
West Drive at Atlantic Boulevard	64 spaces/No Restroom or Showers

Source: NC Division of Coastal Management.

Additional public beach access sites are discussed in Section V(D)(10) regarding recreational facilities in Town.

Fort Macon State Park should also be mentioned as a significant regional park. Even though it is not technically in the corporate limits of the Town, the park has approximately 1.4 million visitors per year and was determined to be one of the top 25 vacation destinations in North Carolina by the NC Department of Commerce in 2004. This environmentally and historically significant facility provides tremendous economic benefit to the Town by attracting these visitors.

**ii. Marinas and Mooring Fields**

“Marinas” are defined as any publicly or privately owned dock, basin, or wet boat storage facility constructed to accommodate more than ten boats and providing any of the following services: permanent or transient docking spaces, dry storage, fueling facilities, haulout facilities, and repair service. Not included in this definition are facilities that only allow boat access or temporary docking and that do not include the services provided by marinas specified above.

To receive a CAMA permit to construct a marina, a marina must meet the general CAMA rules for coastal wetlands, estuarine waters and public trust areas specified above as well as the specific rules below:

- Marinas should be built in non-wetland sites or in deep waters that do not require dredging. They must not disturb valuable shallow-water or wetland habitats, except for dredging necessary for access to high-ground sites. Marinas should be designed to protect the environment as much as possible. The following are four alternatives for siting marinas, ranked in order of Coastal Resources Commission preference:
  - 1) An upland site that requires no alteration of wetlands or other estuarine habitats and has adequate water circulation to prevent the accumulation of sediment and pollutants in boat basins and channels;
  - 2) An upland site that causes no significant damage to fisheries or wetlands and requires dredging for access only;
  - 3) An open water site that does not require dredging or wetland alteration and is not a primary nursery area; and
  - 4) An open water site that requires dredging in less productive habitat, but not deeper than any connecting channels.
- Marinas that require dredging may not be in primary nursery areas or in areas that require dredging a channel through nearby primary nursery areas to deeper waters. DCM will consider maintenance dredging in primary nursery areas for existing marinas on a case-by-case basis.
- Marinas that require dredging must provide acceptable disposal areas to accommodate future maintenance dredging.
- Marinas may not be enclosed within breakwaters that hinder the water circulation needed to maintain water quality. Breakwaters that obstruct or alter the circulation of estuarine waters can accumulate sediment and pollutants and accelerate erosion on nearby shorelines. This could threaten marine life and public health, and it requires more frequent maintenance dredging.
- Marinas serving residential developments and built in public trust waters must be limited to 27 square feet of public trust area for every one linear foot of adjacent shoreline. The square-footage limit shall not apply to fairways between parallel piers or any portion of the pier used only for access from land to the docking spaces.
- Marinas may not be located within areas where shellfish harvest for human consumption is a significant use, or in adjacent areas if the proposed marina will cause closure of the harvest areas. Construction or enlargement of a marina must not lead to the closure of an open shellfishing area.

- Marinas should minimize interference with public waters by using a mixture of dry storage areas, public launching facilities, and docking spaces.
- Marinas may not be built without written confirmation that the proposed location is not subject to a submerged lands lease or deed. (State law requires that marina owners receive an easement from the State Property Office.)
- Marina basins must be designed to promote flushing: basin and channel depths should gradually increase toward open water and must not be deeper than connecting waters. When possible, an opening shall be provided at opposite ends of the basin to promote flow-through circulation.
- Marinas must be designed to minimize adverse effects on boat traffic, federally maintained channels, and public rights to use and enjoy state waters.
- Marinas must meet all applicable requirements for stormwater management.
- Boat maintenance areas must be designed so that all scraping, sandblasting, and painting is over dry land and so that pollutants such as grease, oil, paint and sediments do not flush into estuarine waters. Grease and sediment traps can protect water quality at the marina and throughout the estuarine system.
- Marinas shall post a notice prohibiting the discharge of waste from boat toilets and explaining the availability of information on pumpout services. If dumped overboard, marina sewage can present a threat to marine life and public health.
- Marinas must comply with all other applicable standards for docks and piers, bulkheading, dredging, and spoil disposal.
- Marina replacement may be allowed if all rules are met to the maximum extent practicable.
- New marinas over public trust bottoms are subject to the North Carolina Environmental Policy Act and must undergo a NCEPA review.
- Upland development associated with marinas must comply with coastal shoreline rules, which require that structures with non-water-dependent uses be located at least 30 feet from the water, unless the structures are located in a designated urban waterfront.

A “freestanding mooring” is any means to attach a ship, boat or other water craft to a stationary underwater device, mooring buoy, buoyed anchor, or piling not associated with an existing or proposed pier, dock, or boathouse. When more than one freestanding mooring is used in the same general vicinity, it is known as a “mooring field”. CAMA has regulations for the safe siting and operation of moorings and mooring fields at 15A NCAC 7H.0208 (b) (10) or 7H.2200.

Because of its waterfront location, there are a number of marinas and mooring sites in the Town of Atlantic Beach. Public and private marina and mooring field sites in or around Atlantic Beach are listed in Table 29 below. According to the NC Division of Shellfish Sanitation, there are approximately 1,019 marina slips in and near the Town.

Table 29: Town of Atlantic Beach  
Marina Sites

Name	# of Slips*
Spooners Creek Yacht Harbor	85
70 West Marina	8
Spooners Creek North	29
Miami Street Docks (formerly Daniels Marina)	35
Taylor Boat Works	15
Harbor Master Marina	31
Morehead City Docks/Geer Oil Docks	23
Dockside Marina	77
Leeward Harbor	33
Portside Marina	19
Russell Yachts	6
Radio Island Yacht and Boating Club	43
Radio Island Marina	32
Island Marina	88
Morehead Sports Marina	20
Crows Nest Marina**	51
Fort Macon Marina**	15
Anchorage Marina**	125
8½ Marina**	118
Triple S Marina (Market and Marina Village)**	65
Seawater Marina	30
Causeway Marina**	12
Mud Bucket/Divocean Docks**	10
Capt. Stacy Fishing Center**	8
Sand Spur Marina	12
Bluffs Condominium Marina/Docks	29
TOTAL	1,019

\*Estimate of Slips is Approximate.

\*\*Marinas located within Atlantic Beach.

Source: Shannon Jenkins, NC Division of Shellfish Sanitation.

### **iii. Floating Homes or Structures**

A floating home or structure is any structure, not a boat, supported by means of floatation and designed to be used without a permanent foundation which is used for human habitation or commerce. A structure is considered a floating home or structure if it is inhabited or used for commercial purposes for more than 30 days in any one location. A boat may be deemed a floating structure if its means of propulsion has been removed or rendered inoperative and it contains at least 200 square feet of living area. There are several floating homes located on the west side of the Atlantic Beach Causeway. These homes pre-date the CAMA permitting process. These types of uses/structures conflict with Town policy and would not be permitted under current Town and CAMA regulations. These structures, if destroyed, cannot be rebuilt.

### **iv. Channel Maintenance**

The Atlantic Intracoastal Waterway (AIWW) passes through Bogue Sound north of the Town of Atlantic Beach. The AIWW is a series of federally (i.e., USACE) maintained navigation channels that extend from Norfolk, VA to Miami, FL. For much of its length, the system consists of naturally deep estuaries, rivers, and sounds. These natural stretches are connected by man-made cuts through land areas and shallows, many of which require periodic dredging to maintain their depths. The authorized project depth of the AIWW is 12 ft (at low tide) from Norfolk, VA to Ft. Pierce, FL (Source: Atlantic Intracoastal Waterway Association).

Two channels striking south and west, respectively, from the AIWW at unlighted can buoy #3 serve the Atlantic Beach area. The easternmost of these channels is subject to shoaling; as of mid-2004, it carried 6-foot depths at low water.

Recent cutbacks in the USACE budget for channel maintenance of the AIWW threaten the safe navigability of the AIWW and should be carefully monitored.

There are numerous navigable channels maintained within Atlantic Beach with access to the AIWW. At low tide, navigation into and out of Atlantic Beach must go through these marked channels. The waters of Bogue Sound are generally very shallow even at high tide. Therefore, maintenance of these marked channels is essential for recreational and commercial boaters.

A general CAMA permit can be obtained from the regional CAMA office for maintenance dredging of channels, canals, boat basins, and ditches in estuarine waters, public trust areas, and estuarine shorelines, as long as the maintenance doesn't remove more than 1,000 cubic yards of material.

#### **NORTH CAROLINA WATER QUALITY BASICS**

##### ***WHAT ARE SURFACE WATER CLASSIFICATIONS?***

Surface Water Classifications are designations applied to surface water bodies, such as streams, rivers and lakes, which define the best uses to be protected within these waters (for example swimming, fishing, drinking water supply) and carry with them an associated set of water quality standards to protect those uses. Surface water classifications are one tool that state and federal agencies use to manage and protect all streams, rivers, lakes, and other surface waters in North Carolina. Classifications and their associated protection rules may be designed to protect water quality, fish and wildlife, the free flowing nature of a stream or river, or other special characteristics.

##### ***HOW DO THEY AFFECT ME?***

Before you buy property, plan a new development project, construct a new road or undertake other land use activities, you should check with local, state, and federal agencies about the assigned surface water classification for the waterbody on your property. Many of the newer classifications, especially those designed to protect drinking water supplies and certain high quality waters, have protection rules which regulate some land or disturbance other human activities.

##### ***WHY DO THEY SOMETIMES OVERLAP?***

Many streams, rivers, and lakes may have several classifications applied to the same area. This is because surface waters are classified to protect different uses or special characteristics of the waterbody. For example, a stream or specific stream segment may be classified as Class WS-III Tr HQW by the NC Division of Water Quality (DWQ). This protects it as a drinking water supply (WS-III), as Trout Waters (Tr), and as High Quality Waters (HQW). The stream segments upstream or downstream may have different classifications based on other water uses or stream characteristics.

##### ***STREAM'S CLASSIFICATION?***

DWQ classifies all surface waters. A waterbody's classification may change at the request of a local government or citizen. DWQ reviews each request for a reclassification and conducts an assessment of the waterbody to determine the appropriateness of the reclassification. DWQ also conducts periodic waterbody assessments which may result in a recommendation to reclassify the waterbody. In order for a waterbody to be reclassified it must proceed through the rule-making process.

#### **v. Marine Resources (Water Quality)**

In North Carolina, the water quality of each stream mile of water is evaluated and rated by the NC Division of Water Quality (DWQ) (see adjacent text box). DWQ categorizes Bogue Sound north of Atlantic Beach (DWQ Stream Index # 20-36-(8.5)) as "HQW" or "high quality water". HQW is a supplemental classification intended to protect waters with quality higher than state water quality standards. This is because the waters of Bogue Sound north of Atlantic Beach are also rated "SA" which means that the Sound has salty or brackish waters of excellent quality that contain active shellfish beds and other commercial fishing. "SA" waters are also suitable for all recreational uses, such as boating or swimming.

While all waters of Bogue Sound north of Atlantic Beach are designated SA, not all waters are currently supporting commercial shellfishing use. There are four areas within Atlantic Beach that are identified as prohibited shellfish areas: the Hoop Pole Creek area, the McClamrock Slough area, the Fish-N-Lake area (around Atlantic Beach Causeway and Old Causeway Road), and the Bogue Sound/Atlantic Beach area east of the Causeway.

Because of the HQW and SA designations, several development restrictions exist, as follows:

- 1) Stormwater best management practices and lower density uses are required under CAMA for projects that may affect Bogue Sound (approximately 1 dwelling unit per acre unless specific stormwater controls allow higher density as approved by CAMA).
- 2) No domestic or industrial wastewater discharges are permitted into these waters.

The local CAMA permitting official should be consulted for specific requirements, as they may vary based on the specific development proposal.

The Atlantic Ocean south of Atlantic Beach (Stream Index # 99-(4)) is also rated by DWQ, and has been designated “SB” for water quality. This means that salt surface waters exist and are used for, and suitable for, recreation, including frequent or organized swimming. More limited stormwater controls are required under CAMA than the stormwater controls required under SA/HQW and there are no categorical restrictions on wastewater discharges.

**vi. Primary Nursery Areas, Anadromous Fish Spawning Areas, Submerged Aquatic Vegetation**

“Anadromous” fish are those that migrate up rivers (or into estuaries) from the sea to breed in fresh water. The North Carolina Marine Fisheries Commission (MFC) defines anadromous fish spawning areas as those where evidence of spawning of anadromous fish has been documented by direct observation of spawning, capture of running ripe females, or capture of eggs or early larvae as established under NCAC 15A 31.0101 (20)C.

Anadromous fish nursery areas are those areas in the riverine and estuarine systems used by juvenile anadromous fish as established at NCAC 15A 31.0101 (20)D.

The primary fish nursery areas and anadromous fish spawning areas near the Town of Atlantic Beach are depicted on Map 11. The two primary nursing areas near the Town are across Bogue Sound within Broad Creek and Gales Creek. The only nearby spawning areas are within the White Oak River, Pettiford Creek, and the Newport River.

Under provisions of the North Carolina Fisheries Reform Act of 1997, the North Carolina Marine Fisheries Commission disallowed trawling in approximately 200,000 acres of submerged areas designated as Submerged Aquatic Vegetation (SAV). These vast grassbeds provide protection and also serve as nursery areas for fish, scallops, crabs, and shrimp.

None of this restricted SAV is within close proximity to Atlantic Beach.

## **2. Environmental Composite Map**

In 2002, the NC Coastal Resources Commission adopted revisions to the land use planning guidelines regulating CAMA plans [15A NCAC 7B]. One of the primary modifications to these guidelines was in the area of land suitability analysis. Essentially stated, the new guidelines ask local governments to do more analysis of the planning area's supply of land that is suited for development. This analysis should place more emphasis on how local governments address natural system constraints in land use planning.

This new requirement was borne of a recognition of the fact that all land use development is heavily influenced by attractive and repellent forces caused by the natural and built environments. For example, the presence of a public sewer line near a particular parcel of land will, all other things being equal, attract the dense development allowed by a sewer system. On the other hand, the presence of a wastewater treatment plant will discourage most types of development in immediately adjacent areas.

Section V(E) of this plan will present a land suitability analysis (LSA) based on a number of factors, including compatibility with existing land uses and development patterns, existing land use policies, and the availability of community facilities, as well as natural system constraints.

MAP 11 - WATER QUALITY/PRIMARY NURSERY AREAS

But first, pursuant to CAMA regulatory requirements, we have developed an Environmental Composite Map for the Town of Atlantic Beach that will be used in conjunction with the LSA to provide a guide to the Town for the most appropriate use of land. The Environmental Composite Map was popularized by Scottish landscape architect and urban planner Ian McHarg following his 1969 classic work, *Design with Nature*. McHarg argued that the natural landscape - its constraints and its positive features - should be the most significant factor considered when planning for and siting future land use development. In order to do this, McHarg posited, multi-layered maps must be developed that depicted the various natural features of land masses. Advances in Geographic Information System (GIS) technology in the 1990s and 2000s have made using McHarg's approach more feasible and precise.

The Environmental Composite Map (Map 12) breaks down land masses within the Town into three different categories based on natural features and environmental conditions. The categories utilized are as follows:

**Class I** - Land that contains only minimal hazards and limitations that can be addressed by commonly accepted land planning and development practices. Class I land will generally support the more intensive types of land uses and development.

**Class II** - Land that has hazards and limitations for development that can be addressed by restrictions on land uses, special site planning, or the provision of public services, such as water and sewer. Land in this class will generally support only the less intensive uses, such as low density residential, without significant investment in services.

**Class III** - Land that has serious hazards and limitations. Land in this class will generally support very low intensity uses, such as conservation and open space.

An overlay analysis was performed, breaking the Town into one-acre cells utilizing only map layers determined to be environmental factors. The layers used, and their assigned classes, are outlined in Table 30.

MAP 12 - ENVIRONMENTAL COMPOSITE MAP

Table 30: Town of Atlantic Beach  
Environmental Composite Map Layers

Layer	Class I	Class II	Class III
Coastal Wetlands			✓
Exceptional or Substantial Non-Coastal Wetlands			✓
Beneficial Non-Coastal Wetlands		✓	
Estuarine Waters			✓
Soils with Slight or Moderate Septic Limitations	✓		
Soils with Severe Septic Limitations			✓
Flood Zones		✓	
Storm Surge Areas		✓	
HQW/ORW Watersheds		✓	
Water Supply Watersheds		✓	
Significant Natural Heritage Areas		✓	
Protected Lands			✓

For a given cell, the computed value of the cell will be determined by the highest class theme that contains the cell. For example, if a cell is in a coastal wetland (Class III) and in a storm surge area (Class II) and intersects a soil with a slight or moderate septic limitation (Class I), the cell value will be Class III. In other words, if a cell does not meet the criteria for Class III, but qualifies as Class II, it has Class II for a value. If a cell does not qualify for either Class III or Class II, then it is Class I by default. This order enables the modeler to leave out themes that are not associated with Classes II or III to simplify the model (yielding the same results).

Table 31 provides a summary of the land use acreages by class for the Town.

Table 31: Town of Atlantic Beach  
Land Use Acreage by Class

Environmental Composite	Acres	% from Total
Class 1	256.4	19.3%
Class 2	621.6	46.9%
Class 3	447.9	33.8%
Total	1,325.9*	100.0%

\*Please note that road rights-of-way and water are excluded from consideration.  
Source: Holland Consulting Planners, Inc.

As Table 31 indicates, the majority (almost 68%) of the land area in the Town is located in either the most suitable or moderately suitable classifications.

Although the type of analysis presented in this section should serve as a valuable tool in determining the most appropriate use of land in the Town of Atlantic Beach, it has significant limitations that should be acknowledged, as follows:

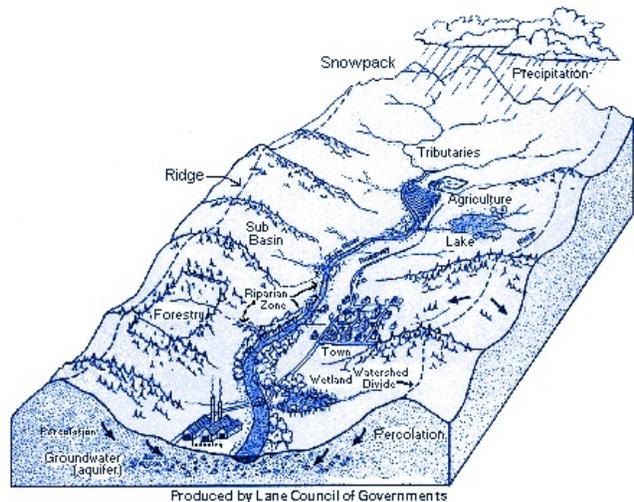
- The environmental composite map only allows land areas to be analyzed on one-acre blocks. This level of aggregation is too large to effectively assess each developable site within the Town for environmental conditions. For example, within the Town of Atlantic Beach, a 10,000 square foot parcel (approximately 1/4 acre) can be developed for four (4) residential units.
- The Environmental Composite Map, as the name suggests, only analyzes environmental factors when considering the appropriateness of land development. Environmental development constraints, while significant to consider, should always be considered in conjunction with the other forces that attract or repel development, such as the availability of community facilities and consumer demand for different types of land development. The LSA provided in Section V(E) of this plan provides this more comprehensive analysis of land suitability for development.

### 3. Water Quality

Water quality in and near the Town of Atlantic Beach is considered at many points in this Plan. However, because of the significant relationship between land use and water quality, a section focusing specifically on local and regional water quality is included here, prior to detailed discussions of existing and future land use. This Plan will primarily analyze water quality on the watershed and subbasin level.

A watershed is the area of land where all of the water that is under it or drains off of it goes into the same place. Geographer John Wesley Powell put it best when he said that a watershed is:

"that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community." (Source: U.S. Environmental Protection Agency).



**Pictorial Representation of a Watershed (Source: Lane County, Oregon, Council of Governments)**

The Town of Atlantic Beach is located wholly in the White Oak River watershed and (significantly) at the outfall of the watershed (see Map 13).

Subbasins are geographic areas that represent part of a watershed, made up of a combination of drainage areas and/or distinct hydroponic features, all draining to the primary watershed. The Town of Atlantic Beach is located in the Newport River subbasin, also known by its USGS designation, subbasin number 03-05-03 (see Map 13).

In North Carolina, water quality is assessed primarily at the watershed or river basin (i.e., “basinwide”) level, due to the interconnectedness of watersheds described above. Basinwide water quality plans are prepared by the North Carolina Division of Water Quality (DWQ) for each of the seventeen major river basins in the State and updated at five-year intervals. The basinwide plan for the White Oak River Basin was developed by DWQ in February, 1997 and updated in September, 2001. This document will be referred to as “BWP” in this Plan.

The goals of the BWP are as follows:

- Identify water quality problems and restore full use to impaired waters;
- Identify and protect high value resource waters;
- Protect unimpaired waters while allowing for reasonable economic growth;
- Develop appropriate management strategies to protect and restore water quality;
- Assure equitable distribution of waste assimilative capacity for dischargers; and
- Improve public awareness and involvement in the management of the state’s surface waters.

The North Carolina Wetlands Restoration Program (NCWRP), in conjunction with the BWP, developed a Basinwide Wetlands and Riparian Restoration Plan (BWRRP) in 1998 to identify the need and opportunity for stream, riparian and buffer restoration in the White Oak Basin where water quality has been or likely could be degraded. This document will be referenced as the NCWRP.

*a. White Oak River Basin Watershed*

The White Oak River Basin is a 1,264-square mile watershed area that drains four separate river systems and their tributaries: the New River, the White Oak River, the Newport River, and the North River. It also drains the entirety of Core, Back, and Bogue Sounds, the latter being the location of Atlantic Beach (Source: NCWRP, page 3).

MAP 13 - RIVER BASINS/SUBBASINS

DWQ has developed a draft third edition of its 5-year basin plan for the White Oak River Basin. The draft was available in January 2007. Some of the information provided here has been obtained from DWQ's draft 2006 basin plan.

The basin contains much of Onslow and Carteret Counties and small portions of Craven and Jones Counties, and includes a total of 16 municipalities, including the larger and fast-growing City of Jacksonville, as well as the Towns of Beaufort, Morehead City, Emerald Isle, and Newport.

It also contains five subbasins, 417 miles of streams, over 130,000 acres of estuarine waters and 91 miles of Atlantic Coastline.

*b. Subbasin 03-05-03*

Subbasin 03-05-03 is comprised of central Carteret County from the Croatan National Forest to Beaufort and Beaufort Inlet and contains the Town of Atlantic Beach, all of Bogue Banks, and Cape Carteret, Newport, and Morehead City. Table 32 provides an overview of the population and land use present in the subbasin.

Table 32: Subbasin 03-05-03 Area, Population, and Land Cover	
<u>Land and Water Area (square miles)</u>	<u>Land Cover (%)</u>
Total area: 228	Forest/Wetland: 59
Land area: 168	Surface Water: 26
Water area: 60	Urban: 4
	Cultivated Crops: 6.5
	Pasture: 4
<u>Population Statistics</u>	
2000 Est. Population: 14,846 persons	
Pop. Density: 65 persons per sq. mi.	
<u>Monitored Water Body Statistics</u>	
<b>Aquatic Life:</b>	
Total: 15.1 mi./5,788.1 ac.	<b>Recreation:</b>
Total Supported: 5,847.9 mi.	Total: 11.2 mi./17,912.9 ac.
Total Impaired: 140.2 ac.	Total Supported: 11.2 mi./17,764.7 ac
Total Not Rated: 15.1 mi.	Total Impaired: 148.1 ac.
<b>Shellfish Harvesting:</b>	
Total: 5.2 mi./23,867.4 ac.	
Total Supported: 19,357.1 ac.	
Total Impaired: 5.2 mi./14,410.3 ac.	

As Table 32 indicates, the subbasin is heavily forested and only contains one developed area north of Morehead City - the Town of Newport. Although there are indications of nutrient inputs in the upper Newport River, as well as elevated levels of fecal coliform bacteria, the water quality in the subbasin is

generally good, with 11,236 of 34,146 acres of estuarine waters being classified by DWQ as Outstanding Resource Waters (ORW).

There are eight (8) facilities permitted to discharge wastewater into the subbasin under the National Pollutant Discharge Elimination System (NPDES) with a total permitted flow of approximately 4.75 million gallons per day (MGD).

*c. Registered Animal Operations in the White Oak River Basin*

The presence of animal operations is significant to water quality, since these operations typically produce large amounts of waste that can negatively affect water quality. This is particularly true in subbasin 03-05-03 where fecal coliform contamination has been a significant concern, due to the impact on shellfishing and recreation described above.

According to the draft BWP, there are two swine operations with a total of 951 animals within Subbasin 03-05-03. These operations are located near Newport on the mainland of Carteret County. While the number of operations remained constant between 1998 and 2004, the number of animals decreased significantly from 3,375 animals in 1998 to the 951 cited above.

*d. Population, Population Densities, and Growth Trends*

According to the 2006 draft BWP, the 2000 population of the basin was estimated to be 311,680, or approximately 3.9% of the State's 2000 population. The majority of this population resides in Onslow County. The current density of the basin is 131 persons per square mile.

For subbasin 03-05-03, the total estimated 2000 population was 14,846, an increase of approximately 30.2% over the estimated 1990 population of 11,404. This number reflects only the permanent population and does not reflect the huge seasonal populations in Morehead City and the towns along Bogue Banks, including Atlantic Beach.

This population increase is reflected in the increase in urban land cover in the White Oak River Basin watershed from approximately 52 acres in 1982 (4% of land area) to 95 acres in 1997 (8% of land area) - an 81% increase. The vast majority of this increase comes from the mainland, since Atlantic Beach is very nearly built out to its maximum urbanized land cover, although densities could increase in the future. During this same period, forested lands shrunk by 9.7% from 379 acres to 342 acres.

## C. ANALYSIS OF LAND USE AND DEVELOPMENT

### 1. Introduction

The Division of Coastal Management Land Use Plan Guidelines (15A NCAC 7B.0207) require that existing land uses and water uses be mapped. The land and water use maps in conjunction with the land suitability map, page 149 should be utilized as working documents and serve as a basis for the development of the future land use map(s). Specifically, this plan should address the following:

- Significant land use compatibility problems;
- Significant water use compatibility problems including those identified in any water supply plan appendix and those identified in the applicable Division of Environmental Management basinwide plan;
- Significant problems that have resulted from unplanned development and that have implications for future land use, water use, or water quality;
- An identification of areas experiencing or likely to experience changes in predominant land uses;
- Significant water quality conditions and the connection between land use and water quality.

### 2. Land Use in Relation to Water Quality

This section will serve to take a closer look at how land use in the Town of Atlantic Beach relates to water quality. This section has been compiled with information provided by the 2006 draft BWP.

It should be noted that the results of the monitoring efforts are not intended to provide precise conclusions about pollutant budgets for specific watersheds. Since the assessment methodology is geared toward general conclusions, it is important not to manipulate the data to support policy decisions beyond the accuracy of the data.

Two primary methods of water quality testing were performed in the Town of Atlantic Beach. The details of this methodology are described below so that the information on the results of this testing can be better understood. The methods utilized were Benthic Macroinvertebrate Monitoring (BMM) and the Ambient Monitoring System (AMS). DWQ also observes water bodies for the existence of algal blooms, which are an indication of poor water quality. Locations of BMM and AMS monitoring stations are provided on Map 11 (page 81).

Benthic macroinvertebrates are organisms, primarily aquatic insect larvae, which live in and on the bottoms of rivers and streams. The use of macroinvertebrate data has proven to be a reliable water quality monitoring tool because most macroinvertebrates are immobile and sensitive to subtle changes in water quality. Benthic communities also respond to, and show the effects of, a wide array of potential pollutant mixtures.

The Ambient Monitoring System (AMS) is a network of stream, lake, and estuarine (saltwater) water quality monitoring stations (about 420 statewide) strategically located for the collection of physical and chemical water quality data (or parameters). Water quality parameters are arranged by freshwater or saltwater water body classification and corresponding water quality standards.

Prolific growths of phytoplankton, often due to high concentrations of nutrients, sometimes result in “blooms” in which one or more species of alga may discolor the water or form visible mats on the water’s surface. Blooms may be unsightly and deleterious to water quality causing fish kills, anoxia, and taste and odor problems.

The results of monitoring at the AMS and BMM stations depicted on Map 11, together with the water quality monitoring efforts at and near shellfish grounds by the North Carolina Division of Environmental Health/Shellfish Sanitation office (DEH SS) indicate that relatively dense land use with little buffering of the Sound, poorly controlled stormwater discharges, and the presence of many poorly functioning septic systems is having a negative effect on water quality.

As noted in Section (V)(B)(1)(h)(v) above, the waters of Bogue Sound north of Atlantic Beach are classified as “SA” or suitable for commercial shellfish harvesting - a categorization limited to only the highest quality estuarine waters in the State. Unfortunately, there are four areas in Atlantic Beach that are closed to shellfish harvesting due to fecal coliform bacteria contamination, a component of human and animal fecal waste matter.

All waters are impaired on an evaluated basis in the fish consumption category because of elevated mercury levels. No freshwater was impaired in this subbasin, except for fish consumption.

The 2001 BWP made the following recommendations regarding water quality in subbasin 03-05-03 that are applicable to the Town of Atlantic Beach:

- **Bogue Sound Reclassifications:** The bacteriological water quality of Bogue Sound north of the Town continues to decline. Therefore, DWQ has indicated that they may recommend an expansion of the areas of Bogue Sound closed to shellfishing, depending on the frequency of temporary closures caused by spikes in recorded fecal coliform counts.

- Stormwater Pumping: DWQ and the Division of Environmental Health / Shellfish Sanitation office (DEH SS) are “monitoring” the Town’s discharge of pumped stormwater onto beaches and estuarine areas and this discharge’s impact on shellfish harvesting waters. This stormwater pumping can negatively impact shellfish harvesting and fish spawning areas. The discharge of pumped stormwater onto beaches and recreational waters results in a public advisory being released and a sign posted at the discharge site that discourages swimming.

The BWP also makes the following recommendations regarding land use planning to improve water quality in the White Oak River basin:

- Minimize number and width of residential streets
- Minimize size of parking areas
- Place sidewalks on only one side of residential streets
- Minimize culvert pipe and hardened stormwater conveyances
- Vegetate road right-of-ways to increase infiltration
- Plant and protect natural buffer zones along streams and tributaries

Other recommended items include:

- Controlling stormwater runoff
- Protecting wetland areas through land use plans

The 2006 draft BWP provided the following local initiatives for the subbasin:

- Land acquisition projects in this subbasin through North Carolina Coastal Federation (NCCF) total 118 acres and include Hoop Pole Creek in Atlantic Beach, Emerald Isle Woods in Emerald Isle, and Sugarloaf Island in Morehead City. NCCF is investigating the possibility of the acquisition of conservation easements on about 7,000 acres of land north of the Newport River to protect water quality in the Newport and preserve forested habitat. This is a high priority in the oyster plan.
- NCCF has partnered on four stormwater projects in this basin, located at Emerald Isle Woods (2001), Morehead City Visitor’s Center (2004), Carteret Community College (2006), and Hoop Pole Creek (2007).
- Living Shoreline Projects provide shoreline stabilization while also restoring wetland habitat area and providing a stormwater buffer. Living shorelines projects in this subbasin are located at the NC Maritime Museum in Beaufort (2001), Duke University Marine Lab in Beaufort (2002), NC

Aquarium at Pine Knoll Shores (2002), and four private locations in Morehead City, Beaufort, Pine Knoll Shores, and Salter Path.

- Oyster habitat area has been restored through NCCF at Hoop Pole Creek in Atlantic Beach. Four distinct oyster reef areas have been restored through different projects from 1998-2006. These projects also included educational opportunities for local students and research opportunities for local universities.
- A shoreline stabilization and habitat restoration project was completed at Carteret Community College in 2006. This project included sections of living shoreline, offshore breakwaters, oyster reef habitat, and a stormwater bmp.
- This subbasin is targeted for conservation by Onslow Bight Conservation Forum.

It should be noted that the NC Division of Water Quality determined that its current coastal stormwater rules have not been adequately effective towards addressing water quality impacts to public trust waters. Additionally, DWQ's review of scientific studies has resulted in a determination that local governments simply deferring to state and federal rules to address water quality issues still results in impaired local water quality based on the following conclusions:

- Areas with impervious surfaces of 10% or greater can be linked to local stream degradation.
- Biological diversity has been shown to drop when impervious surface areas increase beyond 10-15%.
- Stream stability is affected when impervious surfaces approach 10% in an area.
- Estuaries generally degrade with impervious surfaces of greater than 10%.
- Sensitive fish species loss increase after about 12% impervious surface.

### **3. Existing Land Use**

#### *a. Introduction*

As was stated in the Town's 1993 CAMA Land Use Plan update, the Town of Atlantic Beach was originally chartered in 1937 and from that time until approximately 1960, the Town developed a small commercial core known as "The Circle" (West Drive/Central Drive/East Drive). Most development in the Town was commercial development near The Circle catering to the traffic from day visitors

to the Town. Very little residential development existed and the vast majority of land in the current corporate limits was vacant.

Between approximately 1960 and 2000, numerous land use changes occurred that substantially defined the current form of the Town today, as follows:

- Substantial Bogue Sound water and wetland areas were bulkheaded and filled for development.
- NC Highway 58 (Ft. Macon Road) leading to the mainland bridge developed with continuous strip commercialization.
- "The Circle," was primarily developed with commercial development. During the late 1960s, significant deterioration began and continued through the 1990s. No significant redevelopment occurred.
- The town has developed with small overcrowded lots that do not have the capacity/size to adequately accommodate extensive septic tank usage.
- Development spread east and west of the original town core, leaving very little vacant land for development.

In order to characterize current (existing) land use and to help characterize land development trends since the late 1990s, existing land uses in the Town of Atlantic Beach were mapped by conducting a windshield survey of the Town. Windshield surveys were conducted by Holland Consulting Planners, Inc. (HCP), in October, 2004 and January, 2005. The results of this survey were transferred to a parcel base map provided to HCP by the Carteret County Tax Office. The referenced windshield survey was supplemented by an analysis of aerial photography and data by Town Planning Director Lee Smith performed in February, 2005, in conjunction with HCP.

The following categories of land use were used during this survey:

- Single-Family Residential includes all detached single-family homes on individual lots.
- Multi-Family residential structures are those with two or more dwelling units, including apartments, townhouses, and condominiums.

- The Mobile Home category includes single mobile homes on individual lots. This category does NOT include modular homes which are built to the NC State Building Code and are considered Single-Family Residential units.
- The Mobile Home Park category includes mobile homes located on a site owned by one individual where lots are rented. Recreational vehicle/travel trailer parks are also included here.
- The Commercial use category consists of retail sales and service establishment, including tourist-oriented recreational businesses. Motels are also included as commercial uses.
- Office/Institutional uses include (non-retail) offices with related areas (including governmental offices), and churches.
- Utilities includes major wastewater and water facilities, privately- and publicly-owned.
- Recreation includes areas exclusively used for recreation that are accessible to the public.
- Vacant land areas are those which currently are not in use.

Table 33 presents a summary of existing land uses and Map 14 depicts these land uses graphically.

Table 33: Town of Atlantic Beach  
Existing Land Use, February, 2005

Land Use Category	Parcels	Acres	% of Total Acres
Commercial	176	129.315	7.83%
Mobile Home	124	21.760	1.32%
Mobile Home Park	118	88.835	5.38%
Multi-Family	1,974	180.188	10.92%
Office and Institutional	8	7.128	0.43%
Recreation	5	1.315	0.08%
Single-Family Residential	1,589	351.800	21.31%
Utilities	10	79.286	4.81%
Vacant	426	466.321	28.25%
Right-of-way	N/A	178.322	10.81%
Water	N/A	146.310	8.86%
<b>TOTAL</b>	<b>4,430</b>	<b>1,650.580</b>	<b>100.00%</b>

Source: Holland Consulting Planners, Inc., and the Town of Atlantic Beach Planning Department.

MAP 14 - EXISTING LAND USE

The most significant land use changes since the 1993 CAMA Land Use Plan Update can be summarized as follows:

- All areas west of Cedar Lane to the Pine Knoll Shores corporate limits have been annexed into the Town of Atlantic Beach. All areas in the eastern part of Town to the Fort Macon State Park boundary have also been annexed. These annexations increased the land area of the Town (excluding right-of-way) by approximately 275 acres.
- The stock of vacant, developable land has continued its decade long decrease. Although 35.17% of land in the Town is considered “vacant”, the vast majority of this land is non-developable due to Federal, State, or Town development restrictions. Holland Consulting Planners estimates that only approximately 50 acres of land in Town is vacant and readily developable under current development regulations.
- Despite the lack of public sewerage, land values throughout the Town have increased dramatically in the last 10 years, especially in the last 2 to 3 years. This has had the effect of substantially increasing the value of new development and limiting the development of housing affordable to low and moderate income homeowners or renters.

For example, the tax valuation of the 28 single-family residences (including mobile homes) permitted in the year 2000 was approximately \$2.75 million, or \$98,288 per unit. The tax valuation of the 35 single-family residences permitted in the year 2004 was approximately \$7.40 million, or \$211,428 per unit.

- Although substantial redevelopment has not occurred as of this writing (February, 2005), the large increase in land values noted above indicates that the Town is poised to experience a significant increase in such development. This is particularly true near “The Circle” area, where a significant redevelopment project will be underway by mid-2005 (see discussion below).

Significant developments for each land use are presented below.

*b. Residential Land Use*

Atlantic Beach provides distinct residential variety. The residential areas range from moderate density, single-family, predominantly year-round residential areas to high density seasonal mobile home parks. The various types of residential areas are summarized as follows:

- Moderate density predominantly year-round residential areas: The two areas most notably fitting this description are the residential areas extending from NC 58 north to Shoreline, Forest Knoll, and Hoop Pole Creek Drives, and the residential areas constructed on fill north of Davis Boulevard. Overall, only about 20.8% of all housing units in the Town are occupied year-round.
- Moderate density seasonal single family residential development constructed on fill areas extending into Bogue Sound: These areas have been primarily developed within the last 30 years. However, the development of new units adjacent to Bogue Sounds has almost come to a halt due to Federal and State development regulations in the area.
- Moderate to high density, high value oceanfront properties: This development is scattered along the town's ocean shoreline, but is primarily concentrated along Ocean Ridge Drive, East and West Boardwalk, and Glenn Street.
- "Old Atlantic Beach" residential areas are generally situated between NC 58, West Fort Macon Road/oceanfront properties/Cedar Lane area/Wilson Avenue area. The dwelling units within these area vary greatly in size and condition. Many units are beginning to show age and signs of deterioration. The area has much of the character of old North Carolina Outer Banks beach communities. Most units within this area were constructed prior to 1960, with many being built in the 1940s and 1950s.
- Medium to high density multi-family condominium units are scattered throughout Atlantic Beach. Most of these units have been constructed within the last 25 years, with approximately 50% having been built since 1980. The architectural styles vary widely, resulting in much visual inconsistency in the town's landscape. The greatest concentrations of this development are located along NC 58 between the Lee Drive area and the NC/Ocean Ridge Drive intersection, and along the south side (ocean side) of NC 58 east of Commerce Way.

- High density mobile home parks comprise almost 7% of the town's total land area. The parks serve mainly seasonal owners or renters. The majority of the mobile homes are over ten years old and were not built to withstand hurricane force winds. If the town succeeds in installing a central sewer system, it is expected that increased land values may cause many of the mobile home parks to become candidates for redevelopment. The mobile home parks are located in the following areas and are delineated on the existing land use map: Mobile Drive, NC 58 on Hoop Pole Creek opposite Dunescrape Villas, Davis Boulevard, North Shore Drive I and II, Oceanna, and Triple Ess Marina. In total, there are currently 20 operating mobile home parks in the Town, with approximately 1,000 mobile home units.

- Mobile homes on single family lots are scattered throughout many areas of Atlantic Beach. However, there are concentrations of mobile homes situated on individual lots in the following areas: Money Island Drive Subdivision, Money Island Beach Subdivision, Coastal Mobile Estates, Beach Mobile Home Court, Knollwood Banks, and the Triple-Ess Shores Subdivision. These areas are characterized by small lots (generally 6,000 square feet or less) resulting in high density. Congestion is further generated in the Money Island Beach Subdivision because the streets were constructed so as to not tie in with adjacent town streets. Therefore, access in and out of the development is primarily limited to one street. There are approximately 225 to 250 mobile homes on individual lots in the Town.

- In 2005, the approximate average residential densities were:

Single-Family	7 dwelling units per acre
Multi-Family	7 dwelling units per acre
Mobile Home Parks	9 dwelling units per acre
All Residential	8.5 dwelling units per acre

These densities are not expected to increase. If central sewer service becomes available, it is expected that some mobile home parks may be converted to other residential uses which should result in an overall decrease in residential density. It is unusual to have the same residential density for both single and multi-family development. This is primarily the result of small, high density single-family lots in the older sections of town.

c. *Commercial Land Use*

Little change occurred in the town's commercial land use since the Town's 1993 CAMA Land Use Plan Update.

The commercialization along the Causeway and NC Highway 58 exhibits some of the less desirable aspects of strip commercialization, including almost continuous points of vehicle ingress and egress, no service roads, extensive signage, small commercial lot development, and traffic congestion resulting from both local traffic and vehicles traveling through the area to reach points west of Atlantic Beach. However, the Causeway area is one of the trademarks of the Atlantic Beach landscape. Some improvements including improved traffic control, decreased signage, service roads, parking, landscaping, and the removal of overhead wiring would significantly improve the area.

Also significant is that the design of much of this strip commercialization, described above, leads to conflicts with single-family and lower-density multi-family (2 to 4 units) development, particularly north of NC 58.

Atlantic Beach's oldest and most recognizable commercial area is "The Circle." This area is delineated on Map 15. Since the 1960s, the "Circle" has been the victim of deteriorating buildings, traffic congestion, and a proliferation of bars and alcoholic beverage control problems. In the late 1980s and early 1990s, the town began a vigorous effort to redevelop the Circle area. An aggressive program of acquiring buildings which were severely deteriorated and/or the location of establishments with ABC licenses was begun. In 1992, the town acquired control of 4.1 acres of land within "The Circle."

In 2004, the Town established the Circle Development District ("CDD", see Map 15). The CDD is designed to re-establish and preserve the area as the primary civic, retail, office, institutional, cultural and entertainment center for the community. It intends to achieve this by providing a development location and atmosphere where building improvements, streetscape, lighting, landscaping, parking, and public improvements preserve "The Circle" as the premier destination for residents and visitors of Atlantic Beach. Building design, parking, transportation, and improvements in the District will focus and be designed for the comfort and enjoyment of the pedestrian while still allowing for a well balanced flow of automobile traffic. Infill opportunities with higher density development respecting the historic fabric of the area are envisioned. Mixed-use development in the form of multi-family dwelling units on the upper floors of buildings with commercial or non-residential uses on lower floors is strongly encouraged. Higher densities of use are visualized being focused around the key, central area

commercial/institutional hub of “The Circle.” Densities and building height and mass should decrease gradually toward the edges of the development district to provide transition between the lower density neighborhoods and the more intense uses appropriate for a community center. General public parking facilities are recommended and encouraged in addition to the creation of single use private parking lots (Source: Town of Atlantic Beach, Ordinance Number 04-09-01).

Development is scheduled to proceed in mid-2005. The development of this mixed-use CDD, if successful, could spur further attempts at mixed-use development, where appropriate.

Since 1993, the town’s motel/hotel usage has changed very little. Old motels and hotels continue to be located along the Causeway and NC 58.

*d. Other Land Uses*

Almost 80 acres, or approximately 6% of the Town’s area, are devoted to public water utility (e.g., well and tank sites) or large package treatment plants for wastewater operated by individual multi-family developments (e.g., condo associations). About 75% of this total is taken up by the aforementioned package plants. In the event of community sewerage being installed in the Town, this land could be redeveloped over time to a higher use.

Approximately 20 acres is currently occupied by Town buildings/offices and Town-owned parking lots, much of which is located in desirable locations near “The Circle” District. A Town-owned parking lot near “The Circle” area is a prominent example of valuable Town-owned property, along with the current Town Hall on Kinston Street.

As the Town encourages growth and redevelopment in “The Circle” district, pressures may develop to sell or redevelop numerous Town-owned properties. While such sales or redevelopment may benefit “The Circle” district or other areas of the Town, the desire to encourage redevelopment must be weighed against the impact of such redevelopment on the quality and cost of providing governmental services.

Only 1.3 acres of land is designated as recreational, primarily regional beach access sites owned by the Town and only 7 acres, or approximately 0.5% of the total Town land area was office or institutional. This was primarily churches and Town offices. Some office uses can be found within the larger commercial developments (e.g., Coral Bay and Atlantic Station Shopping Centers), but these uses are considered commercial for the purpose of the Existing Land Use map.

MAP 15 - "THE CIRCLE"

e. *Vacant Land*

As noted above, approximately 466 acres of the Town, or 35.17% of the land in the Town is considered vacant. It should be noted, however, that the vast majority of this “vacant” land should be considered undevelopable. Based on the best estimates of Holland Consulting Planners, Inc., only approximately 50 acres of land in the Town (3.25% of all land) is currently developable under current Federal, State, and local development regulations. The reasons for this are primarily as follows:

- Some “vacant” land is permanently protected from development by deed restriction, such as the 35-acre Hoop Hole Creek site owned by the North Carolina Coastal Federation.
- The majority of the land depicted on Map 14 as “vacant” are areas that are undevelopable because of the fact that they are protected wetlands, many of which stay wet for large portions of the year. These are areas north of NC Highway 58 that abut Bogue Sound. Approximately 275 to 300 acres of the area depicted as vacant on the Town’s existing land use map would fall under this category.
- Approximately 50 acres of land are in private recreation areas (e.g., those associated with multi-family developments) and sideyards that are currently vacant and that could be developed, but that are highly unlikely to be developed in the five to seven year planning timeframe.

A more detailed discussion of development trends affecting vacant land will be provided in Section V(G) of this Plan.

D. ANALYSIS OF EXISTING COMMUNITY FACILITIES/SERVICES

1. **Transportation**

NC Highway 58 (East and West Fort Macon Road) and the Atlantic Beach Causeway (State Road 1182) are the town's only major thoroughfares. The town is connected to the mainland by the Atlantic Beach/Morehead City Bridge. These roadways are all owned and maintained by the North Carolina Department of Transportation (NCDOT).

The Causeway and Fort Macon Road are extremely congested during peak summer months. On Memorial Day, 2004, the NCDOT conducted a traffic count at the Sea Water Marina off the Atlantic Beach Causeway (NCDOT, *Bogue Banks Pedestrian and Bicycle Safety Review*, 2004). According to NCDOT, the design capacity of the road is 29,500 average daily traffic. NCDOT recorded 32,162 cars passing on Fort Macon Road at the Sea Water Marina on May 30, 2004.

Despite this fact, the NCDOT Transportation Improvement Plan for Carteret County (2004-2010) does not anticipate any NCDOT roadway improvements in the Town through the 2010 planning horizon. The only project anticipated is sidewalk installation along West Fort Macon Road from Ocean Ridge Drive to the corporate limits, to be completed in 2005 for a total cost of \$120,000.

Because of the seasonal nature of the Town’s population, traffic loads vary significantly between seasons. Map 16 depicts the average annual daily traffic counts (AADT) for major intersections in the Town for 2005, as provided by the NCDOT. Table 34 presents the volume of traffic (i.e., number of cars) at major thoroughfares in Town as recorded by the NCDOT on Memorial Day weekend (May 29-31) of 2004. Therefore, Table 34 should represent something close to “peak” or maximum traffic loads.

Table 34. Town of Atlantic Beach  
Motor Vehicle Counts, Memorial Day Weekend, 2004

<u>Location of Traffic Count</u>	<u>Number of Vehicles Passing Location on Peak Day of Memorial Day Weekend, 2004</u>
Coral Bay Club	17,303
Coral Bay Shopping Center	26,395
Durham Avenue	25,369
Raleigh Avenue	23,833
Beaufort Avenue/Center Drive	16,841
Bayview Boulevard	14,972
Oceanna Drive	15,346
8 ½ Marina and Condos	11,555
Henderson Boulevard	10,604
Sea Water Marina	32,162
Channel Marker Restaurant	31,635

Source: NCDOT, *Bogue Banks Pedestrian and Bicycle Safety Review*, 2004.

HCP is working with Aaron Everett 252/514-4716 and Tammy Raye 919/733-4705, both of NCDOT to determine whether or not a designated “Level of Service” exists for NCDOT roadways in the Town, and if so, what these are and what they are projected to be throughout the planning period.

The Streets Division of the town’s Public Works Department is primarily responsible for the maintenance of the Town’s 17.06 miles of streets. This maintenance includes paving, patching, storm drainage, and the installation or replacement of street signs. In 2004, the Town received Powell Bill funding in the amount of \$70,672. Many of the roads in the older residential sections are in need of repair and/or resurfacing.

MAP 16 - AADT

## 2. Health Care

Carteret General Hospital (CGH) located at 3500 Arendell Street in Morehead City, about 2 miles from the Town, is the primary source of emergency and critical care for citizens of Atlantic Beach. Some relevant information regarding CGH follows:

- Fifty-six active staff physicians, 45 consulting physicians and 12 visiting/courtesy physicians cover a comprehensive range of specialties.
- A Cancer Care Center provides medical oncology for patients who require chemotherapy and a full service radiation therapy center equipped with a state-of-the-art linear accelerator and simulator. The medical oncology clinic is provided through collaboration between the East Carolina University School of Medicine Oncology department and Carteret General Hospital.
- Specialty outpatient clinics are offered at the hospital for neurology and autologous blood transfusions. Sophisticated technologies provided include nuclear medicine, CT scanning, mobile lithotripsy, laser surgery, and laparoscopic surgery.
- The hospital has 117 beds with an average of 87 inpatients each day and performs over 410 surgeries each month. In addition, over 4,000 outpatient tests or treatments are provided each month.
- Approximately 23,000 patients are treated in the Emergency Department and over 570 babies are delivered annually in the Brady Birthing Center.
- The AllWell program, a collaboration between Carteret General Hospital and the Carteret County Health Department, provides successful wellness programs for area employers. This division offers numerous community and industrial health and education programs.
- The Taylor Extended Care Facility provides skilled nursing services for residents who require long-term care. The facility accommodates 104 residents on Nelson's Bay.
- Carteret Home Health and Hospice of Carteret County are divisions of Carteret General Hospital. These mergers have allowed outstanding continuity of care and assistance for patients as they move from hospital to home.

In the Town limits, there is only one doctor's office, an urgent care clinic called Med Center One that is privately-owned and treats minor emergencies and offers primary general medical care. The facility is located on Atlantic Beach Causeway and offers an in-house X-ray service and a dispensing pharmacy for patients of record. Med Center One provides services on a walk-in basis.

Numerous primary care physicians can be found in Morehead City, Beaufort, Emerald Isle and Pine Knoll Shores. There is one dental practice in the Town at 501 Atlantic Beach Causeway run by Dr. J.E. Cameron and staffed with three associated dentists, and there are numerous dentists available in Morehead City and Beaufort.

### **3. Law Enforcement**

The Atlantic Beach Police Department (ABPD) is a full service law enforcement agency responsible for the enforcement of all laws and the investigation of any crimes within the town limits of Atlantic Beach. The Department is composed of 18 full-sworn police officers, 6 civilian support staff members, and 10 part-time sworn officer positions that are used during the peak season. The Police Department is divided into three sections: Administration, Patrol, and Support Services. Emergency response is available through 9-1-1.

The Department has 19 patrol vehicles, one utility trailer with lights, cones and other emergency equipment, a Polaris All-Terrain Vehicle (ATV), and a 21-foot Marine Patrol vehicle, primarily used for monitoring the Sound.

According to Captain Reeme of the Atlantic Beach Police Department, the Department also sponsors the Town's Community Watch program, focused on neighborhood crime reduction through citizen involvement with the police, and the National Night Out program, focused on educating the public on crime reduction through exhibits and entertainment on one night each year in the fall. The Department, through the Community Watch program, also works with business owners to raise funds for rewards and recognition of community leaders in crime reduction efforts. Finally, the Department sponsors the Citizen's Police Academy program that helps train and educate citizens on police procedures.

The ABPD also relies on assistance from the Carteret County Sheriff's Department in cases where outside assistance is necessary.

#### **4. Fire/Emergency Medical Services (EMS)**

The Atlantic Beach Fire/EMS Department's mission is to "provide protection to life and property of the citizens of the Town of Atlantic Beach from adverse effects of fire, medical emergencies and dangerous conditions created by either man or nature."

The Career Staff consists of a Fire Chief, three Shift Captains, and nine additional shift personnel. Each shift consists of three personnel led by a Captain working 24 hours on and 48 hours off. This staff is supplemented by 15 volunteer firefighters. The Department maintains one ladder vehicle, one engine, two rescue vehicles, and a car for the Chief.

The Department also provides EMS and Rescue services and maintains two ambulances staffed with paramedics. Since 2002, the Department has expanded its rescue services to the community and has become one of the premiere fire departments in the region through its specialization in numerous rescue disciplines. According to Captain Mike Simpson, all Department personnel are qualified as "North Carolina Rescue Technicians," which is a certification that serves as a foundation of other rescue certifications and which means that all Department personnel are qualified in vehicle and machinery rescue and extrication as well as other basic rescue techniques. Additionally, the Department is certified in Surface Water (i.e., flood and swift water) Rescue and Ocean/Surf Rescue, one of only four fire departments in the State to earn this latter certification.

The Department was also certified by the North Carolina Fire and Rescue Commission at the Medium Rescue Level, which means that they have advanced training and equipment for all types of technical rescues. The Department is the only fire/rescue department in Carteret County to have obtained this level of certification. The Department also has staff certified in all manner of specialized rescue techniques, such as confined space rescue, rope rescue, and high angle rescue. In 2006, the Department plans to have a dive rescue team in place.

The Department maintains an automatic assistance agreement with the Town of Pine Knoll Shores, meaning the Department is dispatched to any significant fire in Pine Knoll Shores. The Pine Knoll Shores Fire Department provides reciprocal service. The Department also maintains a mutual aid agreement with the County that either party can utilize when local resources are insufficient for a given situation.

The Town's ISO Fire rating is 4, down from 5 in 1996 (on a scale of 1 to 10, with 1 being the best), due to the improvement and installation of fire hydrants at the west end of Town.

## **5. Administration**

Atlantic Beach operates under a Council-Manager form of government with a full-time Town Manager and five governmental departments: Administration and Finance (6 employees), Public Works (15 employees), Planning and Inspections (3 employees), Police (21 employees - 16 Sworn Officers and 5 Support Personnel\*), and Fire/EMS (13 employees). On land use planning matters, the Town Council is supported by a Planning Board and Board of Adjustment.

\*NOTE: Differential from Law Enforcement section is based on full-time equivalent positions.

## **6. Water Supply**

The Town of Atlantic Beach operates its own water supply system, drawn from groundwater of the Castle Hayne aquifer underlying the Town. The extent of the system is depicted on Map 17. The system is supplied by six deep wells, located at sites throughout the Town (see Map 17 - Existing Infrastructure/Community Facilities). Water storage is provided by two elevated and one below ground storage tanks which have a total storage capacity of 1,500,000 gallons.

The water supply is of good quality and the supply has been consistent. Treatment provides softened fluoridated water. Based on the Town's 2002 Local Water Supply Plan submitted to the North Carolina Division of Water Resources, the system can produce 1.74 million gallons in a 12-hour period. The system's water treatment capacity is 2,500 gallons per minute, or 2.5 million gallons per day.

In 2002, maximum daily use per day varied from a low of 482,000 gallons per day in February to 1,645,000 gallons per day in July, or approximately 65.8% of system capacity on the peak day of the year. Total water usage for 2002 was 239.3 million gallons, up only slightly from 1996 totals. Peak monthly usage of approximately 36.5 million gallons (July or August) has remained roughly constant for approximately 10 years, due to the fact that new water connections are increasingly rare due to near "build-out" under existing zoning and development demands. Table 35 provides average and maximum daily water usage by month for the year 2002.

Map 17 - Water System/Community Facilities

Table 35. Town of Atlantic Beach  
Average Daily and Maximum Day Water Usage by Month, 2002

Month	Average Daily Use (in MGD)	Maximum Day Use (in MGD)
January	0.373	0.571
February	0.378	0.482
March	0.450	0.842
April	0.595	0.843
May	0.782	1.510
June	1.023	1.624
July	1.181	1.645
August	0.959	1.313
September	0.673	1.071
October	0.599	0.999
November	0.490	0.681
December	0.344	0.500

Source: Town of Atlantic Beach, 2002 Local Water Supply Plan.

In addition to the available water capacity discussed above, water pressure is sufficient to provide for adequate fire protection.

## 7. Wastewater Disposal

The Town of Atlantic Beach does not have a central sewer system. Most residences and businesses rely on septic tank usage for sewage disposal. Because of the extremely high density of development, serious groundwater and estuarine water pollution has occurred as the result of septic tank failures. The Carteret County Health Department monitors and regulates the operation of all septic systems. An up to date list of septic failures is available through the Health Department. Both commercial and residential septic tanks in fill areas have had high failure rates.

The filled areas created by pumping dredge material over coastal wetlands account for approximately 50% of the town's land area. These septic tank failures pose a significant threat to adjacent estuarine waters. In addition to the fill areas, the older central portions of Atlantic Beach were developed with very high density and undersized septic systems with little or no room for repair or renovation.

The seriousness of the town's sewage disposal problem is summarized by the following excerpt from the Environmental Impact Statement, Town of Atlantic Beach Wastewater Treatment and Disposal.

"Septic tank systems located in low-lying areas with high water tables such as those areas immediately east and west of the Atlantic Beach Causeway in the center of Atlantic Beach represent a severe threat to water quality. Development

in these areas has been constructed along man-made "finger canals." These areas were once marsh areas that were dredged and filled by man in order to create prime waterfront property. The technique of excavating the finger canals and placing the spoil material on top of the adjacent marsh has resulted in creating an environment unsuitable for septic tank systems. The compressed layer of organic "muck" and high groundwater conditions typical of these type developments have led to serious water quality problems in adjacent waterways. An EPA study (Waste Source and Water Quality Studies - Surf City, NC and Vicinity) of similar developments documented that during periods of rainfall septic tank leachate arises out of the ground and runs overland to the adjacent waterways. Dissolved oxygen problems were documented in the same study from the combination of organic loading and poor "flushing" qualities of the finger canals. More importantly, coliform bacteria problems were documented to have resulted in the closure of numerous acres of adjacent shellfishing waters. The waters adjacent to residential developments in Atlantic Beach have been closed to shellfishing. The existing septic tanks adjacent to these waters are very likely contributors to the closures."

Approximately 50% of the Town's residences are provided sewage treatment by a privately-operated sewage treatment plant, or "package" plants. Almost all of these units were located in condominium projects. Although these systems tend to operate better and are more closely regulated than smaller septic tanks used by one or two families, many of these private systems have experienced failures. The failures have resulted in odor and raw sewage overflow problems, especially during periods where the ground has been saturated and the water table high. Table 36 provides a list of package plants in the Town.

Table 36. Town of Atlantic Beach  
Package Treatment Plants, 2005

Treatment Plant Location
Tar Landing Condominiums
Southwinds Condominiums
A Place at the Beach Condominiums
Seaspray Condominiums
Sands Villa Condominiums
8½ Marina Condominiums
Peppertree Resort
Sugar Loaf
Dunescape Villas
Island Beach & Racquet Club

Source: Town of Atlantic Beach Planning and Inspections Department.

In 2001, Infrastructure Management Group, Inc. (IMG), of Bethesda, Maryland, completed a privatization feasibility study for the development of a Town-wide sewerage (wastewater collection and treatment) system to be operated by a private vendor. This Plan looked at the economic and environmental feasibility of such a system and found it to be feasible on both accounts.

IMG completed a Design/Build/Own Action Plan for a Wastewater System that would have allowed them to assist the Town in taking proposals from private firms to design, build, and operate a Town-wide wastewater collection and treatment facility in the Town. The Town has opted not to address installation of a central sewer system in this manner. This will be discussed further in the Future Demands section of this plan.

## **8. Solid Waste Disposal**

Residential refuse collection and recycling service is provided by Waste Industries, a private contractor. Collection is provided once per week from November through March. Twice per week service is provided from April through October. Businesses are required to contract individually with private waste collectors. Condominium developments and mobile home parks have the option of utilizing bulk containers. Once per week pick-up service is provided year-round for glass, steel, aluminum, paper, and plastic recyclables. Participation in the recycling program is voluntary.

Beginning in 1994, a regional landfill at Tuscarora, west of New Bern in Craven County, operated cooperatively by Carteret, Craven, and Pamlico counties through the Coastal Regional Solid Waste Management Authority (CRSWMA) replaced the Carteret County landfill in Newport. Waste disposal costs increased considerably upon opening of the Tuscarora facility. The Town must pay CRSWMA \$34.00 a ton for waste disposal at the Tuscarora facility, and is \$13.50 a month for residential customers.

CRSWMA also operates a transfer station at the site of the old Carteret County landfill in Newport for household hazardous waste, such as paint, used oil, and auto batteries.

## **9. Schools**

Atlantic Beach is served by the Carteret County School System. Kindergarten through third grade students attend Morehead City Primary School. Grades 4 and 5 attend Morehead City Elementary School at Camp Glen and Grades 6 through 8 attend Morehead City Middle School. All three of these schools are located in Morehead City, roughly two miles from Atlantic Beach.

High school students (Grades 9 through 12) attend West Carteret High School, approximately five miles away in Morehead City. Table 37 provides detailed information on the schools serving Atlantic Beach.

Table 37. Carteret County Public Schools Serving the Town of Atlantic Beach, 2005

Facility	Enrollment	Staff/Teachers
Morehead City Primary School (K-3)	681	120
Morehead City Elementary School at Camp Glen (4-5)	361	45
Morehead City Middle School (6-8)	582	66
West Carteret High School (9-12)	1,198	134

Source: Carteret County Public School System.

Due to the construction of the new Morehead City Primary School in 1994, all above listed schools are well under capacity for the planning time frame (i.e., through 2010 to 2012).

Cape Lookout High School (Grades 9-12) in Morehead City and the Tiller School (Grades 1-6) in the Beaufort area are charter public schools and thus attract students from across Carteret County, including the Town of Atlantic Beach. Adult secondary education, including General Equivalency Degrees (GED) for adult students can be obtained from Carteret Community College.

According to the 2000 U.S. Census, there were approximately 140 children of school age (ages 5 to 18) in Atlantic Beach in the year 2000.

There are also a number of private schools in nearby communities, including Beaufort Christian Academy (Baptist, Beaufort), Carteret Academy (Non-Denominational Christian, Morehead City), St. Egbert Elementary (Roman Catholic, Morehead City), and Gramercy Christian School (Non-Denominational Christian, Newport).

Beyond the secondary school level, there are three community colleges located in reasonably close proximity to Atlantic Beach -- Carteret Community College in Morehead City, Coastal Carolina Community College in Jacksonville, and Craven Community College in New Bern.

## 10. Recreation

The Town does not own any non-shoreline related recreational sites. The Town owns and maintains three regional shoreline access sites available to Town residents; one at NC Highway 58 at New Bern Avenue which has 50 parking spaces, restrooms and

showers and two more at West Drive at Central Boulevard and at West Drive at Atlantic Boulevard. These latter facilities have ample parking (303 and 64 spaces respectively) and shower/bathroom facilities. The remaining 11 local public shoreline access sites are unimproved and lack dedicated parking facilities. A map of these sites is available from the DCM website at <http://www.nccoastalmanagement.net>.

Other recreational opportunities include one privately-owned fishing pier, numerous privately-owned boat ramps, tennis courts and swimming pools, and the Fort Macon State Park located east of Atlantic Beach. Atlantic Beach does not employ any recreation personnel, except for lifeguards during the summer season.

Many residents of the Town use recreational facilities in and near Morehead City, particularly Shevans Park (owned and operated by Carteret County), which is a 2-acre neighborhood park with tennis courts and a playground, Swinson Park (also owned by the County), a 34-acre regional park with adult and youth ballfields, tennis courts, basketball courts, picnic shelters, playgrounds and related facilities, and Rotary Park, a 15-acre park featuring soccer and basketball facilities owned by Morehead City.

A 1999 study conducted by the Town with the assistance of East Carolina University found that a large majority of Town citizens do not favor public spending on additional recreation facilities (refer to Appendix A of the Town of Atlantic Beach Public Access - Preliminary Recreation Assessment).

#### **11. Electric Service**

The majority of Atlantic Beach is provided electrical service by Progress Energy Carolinas (formerly Carolina Power and Light). A small area in the west end of Atlantic Beach is provided service by the Carteret-Craven EMC. The town has never experienced any significant power shortage problems or "brown-outs," except following major hurricanes/windstorms due to equipment damage.

#### **12. Telephone Service**

Local telephone service is provided by Embarq. The town has not experienced any significant problems with telephone service availability.

#### **13. Internet Service**

High-speed internet service is available through Time Warner Cable, Sprint, Inc., DSL service, or through satellite internet service provided by numerous providers, including Earthlink.

#### **14. Cellular Telephone / Paging Service**

Cellular telephone and paging services are available town-wide from a number of service providers with offices in Morehead City and/or Beaufort, including Alltel, Sprint, AT & T Wireless, Nextel, US Cellular, and SunCom.

#### **15. Cable Television**

Cable television service is provided by Time Warner Cable, with offices in Newport. Satellite television is available through DirectTV and other service providers.

#### **16. Stormwater Management/Drainage**

##### *a. Introduction*

Stormwater discharges are generated by run-off from land and impervious areas such as paved streets, parking lots, and building rooftops during rainfall and snow events. They often contain pollutants in quantities that can adversely affect water quality and create flooding problems. When roads, parking lots, sidewalks, homes, and offices replace the natural and permeable landscape, rainfall that would once soak into vegetated ground is now available for storm water runoff. As surfaces become more and more impermeable, water simply moves across them. These impermeable surfaces connect to form a stormwater super highway. One of the effects of this water super highway is that more and more stormwater reaches streams because there is less opportunity for it to infiltrate the ground. Peak flows also increase, transporting runoff from large areas rapidly. Velocities in streams increase causing more erosion potential, and lastly, base flow is lower during dry weather because of a lack of infiltration. Using a traditional analysis, such as the Natural Resource Conservation Service (NRCS) stormwater model, TR 55, or the United States Corps of Engineers' (USCE) many versions of HEC, it can be shown that peak flows alone can increase by as much as four times from pre-post development conditions. Flooding is the result of this urbanization.

##### *b. Erosion and Sedimentation*

Erosion and sedimentation have long been recognized as water quality concerns. The North Carolina legislature passed laws to curb sedimentation in 1973; however, sedimentation remains the number one pollutant in NC waters. In the 1990s, the focus of the Piedmont and Eastern NC watersheds turned towards excess nutrients in surface waters. The excess was due to extensive farming operations in the area. Fertilizers contain nutrients for plants to grow, but if excess fertilizer is inadvertently applied to pavement, these nutrients enter the waters during runoff periods causing harm to water quality. Even proper amounts of applied fertilizer can allow nutrients to enter streams in other ways, such as atmospheric deposition, wildlife and pet waste, and septic system malfunctions.

There are numerous ways to reduce pollutant loading. Proper application of fertilizer and proper maintenance of septic systems can reduce loading. Structural devices can also help curb this problem. These structural devices, known as Best Management Practices (BMPs), can be constructed to treat runoff, thereby reducing the amount of pollutant that enters the waterways. These BMPs include wet ponds, stormwater wetlands, infiltration trenches, wells, sand filters, bioretention rain gardens, rubble spreaders, riparian buffers, and reinforcing grassy swells.

*c. EPA Regulations*

The Environmental Protection Agency (EPA) has begun implementation of Phase II of the Stormwater Management Plan. These policies apply to municipalities with populations greater than 10,000 and/or with densities of 1,000 per square mile. For municipalities that meet these parameters, submittal of a stormwater management plan is required. Phase II regulations also apply to entities designated under the 1990 census as a Small MS4 (Small Municipal Separate Storm Sewer System). MS4's are defined as a publicly-owned conveyance or system of conveyances designed or used for collecting and conveying stormwater. MS4's are not combined with sewer and are not part of a publicly-owned treatment facility. Municipally-owned MS4's can include counties, towns, airports, federal properties, hospitals, schools, etc. Small community MS4's are regulated if they discharge into impaired or sensitive US waters. In addition, counties classified as a Tier 4 or Tier 5 county are regulated. At this time, the Town of Atlantic Beach is not required to meet the new EPA Phase II Stormwater Management Program regulations, but expects to be required to meet all Phase II requirements in the near future (i.e., 5 to 7 year planning period for this Plan).

The EPA has developed guidelines for implementing the Phase II Stormwater Management Program. The stormwater pollution problem has two main components: the increased volume and rate of runoff from impervious surfaces and the concentration of pollutants in the runoff. Both components are directly related to new developmental and urbanizing areas. Both components also cause changes in the hydrology and water quality that result in a variety of problems, such as habitat modification, increased flooding, decreased aquatic biological diversity, and increased sedimentation and erosion. Effective management of stormwater runoff offers a multitude of possible benefits. Benefits include protection of wetlands and aquatic eco-systems, improved quality of receding water bodies, conservation of water resources, protection of public health through flood control, and improved operation and hydraulic characteristics of streams receiving run-off; all of which can cause higher peak flow rates that increase frequency and duration of bank full and sub-bank full flows. Increased occurrences in downstream flooding can also be reduced by lowering base flood levels, such as with traditional flood control methods that rely on the detention of the peak flows. They are generally not targeted to the reduction of flooding and in many cases have exacerbated the problems

associated with changes in hydrology and hydraulics. The EPA recommends an approach that integrates control of stormwater peak flows and the protection of natural channels to sustain physical and chemical properties of aquatic life.

The EPA has outlined six steps for the development of BMP's for a stormwater management plan. The six steps are as follows:

- (1) Public Education and Outreach on Stormwater Impacts
- (2) Public Involvement and Participation
- (3) Elicit Discharge Detection and Elimination
- (4) Construction Site and Stormwater Runoff Control
- (5) Post-Construction Stormwater Management, and New Development or Redevelopment
- (6) Pollution Prevention and Good Housekeeping for Municipal Operations

*d. Construction Activities*

Stormwater runoff from construction activities can have a significant impact on water quality, contributing sediment and other pollutants exposed at construction sites. The NPDES Stormwater Program requires operators of both large and small construction sites to obtain authorization to discharge stormwater under a NPDES construction stormwater permit. In 1990, the Phase I Stormwater Management Program regulations addressed large construction operations that disturbed five (5) or more acres of land. The NPDES program also addresses small construction activities - those that disturb less than five acres of land - which were included in the Phase II final rule. Construction activities that disturb over one acre of land are required to develop and implement a stormwater pollution prevention plan specifically designed for the construction site. The development implementations of the plan follow the basic phases listed below:

- (1) Site Planning and Design Development Phase
- (2) Assessment Phase
- (3) Control Selection/Design Phase
- (4) Certification/Verification/Approval Phase
- (5) Implementation/Construction Phase
- (6) Final Stabilization/Termination Phase

*e. North Carolina Shoreline Buffering*

In August 2000, the State of North Carolina developed a 30 foot buffering rule for all new development in the 20 coastal counties governed by the Coastal Area Management Act (CAMA). This rule applies to all navigable waters, excluding the ocean, which has previously established setback requirements. The development of this buffer does not

restrict the construction of water dependent structures, such as docks and boat ramps. The benefits of the buffering include the following:

- (1) Flood Control - by reducing the velocity and providing a collection area for stormwater runoff and precipitation. Buffers encourage water infiltration into the ground, rather than flooding low-lying areas.
- (2) Groundwater Recharge - buffers are also beneficial to recharging the ground water supply and promoting ground water flow.
- (3) Soil Erosion Prevention - vegetated buffers stabilize the soil and reduce sedimentation.
- (4) Conservation of Coastal Riparian Wildlife Habitats - these natural areas provide breeding, nesting, and habitat, and protect wildlife from predication. Vegetated buffers help increase the diversity of wildlife while providing site for foraging and corridors for dispersal.

*f. Stormwater Management/Drainage as Related to Atlantic Beach*

Atlantic Beach experiences drainage problems throughout the town. These problems all result from low elevation and depressed areas that do not have any natural drainage. A particularly serious problem exists at the Wilson Avenue/East Terminal Boulevard intersection. However, the town has taken mitigative action to substantially reduce the problem. The Town has attempted to address this problem through the installation of 11 stormwater pumps to quickly remove standing water from closed drainage basins. These pumps remove water from developed residential and commercial areas to between the first and secondary dune lines where it can be filtered and safely discharged to the sea or to Bogue Sound.

It should be noted, however, that the Town has very limited options in effectively dealing with stormwater management/drainage concerns, due to the generally high water table and the extremely limited amount of available land on which to detain or retain stormwater runoff.

The above-referenced stormwater pumps, while somewhat effective in reducing stormwater-related flooding and standing water, contribute to elevated fecal coliform levels in Bogue Sound that contribute to the closure of shellfish beds. Stormwater runoff quantity is increased and water quality decreased by landscaping practices that focus on sod and non-native vegetation, rather than xeriscaping and use of local vegetation.

The installation of a sanitary sewer system town-wide would allow the Town to install ditches/swales along major roadways to help capture and filter stormwater and undertake other stormwater management BMPs. Under current conditions, this practice has the effect of interfering (either directly or through removing repair areas) with

existing septic systems in the vast majority of areas of the Town (i.e., those areas without package wastewater treatment systems).

Flooding is most serious during strong summertime conventional storms. Because of the porous soils, the standing water normally seeps into the ground in several hours. The town does not have a master drainage plan.

Stormwater runoff into the estuarine canals located within the town adds to the pollution from malfunctioning septic tanks. Many of the canals have little or no "flushing" action. Therefore, pollution is allowed to accumulate without any regular cleansing.

Map 18 depicts areas of particular drainage/stormwater management concerns.

Map 18 - Stormwater Concerns

## E. CURRENT PLANS, POLICIES, AND REGULATIONS

The Town of Atlantic Beach has a strong and active planning program. The town employs a full-time planning director, an inspections director, and an administrative assistant. A variety of local codes and ordinances have been adopted to regulate land use. These controls are managed by the Planning staff and legislated by the Town Council with the advice and support of the Planning Board.

The Town technically has an extraterritorial jurisdiction (ETJ) which extends one mile in to the Atlantic Ocean and one mile in to Bogue Sound. The ETJ in the Bogue Sound is coterminous with the Morehead City ETJ. The Bogue Sound ETJ is zoned RS-Recreational Sound, while the ocean ETJ area has the same zoning as the zoning of the adjacent land area. Policies listed below are also applicable in this ETJ area unless otherwise noted.

The following provides a description of each of the town's land use-related codes, ordinances, and planning documents:

### 1. **Review of the 1993 Atlantic Beach CAMA Land Use Plan Update**

Atlantic Beach's existing land use plan was certified by the Coastal Resources Commission on May 27, 1994. Policies from that plan are included on the following pages and are organized based on their status of completion as "Accomplished/Ongoing" or "Not Accomplished." The list is a verbatim reproduction of the text from the 1993 Town of Atlantic Beach Land Use Plan Update. As such, there may be duplications in the text. Some of the statements may be inconsistent with current circumstances and requirements. However, they were not changed in order to accurately reflect the contents of the 1993 plan.

## ACCOMPLISHED/ONGOING

### Resource Protection Policy Statements

Soils: The following soils policies will be enforced to mitigate septic tank problems and improve problems associated with poor soil conditions.

- It is town policy that soils are a limitation to development under the following situations: (1) if the lot to be developed is within 150 feet of estuarine waters; (2) if the soils on the lot, as mapped by the Soil Conservation Service, are rated as severe or very severe for septic systems use; or (3) if the waste treatment system to be used in connection with the development is to be a septic system or ground disposal system.

The town supports a public sewer system for the entire town; however, until such a system is constructed, the town intends to limit development and protect the estuarine resources of the town through limitations on development in the estuarine shoreline area. It is town policy to require large lot sizes for future development, to require maximum practical distance between septic systems and estuarine waters, and to limit the clearing of vegetation. The town supports the current policies of the Coastal Resources Commission as regards development in this area of environmental concern (AEC). The town supports the enforcement of county health regulations.

The town will revise its zoning ordinance and subdivision regulations to implement this policy while designing and constructing a town-wide sewage collection and treatment system as soon as may be practical.

- Atlantic Beach acknowledges and endorses the 404 wetlands permit process as defined by the Corps of Engineers' 1987 Manual for Wetlands Identification.
- Enforce current regulations of the N.C. State Building Code and support Carteret County Health Department in matters relating to septic tank installation/replacement in areas with soils restrictions.

#### Flood Hazard Areas:

- The town supports programs designed to foster development and building practices that will minimize flood damage from storms and erosion. The town supports the Federal Flood Insurance Program.
- Atlantic Beach will continue to enforce its existing zoning and flood damage prevention ordinances and follow the storm hazard mitigation plan. (See Storm Hazard Mitigation, Post-Disaster Recovery, and Evacuation Plans.)
- Atlantic Beach will continue to support and implement the community rating system which allows for reduced flood insurance rates.

#### Groundwater/Protection of Potable Water Supplies:

- Atlantic Beach will conserve its surficial groundwater resources by supporting CAMA and N.C. Division of Environmental Management stormwater runoff regulations, and by coordinating local development activities involving chemical storage or underground storage tank installation/abandonment with Carteret County Emergency Management personnel and the Groundwater Section of the N.C. Division of Environmental Management.

- Atlantic Beach supports a regional multi-jurisdictional study of the limestone aquifer underlying Carteret County. Such a study would aid in determining the optimum locations for wells and the long-term viability of the town's water supply. The issue of salt water intrusion should be addressed by the study.
- Atlantic Beach will encourage and support water conservation efforts. This will include limiting the maximum output of each town well to a rate which will ensure that the town's water conservation policies will be met. Motels and rental units will be encouraged to post notices encouraging water conservation by tourists. The town will also encourage the use of water conservation devices for all residential and commercial users.
- Atlantic Beach will support efforts by Carteret County to ensure that aquifer recharge areas are adequately protected.
- The town's water supply is derived from six wells that draw from a deep aquifer. The aquifer is recharged on the mainland, therefore, little or no danger of pollution of the water supply from surface development exists. However, the town recognizes the potential for well contamination from salt water intrusion due to overpumping of individual wells and will continue to take measures to avoid such consequences. The town supports state and federal groundwater research, monitoring, and management programs.
- The town will investigate a new water rate structure that will further encourage water conservation.

Stormwater Runoff:

- Atlantic Beach recognizes the value of water quality maintenance to the protection of fragile areas and to the provision of clean water for recreational purposes. The town will support existing state regulations relating to stormwater runoff resulting from development (Stormwater Disposal Policy 15 NCAC 2H.001-.1003).
- In Atlantic Beach, no storm drains or drainage ditches shall be constructed which discharge directly into estuarine waters, or public trust waters. Some form of water retention area or settling basin must be provided. The town will encourage the use of "best management practices" to minimize the rapid release of pollutants to coastal waters through stormwater runoff. Examples of these practices include using pervious or semi-pervious materials, such as turf stone or gravel for driveways and walks; retaining natural vegetation along marsh and waterfront

areas to retain its natural filtering properties; and allowing stormwater to percolate into the ground, rather than discharging it directly to coastal waters.

- Atlantic Beach will investigate the development of a town-wide stormwater control ordinance. The town will be consistent with state regulations in exercising the ordinance.

#### Man-made Hazards:

- Atlantic Beach supports the technical requirements and state program approval for underground storage tanks (Chapter 40 of the Code of Federal Regulations, Parts 280 and 281), and any subsequent state regulations concerning underground storage tanks adopted during the planning period.
- With the exception of bulk fuel storage tanks used for retail sales, individual heating fuel storage tanks, and publicly owned fuel storage tanks, Atlantic Beach opposes the bulk storage of man-made hazardous materials within its jurisdiction. The Atlantic Beach zoning ordinance prohibits above ground fuel storage tanks in all zones except for three retail zoning districts. In addition, fuel storage is regulated by Chapter 8, Article 8-18, of the town's fire prevention ordinance.
- Atlantic Beach is opposed to the establishment of toxic waste dump sites within Carteret County.
- Atlantic Beach supports the Carteret County policy of opposing any low level military training flights that are not in compliance with the minimum safe altitudes for aircraft operation as described in the Federal Aviation Regulations, Part 91. It is understood that the county does not have any authority to regulate the area or elevation of military flights.

#### Solid Waste:

- Atlantic Beach supports Carteret County's participation in a regional multi-county approach to solid waste management.
- Atlantic Beach will cooperate with any efforts to educate people and businesses on waste reduction and recycling. The town vigorously supports recycling and supports setting up practical collection methods and education efforts to achieve a high degree of county-wide recycling.

Cultural/Historical Resources: There do not appear to be any nationally significant historic or archaeological sites within Atlantic Beach. However, in order to protect any discovered sites, especially in the area of the Fort Macon State Park, Atlantic Beach will:

- Notify Archives & History prior to the town's undertaking any development in previously undisturbed sites.
- The Town of Atlantic Beach will investigate the historical significance of fishing, whaling, pirates, and the development of the shag dance to determine what, if any, actions should be taken to preserve/highlight the significance of these activities to the town.

#### **Miscellaneous Resource Protection**

Package Treatment Plant Use: The Town of Atlantic Beach will support the construction of package treatment plants that are approved and permitted by the State Division of Environmental Management and by the Carteret County Health Department/Division of Health Services. If any package plants are approved, Atlantic Beach supports requirement of a specific contingency plan specifying how ongoing private operation and maintenance of the plant will be provided, and detailing provisions for public assumption of the plant should the private operation fail. Additionally, it is the town's policy that existing package treatment plants continue to operate but must be tied into the municipal sewage treatment system upon its completion.

#### Marina and Floating Home Development:

- Atlantic Beach considers boating activities an extremely important part of its tourist industry and overall economy. Subject to the policies stated herein, the town does not oppose the construction of both open water and upland marinas.
- The Town of Atlantic Beach supports the development of additional commercial open water and upland marinas within its jurisdiction in accordance with the conditions and restrictions of local ordinances including the construction of marina facilities designed and operated for the residents of a private residential development.
- The construction of all marinas, docks and piers shall minimize or eliminate adverse effects on coastal wetlands and subaquatic vegetation and comply with 15A NCAC 7H minimum use standards.
- Atlantic Beach will allow construction of dry stack storage facilities for boats associated either with or independent of marinas. All applicable zoning,

subdivision, and other regulations must be satisfied. Water access to dry stack storage facilities should not disturb active shellfishing areas or subaquatic vegetation.

Development of Sound and Estuarine Islands: The town's policy is that sound and estuarine islands should not be developed, and therefore are classified as Conservation by the Land Classification Map, except Money Island which is zoned RA-1.

Ocean Hazard Areas:

- Atlantic Beach will support only uses within the ocean hazard areas which are allowed by 15A NCAC 7H and are consistent with the town's zoning and land protection ordinances.
- Atlantic Beach supports the deposit of dredge spoil by the U.S. Army Corps of Engineers on the beach and relocation as the preferred erosion control measures for ocean hazard areas.
- The town finds that the frontal and secondary dunes are important to the town; they protect development from storm damage and wind erosion; they are aesthetically pleasing and are attractive to future development. It is town policy to protect the secondary dunes and other components of the dune system while allowing development of these areas. The town will encourage future developers to use planned unit development in these areas. This type development should be designed to shift the heaviest portion of development to areas that are less fragile or sensitive, hence conserving those areas that are more fragile. At the same time, site development can ultimately contain the same or sometimes more units than are allowed under conventional districts of the zoning ordinance. It is town policy to require large lot sizes in these areas and to limit the amount of cut and fill and the clearing of the vegetation.
- The town supports state requirements pertaining to shoreline stabilization in ocean hazard areas.
- Atlantic Beach will support the limited adjustment of the CAMA setback line in association with ongoing deposit of sand from dredge spoil projects and the establishment of new permanent dune and vegetation lines. However, it is understood that this policy will not impact permit decisions regarding CAMA setback line in ocean hazard areas unless the Coastal Resources Commission modifies the State use standards for this AEC.

Inlet Hazard Areas: There are no inlet hazard areas within Atlantic Beach's planning jurisdiction. In event of blow-out, inlets may be filled or returned to original condition.

Bulkhead Construction: Except for ocean hazard areas, Atlantic Beach does not oppose bulkhead construction within its jurisdiction as long as construction fulfills the use standards set forth in 15A NCAC 7H. The town is opposed to bulkhead construction in ocean hazard areas.

Sea Level Rise: Atlantic Beach recognizes the uncertainties associated with sea level rise. Although the rate of rise is difficult to predict, the town will implement the following policies:

- Atlantic Beach will cooperate with county, state, and federal efforts to inform the public of the anticipated effects of sea level rise.
- Atlantic Beach will continuously monitor available information on sea level rise and revise as necessary all local building and land use related ordinances to establish setback standards, long-term land use plans, density controls, buffer vegetation protection requirements, and building designs which will facilitate the movement of structures.
- Atlantic Beach will allow the construction of bulkheads which satisfy 15A NCAC 7H in all areas to protect structures and property from rising sea level.

Maritime Forests:

- The maritime forest is an important natural resource to the town. The maritime forest and shrub thicket maintain the stability of the land in the face of wind and water erosion. The forest and shrub thicket are important to the attractiveness of the town and the island. It is town policy to protect as much of this resource as possible while allowing for a moderate amount of development which would not be destructive to the uniqueness of this resource. The town will encourage future developers to use planned unit development in and around these maritime forest areas. It is the goal of this policy to shift development from wooded areas to the periphery or cleared areas without interfering with developers' expectations concerning the number of dwelling units or commercial structure or the amount of commercial building space they will realize from a tract or parcel. It is town policy to require large lot sizes in these areas and to limit the amount of clearing of vegetation to only so much as is necessary to site a home and provide access. Further, it is the town's policy that the overall benefits resulting from public improvement projects of town-wide significance may outweigh the desire to preserve as much maritime forest as possible. For example, the clearing of

maritime forest to construct a wastewater treatment plant designed to serve the entire town would be justified because of the overriding benefits that would accrue to the public at large.

- Atlantic Beach will consider the adoption of a tree removal ordinance to regulate the cutting of trees.

## **Resource Production and Management Policies**

### Recreation Resources:

- All lands classified as conservation, except estuarine shoreline areas, are considered valuable passive recreation areas. Development will be allowed which is consistent with the policies contained in this plan, town codes and ordinances, and the 15A NCAC 7H use standards.
- Atlantic Beach supports the development of additional estuarine and ocean shoreline access areas to ensure adequate shoreline access within all areas of the town. The town will cooperate with municipalities and state and federal agencies to secure such access. Areas that have traditionally been used by the public will be given special attention.
- Atlantic Beach will support the development of non-shoreline access general use year-round recreational facilities.

Productive Agricultural Lands: There are no productive agricultural lands found in Atlantic Beach; therefore, no policy statement is necessary.

Productive Forest Lands: Commercial forestry is not currently a significant use within the town. A modest amount of land in and near the town is wooded, most of this in maritime forest or shrub thicket. The commercial harvesting of these areas is unrealistic. The town views its forested areas as a resource that needs protection and not a resource that should be subject to harvest.

Aquaculture Activities: Aquaculture is considered the cultivation of aquatic plants and animals under controlled conditions. The following policy shall apply:

- Atlantic Beach will encourage all aquaculture activities which meet applicable federal, state and local policies, and will carefully evaluate all requests for approval of aquaculture activities.

- Atlantic Beach objects to any discharge of water from aquaculture activities that will degrade in any way the receiving waters. The town objects to withdrawing water from aquifers or surface sources if such withdrawal will endanger water quality or water supply from the aquifers or surface sources.
- Atlantic Beach will support only aquaculture activities which do not alter significantly and negatively the natural environment of coastal wetlands, estuarine waters, public trust areas, and 404 wetlands as shown on the Land Classification Map.

Residential, Commercial, and Industrial Development Impacts on Resources:

- Atlantic Beach has adopted an ordinance governing bulkheading along the estuarine shoreline and the zoning ordinance limits lot coverage to 40%, thus 60% of residential lots remain open.
- Residential and commercial development which meets 15A NCAC 7H minimum use standards, Atlantic Beach zoning requirements, and the policies contained in this plan will be allowed in estuarine shoreline, estuarine water, and public trust areas. Industrial development will not be allowed in estuarine shoreline, estuarine water, and public trust areas. In other areas of the town, light manufacturing activities which are permitted by the town's zoning ordinance will be allowed within Atlantic Beach.
- Atlantic Beach opposes the construction of any privately owned signs in the coastal wetlands, estuarine waters, and public trust areas. Publicly owned instructional signage will be permitted.
- Atlantic Beach will vigorously enforce Article VIII of the town's zoning ordinance which establishes stringent requirements for lot clearing.
- Atlantic Beach will vigorously enforce Article X of the town's zoning ordinance which establishes stringent requirements for the preservation and protection of sand dunes and the vegetation thereon.
- The town realizes the importance of coastal wetlands to the life cycle of plants and animals, including sport and commercial fisheries. The town supports state policies for the wetlands as stated in federal and state legislation and as embodied in the regulations for coastal wetland areas of environmental concern. The town will consider enactment of local measures designed to complement the state's actions while preserving these areas from future development which may irreparably damage this resource.

- In recognition of the importance of estuarine waters for fisheries and related industries as well as aesthetics, recreation and education, Atlantic Beach shall promote the conservation and quality of this resource in accordance with state AEC regulations. Appropriate uses may include simple access channels, structures which prevent erosion, navigation channels, boat docks, piers, and mooring pilings. Atlantic Beach supports and is actively pursuing the construction of a wastewater collection and treatment system in accordance with the bond referendum passed in March, 1985.
  
- Atlantic Beach supports state AEC regulations for public trust areas. Atlantic Beach shall protect those established rights of the public in these areas by promoting their conservation and management. In the absence of overriding public benefit, any land use which significantly interferes with the public right of navigation or other public trust rights which apply in the area shall not be allowed. Projects which would directly or indirectly block or impair existing navigation channels, increase shoreline erosion in non-ocean hazard areas, private deposition of spoils below mean high tide, cause adverse water circulation patterns, violate water quality standards, or cause degradation of shellfish waters shall, in general, not be allowed. Uses that may be allowed in public trust areas shall not be detrimental to the public trust rights and the biological and physical functions of the estuary. Examples of such uses include the development of navigational channels, the use of bulkheads to prevent erosion, or the building of piers or docks.

Marine Resource Areas:

- With the exception of the construction of signs and floating structures, and stormwater runoff policies, Atlantic Beach supports the use standards for estuarine waters and public trust areas as specified in 15A NCAC 7H.0208.
  
- Atlantic Beach reserves the right to review and comment on policies and requirements of the North Carolina Division of Marine Fisheries which govern commercial and recreational fisheries and activities, including trawling activities.

Mineral Production Areas: The mining of the secondary dunes system, or any other dunes or land within the town's planning jurisdiction, is considered an inappropriate use.

Off-Road Vehicles: Article II of the Beach and Shore Regulations of the Atlantic Beach Town Code regulates vehicular traffic, off-road vehicles, in the beach area. Vehicular traffic is prohibited between 12:01 a.m. on Friday before Easter Sunday and 12:00 midnight on the Wednesday following Labor Day. However, vehicles operated by

commercial fishermen issued a valid state fishing license are exempt. The town will continue to regulate off-road vehicles through enforcement of Article II of the Town Code.

### **Economic and Community Development Policy Statements**

General: Although higher than average density development and/or redevelopment is likely to occur in some areas of Atlantic Beach, it is the town's goal to achieve a lower overall density through continued enforcement of its land use regulations. It is the town's intention to use its available sewer capacity (once a community-wide sewer system is obtained) and its zoning authority to control and limit future residential and commercial density levels. It is the town's desire for residentially and commercially zoned areas to remain primarily in 1992 locations. Intrusion of commercial development into residentially zoned areas will not be permitted; however, residential uses infiltrating commercial areas are allowed on a limited basis through the special use provisions of the town zoning ordinance. No heavy industrial development will be allowed in Atlantic Beach.

Water Supply: The Atlantic Beach water supply is adequate and does not present any constraint to redevelopment/development which is permitted by the town's zoning ordinance. Atlantic Beach has extended water service to all areas of the town including the west end area. The addition of wells and storage tanks will be supported by the town as necessary to ensure an adequate water supply. However, it shall be the town's policy to promote water conservation by encouraging the use of residential and commercial water saving devices and by making appropriate modifications to the existing water rate structure.

Sewer System: Atlantic Beach supports the construction of a sewage disposal system and a central sewer collection system to eliminate the town's sewage treatment problems. This may be accomplished by the town acting independently of other jurisdictions or through a regional effort.

#### Energy Facility Siting and Development:

- There are no electric generating or other power generating plants located in or proposed for location within Atlantic Beach' planning jurisdiction. The town will not support the location of permanent energy generating facilities within its planning jurisdiction.
- The Town of Atlantic Beach opposes any offshore exploration for or production of oil or natural gas.

- Atlantic Beach supports Carteret County's policy of reviewing proposals for development of non-nuclear electric generating plants within Carteret County on a case-by-case basis, judging the need for the facility by the county against all identified possible adverse impacts. Atlantic Beach objects to all nuclear power plant construction. Atlantic Beach reserves the right to comment on the impacts of any energy facility proposed for location within Carteret County.

Redevelopment of Developed Areas:

- It is town policy to promote, foster, and encourage the redevelopment of old, poorly designed and underutilized areas. Redevelopment is preferred and deemed more important than development of currently undeveloped areas. Many developed areas are in poor condition with poor road design, lack of vegetation, dilapidated housing, mixed uses, etc. The town will continue a program of strict enforcement of the minimum code as a means to improve the quality of existing development.
- Atlantic Beach will take an active supervisory role in all future redevelopment projects. All projects are required to consider the town's environmental policies and to address the town's other public needs, especially its needs for a sound street system and for public access to the beaches.
- Atlantic Beach will allow the reconstruction of any structures demolished by natural disaster or by other causes in accordance with all applicable federal, state and local regulations.
- Atlantic Beach supports adoption by the U.S. Department of Housing and Urban Development of stricter standards for the construction of mobile homes which are to be located in the coastal zone. Such standards should increase wind resistant capabilities to a level consistent with that which is required for conventional site built housing.
- Atlantic Beach supports regular deposit of dredge spoil on the beach by the U. S. Army Corps of Engineers, and considers such projects essential to the continuing redevelopment process within the town.
- Atlantic Beach will consider, on a case-by-case basis, the expenditure of local funds to acquire unbuildable lots in hazardous areas. Donations of such lots will be accepted.

Estuarine Access: Atlantic Beach supports the state's shoreline access policies as set forth in 15A NCAC, Subchapter 7M. The town will conform to CAMA and other state and federal environmental regulations affecting the development of estuarine access areas.

Types and Locations of Desired Industry: Industrial development will not be allowed in estuarine shoreline, estuarine water, and public trust areas. In other areas of town, light manufacturing activities which are permitted by the town's zoning ordinance will be allowed.

Community Facilities: Atlantic Beach will support the development of the following community facilities:

- New municipal administration building/police department/fire station complex as circumstances dictate.
- Construction of a sewage collection and treatment system.
- Expansion of the town's water system to include supply wells and storage tanks.
- Stormwater drainage facilities.
- Construction of additional shoreline access facilities.
- State and local transportation facilities, including roads.
- Construction of general use year-round recreational facilities.
- Extension of electrical utilities.

Commitment to State and Federal Programs: Atlantic Beach is receptive to state and federal programs, particularly those which provide improvements to the town. The town will continue to support fully such programs, especially the following: North Carolina Department of Transportation road and bridge improvement programs, environmental protection, tourism, planning, the U.S. Army Corps of Engineers regulatory and permitting efforts, dredging and channel maintenance by the U.S. Army Corps of Engineers, the North Carolina shoreline access grant program, flood insurance, and federal and state projects which provide efficient and safe boat access for commercial and sport fishing.

Assistance in Channel Maintenance: The town encourages private participation in the vegetation of beach areas. The town encourages the deposit of dredge spoil on the beach by the Corps of Engineers. The town further states its desire that the Corps of Engineers maintain all navigation channels coming into Atlantic Beach proper.

Tourism:

- Atlantic Beach will support North Carolina Department of Transportation projects to improve access to and within Carteret County and Atlantic Beach.

- Atlantic Beach will support projects that will increase public access to shoreline areas.
- Atlantic Beach will continue to support the activities of the North Carolina Division of Travel and Tourism; specifically, the monitoring of tourism-related industry, efforts to promote tourism-related commercial activity, and efforts to enhance and provide shoreline resources.
- Atlantic Beach will continue to support the activities of the Carteret County Tourism Development Bureau.
- The town's development priorities and goals of environmental and resource protection clearly state its strong desire to encourage and promote tourism. This policy is implemented through the network of other policies contained in this plan.

Transportation:

- Atlantic Beach supports the development and adoption of a county-wide thoroughfare plan.
- Atlantic Beach supports the construction of a third bridge between Bogue Banks and the mainland.
- Atlantic Beach will work with the North Carolina Department of Transportation to ensure that all road hazards are clearly marked or corrected. The town will identify and report hazards to the NCDOT.
- Atlantic Beach supports the widening of U.S. 58 to provide four lanes.
- Atlantic Beach supports the development of bike paths and pedestrian walks and crossings within the town.

Development/Growth Objectives: Through enforcement of the policies contained in this plan, and enforcement of local codes and ordinances, Atlantic Beach will endeavor to accomplish the following growth objectives:

- Support development of a central sewer collection and treatment system.
- Protect maritime forest and dunes areas.
- Reduce overall average residential density.
- Redevelop deteriorated residential and commercial areas.
- Maintain an adequate water supply.
- Improve traffic flow, especially on N.C. 58.

- Continuing regular, periodic deposit of dredge spoil projects in conjunction with the Corps of Engineers.

Land Use Trends: Atlantic Beach's land use trends have been identified in the previous sections of this plan. However, they are summarized as follows:

- Increasing traffic congestion.
- Increasing pressure for a central sewer collection and treatment system.
- Continuing development of maritime forest areas.
- Increasing demand for services as the result of increasing peak population.
- Continuing residential development at a moderate rate.
- Limited commercial growth/development.

These land use trends should be monitored by the town and controlled through existing local, state, and federal land use regulations including CAMA, "404" regulations, sanitary regulations, and the town's subdivision and zoning ordinances and building inspection program. This plan contains policies designed to deal with the identified land use trends.

## NOT ACCOMPLISHED

### Resource Protection Policy Statements

Solid Waste: Atlantic Beach will adopt ordinances with severe penalties for illegal dumping.

### Miscellaneous Resource Production

#### Marina and Floating Home Development:

- The Town of Atlantic Beach supports revisions to the zoning ordinance or adoption of a separate ordinance to prohibit floating homes and live-aboard boats.
- Existing marinas, docks and piers may be reconstructed to their prior size so long as all local ordinances and other applicable policies of this plan are satisfied and met when reconstruction occurs.

Development of Sound and Estuarine Islands: The town's policy is that sound and estuarine islands should not be developed, and therefore are classified as Conservation by the Land Classification Map, except Money Island which is zoned RA-1.

## **Resource Production and Management Policies**

### Residential, Commercial, and Industrial Development Impacts on Resources:

- In addressing future rezoning applications for commercial housing, townhouse, or multi-family housing, the town will consider, among other factors, the following: (1) a preference to have commercial and other intense land uses that generate a substantial amount of traffic and other off-site impacts develop as self-contained areas having minimal ingress and egress to main traffic routes; (2) a preference to have the uses described above locate with entrances and exits along streets and roads that are perpendicular to the nearest main traffic route; and (3) a preference to redevelop areas in poor condition.

#### **2. Beach and Shoreline Regulations**

These regulations are included in Chapter 5 of the Municipal Code. Usage of beach and shoreline areas is regulated, including prohibition of glass containers and metal cans, surfing, vehicular traffic, and issuance of permits for beach traffic.

#### **3. Buildings and Building Regulations**

Chapter 6 of the Municipal Code includes these regulations. The town has adopted and enforces the North Carolina state building, plumbing, heating, electrical, and residential codes. The chapter also establishes requirements for a uniform numbering system for all buildings.

#### **4. Planning and Development**

Atlantic Beach's planning program is established by Chapter 13 of the Municipal Code, with responsibility over enforcement of zoning and subdivision regulations administered through the Planning and Inspections Department. The chapter establishes both the Planning Board and Board of Adjustment. Responsibilities for both boards are defined. In addition, the chapter establishes the following:

- Implementation and enforcement program for minor (CAMA) development permits.
- Soil, erosion, and sedimentation control.
- Group housing regulations, including controls for condominiums, townhouses, and apartments.
- Construction permits.

## **5. Streets and Sidewalks**

The use and maintenance of streets and sidewalks is regulated by Chapter 16 of the Municipal Code. Damage to streets, bridges, lights, and signs is regulated and prohibited. In addition, controls on the moving of buildings upon or across public streets or sidewalks are provided.

## **6. Subdivision and Pre-Development Regulations**

Chapter 17 of the Municipal Code provides the Town of Atlantic Beach subdivision regulations. The following excerpt from the subdivision ordinance provides the purpose of the subdivision regulations:

"The purpose of these regulations is to regulate and control the subdivision of land within the limits of the town in order to promote the public health, safety, and general welfare of the community. They are designed to lessen congestion in the streets and highways; to further the orderly layout and use of land; to insure proper legal description and proper monumenting of subdivided lands; to secure safety from fire, panic and other dangers; to provide adequate light and air; to prevent the overcrowding of land and avoid undue concentration of population; to facilitate adequate provisions for transportation, water, sewerage, parks, schools, playgrounds and other public requirements; to facilitate the further resubdivision of larger tracts into small parcels of land."

Specifically, the subdivision regulations require that:

- Town services shall not be provided until a final subdivision plat is approved;
- No streets or utilities shall be accepted until a final subdivision plat is approved;
- No construction permits shall be issued until a final subdivision plat is approved.

## **7. Zoning**

The Atlantic Beach zoning ordinance is included in Chapter 18 of the Municipal Code. The purposes of the zoning ordinance, as stated in the Section 18-1 of the 2001 revisions to the ordinance, are as follows:

“(1) Promoting the public health, safety, morals, and general welfare; (2) Promoting the orderly growth and development of the Town of Atlantic Beach and the surrounding area; (3) Lessening congestion in the street and roads; (4)

Providing adequate light and air; (5) Securing safety from fires, panic, and other dangers; (6) Preventing the overcrowding of land; (7) Avoiding undue congestion of population; (8) Facilitating the adequate provision of transportation, water, sewerage, schools, parks, and other public requirements.”

The zoning ordinance includes the following twelve land use districts. Each parcel of land in the Town is included in one of the following districts:

*RA-1 Residential District.* The RA-1 residential district is established as a district in which the only use of land is for single-family dwellings.

*RA-1.5 Residential District.* The RA-1.5 residential district is established as a district in which only single-family dwellings or duplex dwellings will be allowed.

*RA-1M Residential District.* The RA-1M residential district is established as a district in which the only use of land is for single-family dwellings which shall include conventional houses, modular homes and mobile homes.

*RA-2 Residential District.* The RA-2 residential district is established as a district in which the principal use of land is for single-family, duplex, triplex, and four-family dwellings.

*RA-3 Residential District.* The RA-3 residential district is established as a district in which the principal use of the land is for high density residential development in order to provide overnight accommodations.

*RA-3M Residential District.* The RA-3M residential district is established as a district in which the principal use of the land is for high density residential development in order to provide overnight accommodations.

*RA-3V Residential District.* The RA-3V residential district is established as a district in which the principal use of land is for high density residential development in order to provide overnight accommodations.

*RR Resort Residential District.* The RR resort residential district is established as a district to provide areas, which, due to their location, natural features and access, have an extremely high potential for both permanent and tourist types of residential development.

*RC Resort Commercial District.* Within a limited business district, it is intended that permitted uses shall be oriented to those businesses and services associated with those tourist related activities which reflect a family atmosphere.

*RS Recreational Sound District.* The RS district is established as a district in which the principal use of land and water is for recreational purposes only.

*CDD Circle Development District.* The CDD district allows a dense mix of commercial and residential uses in “The Circle” redevelopment district as designated by the Town. Development in this district is subject to the requirements of the Town’s “Circle Development District” ordinance adopted in 2004.

*GB General Business Zone.* The purpose of this district shall be to create and maintain general businesses and professional offices which are necessary to the residents of Atlantic Beach and also to the tourists who visit Atlantic Beach.

*CZ Conservation Zone.* The purpose of this conservation zone is to provide environmental protection for surface waters and to protect the wildlife and natural features of the property. Any activity in this zone inconsistent with the purposes of this zone is prohibited. The property shall be maintained in its natural, scenic, wooded and open condition and restricted from any development or use that would impair or interfere with the conservation purpose of this conservation zone.

In addition to the twelve aforementioned primary zoning districts, the Town created two “overlay” zones in 2001. These “overlay” zones can be found in any of the twelve primary zoning districts and they impose additional site and building design requirements to those found in the primary zoning categories. The first of these overlay zones is for areas identified as maritime forests. In these areas, significant maritime forests must be preserved. The second overlay zone applies to special flood hazard areas. In these areas, filling, grading and dredging, and the installation of flood barriers are restricted to ensure no negative impacts to nearby properties and foundation elevation requirements are imposed.

**8. NCDOT Transportation Improvement Program (TIP), Division 2, 2004-2010**

The TIP is developed on a yearly basis by the North Carolina Department of Transportation (NCDOT) and contains funding information and six year schedules for various transportation divisions including: highways, aviation, enhancements, public transportation, rail, bicycle and pedestrians, and the Governor’s Highway Safety Program. The only TIP project in the Town of Atlantic Beach is a project to construct sidewalks from Ocean Ridge Drive to the corporate limits under a NCDOT Enhancement Project. This project is expected to begin construction in 2005 and cost approximately \$120,000 (Project Number E-4734).

## **9. Crystal Coast Area Long-Range Transportation Plan**

This document has been under development since 2001 and is still (March, 2005) in final draft form. It is being developed by NCDOT to serve as a long term (i.e., through 2025) transportation and thoroughfare plan for Beaufort, Morehead City, Cape Carteret, Cedar Point, Emerald Isle, Indian Beach, Pine Knoll Shores, and Atlantic Beach. The Plan encourages traffic signal analysis/coordination, the construction/installation of pedestrian and bicycle paths, and the widening or upgrading of 13 major thoroughfares, none of which are in the Town. The Plan does, however, encourage widening of US Highway 70 at numerous locations between Raleigh and Atlantic Beach, thus improving access to the Town.

## **10. Water Department Policies**

In 1993, the Town created Section 21 and 22 of its Water Supply policy to establish water tap fees and impact fees for homeowners and businesses wishing to tap into the Town's Potable Water Supply System. The intent of the tap fees was simply to cover the cost of tap installation, up to 2" service connections (beyond that size the owner must pay a contractor to install a tap). Fees range from \$350 to \$1,200 depending on tap size.

The intent of the impact fee is to maintain and upgrade its water system for fire protection, supply and storage capacity, and to meet health and safety regulations established by State and Federal agencies. Impact fees are over and above any other fees required by the Town of Atlantic Beach for connection to the municipal water system, and shall be required for all new or modified services.

## **11. Marina Ordinance**

In 1978, the town adopted a marina ordinance. The ordinance defines marinas as establishments providing storage for more than six boats, wet or dry facility. A site plan is required which meets the ordinance requirements for minimum lot size, width, depth, side yard, and rear yard. The site plan must be prepared by a registered engineer, and include parking and storage areas, driveways, signs, lighting, pollution control, and dock construction.

In 1988, this ordinance was incorporated into Article V of Chapter 6 of the Town's Code of Ordinances (Buildings and Building Regulations)

## **12. Flood Damage Prevention Ordinance and Community Rating System (Repetitive Loss) Plan**

In 1978, the town adopted the flood damage prevention ordinance in order to comply with the National Flood Insurance Program. Specifically, the ordinance requires the following:

- All new residential construction or improvements greater than 50% of structure's market value must be elevated to or above 100-year base flood elevations.
- Commercial buildings must be elevated above base flood elevations or floodproofed.
- Anchorings and pilings designs must be certified by a registered engineer or architect, or must be in full compliance with the NC State Building Code.
- No alterations of frontal dunes or fill for structural support is allowed in "V" or velocity zones except as may specifically be allowed under CAMA regulations. (Source: 1988 Atlantic Beach Land Use Plan.)

The Town currently has a Community Rating System rating of eight which means that it takes extra efforts to minimize the risk of flooding in the Town and which awards its citizens approximately a ten percent reduction in their flood insurance premiums.

In 2001, the Flood Damage Prevention Ordinance was incorporated into Section 18-102 (Zoning) of the Town's Code of Ordinances, and is now administered through the Planning and Inspections Department.

## **13. Mobile Homes and Mobile Home Park Ordinance**

The Atlantic Beach mobile homes and mobile home park ordinance was adopted in 1986. This ordinance regulates mobile home park development, mobile homes within parks, and mobile homes placed on individual residential lots in subdivisions. Design standards for mobile home parks are established and plans for mobile home parks are required. The mobile home park plans must provide the following: site plan defining all features, stormwater drainage plan, description of recreation areas, indication of water supply, definition of sewage disposal method, and site development standards.

In 2001, the provisions of this ordinance were incorporated into Chapter 18 (Zoning) of the Town's Code of Ordinances and is now administered through the Planning and Inspections Department.

#### **14. Recreational Vehicle Parks**

A recreational vehicle parks ordinance was adopted in 1987. The ordinance regulated parks intended to provide temporary dwelling spaces for travel trailers, motor homes, tent campers, and truck-mounted camper. Standards for the following are included: minimum park area, minimum lot area and width, minimum distance between campers, driveway/parking standards, stormwater drainage, water supply, sewage disposal, and solid waste disposal.

In 2001, the provisions of this ordinance were incorporated into Chapter 18 (Zoning) of the Town's Code of Ordinances and is now administered through the Planning and Inspections Department.

#### **15. Carteret County Emergency Operations Plan for Multi-Hazards and Standard Operating Procedures (SOP)**

In 1992, the Town of Atlantic Beach adopted the Carteret County SOP. This manual provides standard operating procedures to be implemented in the event of a hurricane or other natural disaster, in conjunction with the County, and the Towns of Pine Knoll Shores, Indian Beach, and Emerald Isle. Procedures include: evacuation, operation of the Carteret County emergency operations center, damage assessment, post-disaster recovery, disaster assistance, temporary housing, tornadoes, winter storms, transportation accidents/mass casualties, and plane crashes.

#### **16. Erosion and Sediment Control Ordinance**

The Erosion and Sedimentation Ordinance of Atlantic Beach was passed in 1985 with the main intent of regulating certain land disturbing activities in order to control the accelerated erosion and sedimentation amounts that can damage the watercourses of the area as well as damage public and private properties. The ordinance requires property owners to apply for permits and submit plans for control of erosion and sedimentation for specified land disturbing activities of ½ acre or greater. The ordinance has been expanded somewhat to give the town limited enforcement over projects containing less than ½ acre for properties along the waterways (Source: Town of Atlantic Beach Hazard Mitigation Plan).

#### **17. Dune Protection Ordinance**

In 2001, the Town of Atlantic Beach passed a dune protection ordinance to preserve the protective quality of the remaining dune structures within the town. The regulations prohibit any damage or destruction to any dune within the town. Certain reconstruction or relocation efforts are permitted to allow for the development of a lot;

however, the dune must retain its entire height and mass upon relocation (Source: Town of Atlantic Beach Hazard Mitigation Plan).

**18. Privatization Feasibility Study and Design/Build/Own Action Plan: Municipal Wastewater Treatment Facilities for the Town of Atlantic Beach**

In 2001, Infrastructure Management Group, Inc. (IMG), of Bethesda, Maryland, completed a privatization feasibility study for the development of a Town-wide sewerage (wastewater collection and treatment) system to be operated by a private vendor. This Plan looked at the economic and environmental feasibility of such a system and found it to be feasible on both accounts.

IMG is currently completing a Design/Build/Own Action Plan for a Wastewater System that will allow them to assist the Town in taking proposals from private firms to design, build, and operate a Town-wide wastewater collection and treatment facility in the Town. Proposals could be solicited as early as 2006, but no final decisions on a timeline have been made as of this date (March, 2005).

**19. Town of Atlantic Beach Hazard Mitigation Plan**

Developed by the Town Planning Director and adopted in January 2005, the Hazard Mitigation Plan (HMP) identifies potential natural hazards that may affect the Town, identifies the extent of the risk the Town faces from these hazards, and adopted goals, policies and procedures to help minimize these risks over the long term.

This Plan was required by Federal and State laws adopted in the year 2000 that require all local governments to have a hazard mitigation plan in place as a condition of disaster recovery and hazard mitigation assistance after November 2004. The HMP has been approved by the State and is under final review by FEMA as of this writing (March, 2005).

**20. Public Access - Preliminary Recreation Assessment**

In 1998, the Town was awarded a grant from the North Carolina Department of Environmental and Natural Resources (DENR) to develop a preliminary assessment of recreation needs and desires. This assessment was completed in 1999, and relied largely on extensive surveys of the Town's citizens and many public meetings. The primary finding of the assessment was that a large majority of property owners in Town felt that the Town's ocean and beach accesses and boat ramps were adequate and they did not want Town funds to be used for the construction of indoor or outdoor recreational facilities.

## **21. Economic Analysis and Profile for Development Opportunities Within the Circle Area**

Developed in January 2002, by Town Planning staff, this analysis presented basic information about current conditions in the “Circle Area,” including regulatory restrictions, property values, tax receipts and expenditures, and opinions of nearby homeowners, and presented several redevelopment options for the area. This analysis presented much information useful for the subsequent development of the Circle Development District Ordinance (see below).

## **22. Coastal Habitat Protection Plan (CHPP)**

The North Carolina General Assembly passed the Fisheries Reform Act in 1997 which contained the directive to protect and enhance habitats supporting coastal fisheries. In response to this directive, the Legislature directed the North Carolina Division of Marine Fisheries to develop a plan that would help meet the aforementioned legislative goal and to serve as the factual basis for possible regulations/guidelines/rules to be adopted by the State’s fisheries’ regulatory bodies.

This plan was completed in draft form in December 2004. The over 600 page document does the following:

1. Document the ecological role and function of aquatic habitats for coastal fisheries.
2. Provide status and trends information on the quality and quantity of coastal fish habitat.
3. Describe and document threats to coastal fish habitat, including threats from both human activities and natural events.
4. Describe the current rules concerning each habitat.
5. Identify management needs.
6. Develop options for management action using the above information.

This document should be carefully reviewed and its impact on rule-making/regulation closely monitored by the Town, because of its potentially broad impact on land use in coastal areas.

## **23. Circle Development District Ordinance**

In September 2004, the Town adopted the Circle Development District Ordinance (CDDO), which was, according to the CDDO “designed to re-establish and preserve the Circle area as the primary civic, retail, office, institutional, cultural and entertainment center for the community.” Towards this goal, the CDDO allowed a dense mix of development and land uses within the Circle Development District, with the intent of providing a hub of activity that was walkable and that encouraged similar development

in adjacent areas, lessening the reliance on the automobile to access recreational and commercial opportunities. Developer Fred Bunn, of Wilson, North Carolina, will soon begin extensive construction in this area, pursuant to CDDO guidelines.

F. LAND SUITABILITY ANALYSIS

A thorough analysis of all impediments to development, as well as existing community facilities, has been completed in Sections V(B), V(D), and V(E) of this Plan. These same sections also analyzed factors that attract development, such as the presence of transportation, water, and waste disposal capabilities. All of these variables factor into suitability for development for a specific piece of property. In order to assess what affect the various man-made and environmental constraints will have on development throughout the Town of Atlantic Beach, an overlay analysis was performed. This overlay analysis is a GIS-based process geared toward evaluating the suitability of land for development. The procedure is very similar to the practice developed by Ian McHarg, the Scottish urban designer, in which geospatial data layers are referenced to each other in an effort to determine what portions of a land mass appear to be the most favorable sites for a specific land use.

The overall process utilized Arcview GIS software with the Spatial Analyst extension along with data layers provided by the North Carolina Center for Geographic Information and Analysis (NCCGIA). The analysis takes into consideration a number of factors, including natural systems constraints, compatibility with existing land uses and development patterns, existing land use policies, and the availability of community facilities. The end product of this analysis is a land suitability map that shows underutilized land that is suited or not suited for development (see Map 19). This map can be used as a foundation for the discussion and formation of town-wide land use policy and should be compared to the future land use map (see Section VI(D)).

Land suitability analysis involves the application of criteria to the landscape to assess where land is most and least suitable for development of structures and infrastructure. A computer application is not essential for this analysis, but greatly simplifies the process.

There are eight key steps to completing the overlay analysis:

- (1) Define criteria for the analysis
- (2) Define data needed
- (3) Determine what GIS analysis operations should be performed
- (4) Prepare the data
- (5) Create a model
- (6) Run the model
- (7) Analyze results
- (8) Refine model as needed

All of these steps have been completed and, as noted above, the end product is displayed on Map 19. There were no additions or adjustments to the default layer sets and weighting factors provided by the Division of Coastal Management to the town for the existing land suitability analysis map. Prior to producing the map, data was compiled and each data layer in conjunction with criteria was assigned a weight. The town was then divided into one-acre squares. Each of these one-acre squares of land was given a score based on how that respective piece of property related to each data layer. The score for each data layer was multiplied against that given layer's weight. The scores for each layer were added together to determine a suitability rating for that one-acre square of property. The suitability rating falls into four primary categories: least suitable, low suitability, medium suitability, and high suitability.

The following table summarizes all data layers used, including the criteria and weight assigned to each layer.

Table 38: Land Suitability Analysis Criteria

Layer Name		Criteria and Rating				Assigned Weight
		Least Suitable	Low Suitability	Medium Suitability	High Suitability	
		0	-2	1	+2	
Coastal Wetlands	Exclusion*	Inside	--	Outside	--	
Exceptional & Substantial Non-Coastal Wetlands	Exclusion*	Inside	--	Outside	--	
Estuarine Waters	Exclusion*	Inside	--	Outside	--	
Protected Lands	Exclusion*	Inside	--	Outside	--	
Storm Surge Areas	Weighted	--	Inside	--	Outside	2
Soils (Septic Limitations)	Weighted	--	Severe	Moderate	Slight	2
Flood Zones	Weighted	--	Inside	--	Outside	2
HQW/ORW Watersheds	Weighted	--	Inside	--	Outside	1
Natural Heritage Areas	Weighted	--	<500'	--	>500'	1
Hazardous Substance Disposal Sites	Weighted	--	<500'	--	>500'	1
NPDES Sites	Weighted	--	<500'	--	>500'	1
Wastewater Treatment Plants	Weighted	--	<500'	--	>500'	1
Discharge Points	Weighted	--	<500'	--	>500'	1
Land Application Sites	Weighted	--	<500'	--	>500'	1
Developed Land	Weighted	--	>1 mi	.5 - 1 mi	<.5 mi	1
Roads	Weighted	--	>1 mi	.5 - 1 mi	<.5 mi	2
Water Pipes	Weighted	--	>.5 mi	.25 - .5 mi	<.25 mi	3
Sewer Pipes	Weighted	--	>.5 mi	.25 - .5 mi	<.25 mi	3

\*Data layers that are slated as exclusion have a suitability of 0 or 1, meaning that if a specific one-acre piece of property falls within one of these areas, it is automatically considered least suitable for development. Source: NCCGIA and CAMA.

Overall, land in the Town of Atlantic Beach is predominantly suitable for development. Table 39 below provides a summary of land suitability acreage based on the results of the overlay analysis. Currently undeveloped areas adjacent to or near Bogue Sound are generally the least suitable areas for development, due to environmental constraints and lack of infrastructure, while the remainder of the Town is primarily of medium or high suitability for development.

Table 39: Town of Atlantic Beach and ETJ  
Land Suitability Analysis, 2005

	Acres	% from TOTAL
Least	580	35.13%
Low	86	5.21%
Moderate	484	29.32%
High	501	30.35%
TOTAL	1,651*	100.00%

\*Please note that road rights-of-way and water are included in this figure.  
Source: NCCGIA and Holland Consulting Planners, Inc.

Map 19 - LSA