

SECTION I. INTRODUCTION

This Fiscal Year 2004/2006 CAMA Land Use Plan is prepared in accordance with the requirements of the North Carolina Coastal Area Management Act (CAMA). Specifically, this document complies with Subchapter 7B, "CAMA Land Use Planning Requirements," of the North Carolina Administrative Code, as amended, August 1, 2002.

The 7B guidelines provide that each of the twenty coastal counties prepare and adopt a CAMA Land Use Plan that meets the planning requirements adopted by the Coastal Resources Commission (CRC). If a county chooses not to prepare a plan, the guidelines specify that the CRC will prepare and adopt a CAMA Land Use Plan for that county.

In general, 7B requires that a plan include analysis of existing and emerging conditions, a plan for the future including specific land use/development goals/policies, and tools for managing development. The management tools must specify the actions which the Village of Bald Head Island will take to ensure implementation of this plan. Hereinafter, the Village of Bald Head Island will be referred to as the Village.

At the beginning of the preparation of this document, the Village adopted a Citizen Participation Plan which is intended to ensure that all interested citizens have an opportunity to participate in the development of this plan through both oral and written comments. A copy of the Citizen Participation Plan is included as Appendix I.

Following adoption of the plan by the Bald Head Island Village Council, it was submitted to the CRC for certification. Certification of the plan was achieved on _____, 2006.

SECTION II. HISTORY

The Village's history is peppered with colorful people and connections. Through the years, the island has been a breeding ground for wild boar, a prime hangout for bootleggers, a supplier of materials for cedar pencils, a Civil War fort, a nesting ground for loggerhead turtles, and a produce farm and fruit orchard. Pirates, lighthouse keepers, Indians, river pilots, ruffians, soldiers, farmers, and entrepreneurs of all types have come and gone, and yet, the Village's essence is unchanged. This can only be because the island itself is a living thing, with its own integrity and spirit, its wild beauty more or less disregarding man's inclination to tinker.

In the 17th and 18th centuries, when pirates ruled the waters off the coast of North Carolina with greed and terror, the Village was a favorite refuge and base for these notorious buccaneers. In all, the waters surrounding Cape Fear were a hideaway for hundreds of pirates, the most famous of which were Edward Teach, better known as Blackbeard, and Stede Bonnet, the gentleman pirate.

Bonnet, the so-called "Gentleman Pirate" from Barbados, was an educated retired military officer who turned to piracy in 1717 as a second career in order to escape what one historian tactfully referred to as "the discomforts he found in a married state." During his short stint as a pirate, Bonnet terrorized the Carolina and Virginia coasts aboard his sailing sloop *Revenge* with 10 guns and 70 men. For a brief time, Bonnet even linked up with Blackbeard, a pirate who never carried the title "gentleman." In 1718 Blackbeard was cornered and killed aboard his sloop, *Adventure*, by two warships sent by the governor of Virginia. Just three weeks later, Bonnet was captured at Bonnet's Creek in Southport by Colonel William Rhett of South Carolina and hanged near Charlestown. Their deaths marked a dramatic end to the Golden Age of Piracy in North Carolina.

Long before pirates ever discovered the Village's nooks and crannies, Native Americans hunted Bald Head Island and fished its surrounding waters in the spring and summer while maintaining permanent settlements on the mainland. The island was, in effect, a seasonal retreat for the Native Americans when supplies of corn or grain began running low.

Early river pilots were responsible for giving the Village its unique and descriptive name. Eager to offer their navigational services to ships approaching the entrance to the Cape Fear River, they took up watch on a high dune headland on the southwest point of the island. According to local lore, the headland was worn bare of vegetation, making it stand out in contrast to the forest

behind it. This “bald” headland served as a reference point for ships entering the river, and the name Bald Head Island has endured.

The year 1817 saw the construction of the island’s most revered landmark and symbol, Old Baldy Lighthouse. Still the island’s only “highrise,” Old Baldy lighthouse was the second of three lighthouses built on Bald Head Island, and is the only one remaining. In 1903, the lighthouse was decommissioned when the Cape Fear Light was erected on the eastern end of the island, but it still serves as a prominent day marker for mariners. Due to restoration efforts by the Old Baldy Foundation and the generosity of hundreds of contributors, visitors to North Carolina’s oldest lighthouse can climb up her 108 steps for a spectacular panoramic view of Bald Head Island.

The foundation of the Cape Fear Light can still be seen at the end of Federal Road across from three lightkeeper’s cottages known as Captain Charlie’s Station, after Captain Charles Norton Swan, a lighthouse keeper who lived with his family on Bald Head Island from 1903 until 1933. Captain Charlie’s Station is listed in the National Register of Historic Places, and still commands a sweeping view of the dunes and sea at the island’s southeastern point.

In addition to lightkeepers, in the late 19th and early 20th centuries the island was home to members of the U.S. Lifesaving Service, the predecessor to the modern day Coast Guard. Several buildings on the southeastern shore of the island overlooking Frying Pan Shoals served as equipment storage and housing for the servicemen. The only remaining Lifesaving Station structure is a boathouse that was moved from the beachfront to back among the dunes where it is now a private residence.

Another symbol of the past presence of lightkeepers and lifesaving servicemen on the island is the Old Boat House on Bald Head Creek, built in 1903 to store supplies and boats. A dramatic change in the shape of the creek channel over the last ninety years makes it appear to have moved several hundred yards.

The most notable feature on the 1864 Blackford map (established by B.L. Blackford) was Fort Holmes, located on the Bald Head promontory at the southwest corner of the island. Most of what we know regarding the fort can be gathered from a detailed sketch of its layout prepared in 1865. In addition, several firsthand accounts prepared by officers at Fort Holmes are extant. The fort had been hurriedly erected in 1863 and 1864 as part of a defense system for the lower Cape Fear. The string of forts from Bald Head to Wilmington kept the river, the “lifeline of the

Confederacy,” open for blockade runners. Given the presence of two navigable entrances, that at Bald Head and a second above Smith Island at New Inlet, the river was ideal for such traffic.

The sketch of Fort Holmes prepared by Federal occupation forces in 1865 indicates that the earthen breastworks extended the width of the island from the lighthouse to the southwest tip at Bald Head. A road to the opposite end of the island ran through the upper part of the fort. The earthen works, it was noted, were reinforced with palmetto and oak logs. Four batteries extended along the east side of the fort. The fifth and largest, Battery Holmes, with bombproof magazines, was at the island’s southwesternmost point. A flagstaff was positioned on the Bald Head promontory. Quarters and storehouses were located in several spots inside the fort.

Despite subtle shifts in sand and sea, Bald Head Island remains much as it was centuries ago. It still serves as a natural sanctuary for educators and students interested in coastal ecology, a home for a special breed of permanent residents that share a kinship of spirit with the hardy, independent lightkeepers and servicemen of days long past, and a refuge for vacationers seeking privacy and rejuvenation in a beautiful, relaxed setting.

SECTION III. REGIONAL SETTING

The Village is the southernmost of North Carolina's cape islands, and is located at the mouth of the Cape Fear River. The island sits off of the North Carolina Coast adjacent to the City of Southport and Oak Island. Reaching the island involves a 20-minute passenger ferry ride which transports you from the ferry terminal at Indigo Plantation and Marina in Southport, N.C., to the harbor at the Village. This trip covers a distance of two nautical miles.

In order to reach the ferry terminal you must travel down NC Highway 211 to Southport. Southport is located 30 miles south of Wilmington, N.C., and 60 miles north of Myrtle Beach, S.C. From points west, Interstate 40 and Highway 74/76 link the region directly with I-95. Entering Southport on Route 211 (Howe Street), turn right onto West 9th Street and continue to the ferry landing. The ferry service to and from the Village runs year round on a consistent basis. Map I provides the regional location and ferry route for the Village.

MAP I - REGIONAL LOCATION

SECTION IV. BALD HEAD ISLAND CONCERNS/ASPIRATIONS

A. KEY ISSUES

On January 17, 2005, the Village conducted a publicly advertised meeting with the purpose of identifying key issues and concerns for the Village. The intent of this effort was to identify issues related to the Village that can be addressed in the context of this plan. All permanent Village residents were mailed a letter inviting them to attend the meeting, and advertisements were also run in the local newspaper and on the Bald Head Island Association public cable channel. Approximately 30 people attended the meeting. The following provides the top ten issues (see Appendix II for a complete listing):

Rank	Issue	Score
1	Protect maritime forests	25
2*	Beach erosion	22
2*	Address carrying capacity and future needs of the Island. Build-out?	22
3	Water quality in Bald Head Creek	21
4	Need to address redevelopment of a public restroom/shower facility at East Beach	18
5	Wildlife management	16
6*	Allow for adequate commercial development	13
6*	Preservation of vegetation and dune lines (Live Oaks)	13
6*	Protect conservation areas	13
6*	Coordinate LUP with restrictive covenants	13
7	Stormwater management	11
8*	Maintenance of ferry basin	10
8*	Protection of water table (foreign water affecting aquifer)	10
9*	Restriction of gas powered engines	9
9*	Processing of waste	9
9*	Address utilities	9
	– Size (7)	
	– Disposal of waste of golf courses (2)	
10	Preservation of the dune ridge	8

*Indicates a tie score.

Additionally, surveys were mailed out to 1,348 absentee property owners. A total of 473 completed questionnaires were received. Results of the responses to the village meeting and absentee property owners were very similar. See Appendix III for a comparison of these results as well as the tabulation of additional questions from the absentee property owners survey.

B. VILLAGE OF BALD HEAD ISLAND COMMUNITY VISION

Bald Head Island is a residential, family oriented community and major family tourist destination committed to living in harmony with nature while being supportive of activities and services necessary to enhance the quality of life on the Island.

SECTION V. ANALYSIS OF EXISTING AND EMERGING CONDITIONS

A. POPULATION, HOUSING, AND ECONOMY

I. Village of Bald Head Island Permanent Population

a. Village of Bald Head Island and Brunswick County including all municipalities

The permanent population for the Village remains quite low; however, growth has been consistent since the Village’s incorporation in 1985. Between 1990 and 2000, the population increased by 121.8%. The 1990 Census was the first year that a population count was prepared for the Village. According to estimates from the North Carolina Office of State Planning, an additional 32 permanent residents moved to the island between 2000 and 2003, boosting the total population to 205 residents. Although the growth in terms of total population has been low, the percentage growth rate experienced in the Village has been rapid. In terms of percentage growth rate, the Village was the fourth fastest growing municipality in Brunswick County between 1990 and 2003. Table I below provides a detailed breakdown of population growth and growth rates for the Village as well as all municipalities within Brunswick County.

Table I: Village of Bald Head Island and Brunswick County Population Growth by County and Municipality

Municipality	Total Population			% Change		Overall '90-'03
	1990	2000	2003 Estimate	'90-'00	'00-'03	
Bald Head Island	78	173	205	121.8%	18.5%	162.8%
Belville	66	363	407	450.0%	12.1%	516.7%
Boiling Spring Lakes	1,650	2,972	3,427	80.1%	15.3%	107.7%
Bolivia	228	148	151	-35.1%	2.0%	-33.8%
Calabash	179	711	1,334	297.2%	87.6%	645.3%
Carolina Shores	1,031	1,482	2,120	43.7%	43.0%	105.6%
Caswell Beach	175	370	425	111.4%	14.9%	142.9%
Holden Beach	626	787	836	25.7%	6.2%	33.5%
Leland	1,801	1,938	4,703	7.6%	142.7%	161.1%
Long Beach*	3,816	0	0	-100.0%	0.0%	N/A
Navassa	445	479	1,570	7.6%	227.8%	252.8%
Northwest	611	671	727	9.8%	8.3%	19.0%
Oak Island*	0	6,571	7,120	0.0%	8.4%	N/A

**Table 1: Village of Bald Head Island and Brunswick County
Population Growth by County and Municipality (Continued)**

Municipality	Total Population			% Change		Overall '90-'03
	1990	2000	2003 Estimate	'90-'00	'00-'03	
Ocean Isle Beach	523	426	448	-18.5%	5.2%	-14.3%
Sandy Creek	243	246	262	1.2%	6.5%	7.8%
Shallotte	1,073	1,381	1,662	28.7%	20.3%	54.9%
Southport	2,369	2,351	2,558	-.8%	8.8%	8.0%
St. James**	0	804	1,610	0.0%	100.2%	N/A
Sunset Beach	311	1,824	1,967	486.5%	7.8%	532.5%
Varnamtown	404	481	513	19.1%	6.7%	27.0%
Yaupon Beach*	734	0	0	-100.0%	0.0%	N/A
Total Municipalities	16,363	24,178	32,045	47.3%	33.0%	95.8%
Total Unincorp. Areas	34,622	48,963	49,765	41.6%	1.5%	43.7%
Total County	50,985	73,141	81,810	43.5%	11.9%	60.5%

*Long Beach and Yaupon Beach merged to form the Town of Oak Island on 7/1/1999.

**This municipality was incorporated between the 1990 and 2000 Census. NOTE: The Town of Saint James paid for a special census to be completed as a result of some annexations that occurred after the 2000 Census was taken. The special census, dated June 10, 2004, reflects a census count of 1,831 persons. Municipalities may challenge a census count within three years of when the census is taken in order to have the population changed. The special census for Saint James was completed after that time period and, therefore, the official decennial census count was not changed. However, the state demographer gave Saint James an updated census count of 1,814. This figure was based on the town's boundaries, including the 2001 annexed areas (This information was obtained from the NC State Data Center). Source: US Census Bureau & NC Office of State Planning.

Table 2 summarizes peak seasonal population in the Village. The Village relies heavily on seasonal visitors. During the summer months, population on the island increases substantially, and resources of the Village are stretched. The information provided in this table is taken from several different sources. The calculations provided for marina boat slips are based on data obtained from the dockmaster operating the Bald Head Island Marina. According to the dockmaster, there are 150 boat slips at the marina. All of these slips have full hookups, meaning that water and electric service is provided to all slips. During peak summer months, it is estimated that 25 of these slips are utilized for overnight visitors. According to the dockmaster, each boat typically houses an average of 4.5 persons. The only other means of getting to Bald Head Island is by the ferry. Based on this, peak seasonal population figures have been based on total available parking at the ferry terminal located at Indigo Plantation. There are currently 1,138 total parking spaces at this facility. During peak summer months, these lots are generally full. In order to establish a peak seasonal population estimate, an average of four persons per car was utilized. By using this methodology,

foot traffic into the Village will be accounted for; however, construction workers and other personnel utilizing the construction ferry terminal have not been included. Additionally, parking spaces utilized by permanent residents and employees were subtracted from this figure. In order to determine how many parking spaces are occupied by permanent residents, an average of 1.5 cars per household was utilized. There are approximately 88 homes within the Village that are occupied by permanent residents. Parking spaces that are occupied by Village employees have also been subtracted. Accounting for these two groups results in 973 parking spaces available for seasonal visitors and residents. Based on these calculations, the total peak seasonal population for 2003 is 4,210.

Table 2: Village of Bald Head Island Seasonal Population, 2003

Housing Type	Number of Units	Persons Per Unit	Seasonal Population
Parking Spaces	973	4.00	3,892
Marina Boat Slips	25	4.50	113
Total			4,005
Permanent Population	205		
Peak Seasonal Population	4,005		
Total Peak Population	4,210		

*It should be noted that when parking at Indigo Plantation is not sufficient, additional parking is available at Southport Elementary School, as well as the old Roses Parking Lot. These parking spaces are not accounted for in these figures. Source: Holland Consulting Planners, Inc.

b. Population Profile

As of 1990 the US Census reported that the population in the Village was one hundred percent Caucasian. The 2000 Census reported that there is some racial diversity now on the island. The permanent population is still predominantly Caucasian, making up 95.4% of the population, but there is a small African American population (3.0%), as well as one American Indian and two individuals of two or more races. The gender breakdown of the permanent population is fairly evenly split with 89 males (51.4%) and 84 females (48.6%). The following table is a comprehensive summary of racial composition in the Village and Brunswick County.

**Table 3: Village of Bald Head Island and Brunswick County
Racial Composition, 1990-2000**

	Village of Bald Head Island		Brunswick County
	Total	Percentage	Percentage
1990 Population*	78	100.0%	100.0%
White	78	100.0%	81.1%
Black	0	0.0%	18.1%
Asian or Pacific Islander	0	0.0%	0.2%
American Indian, Eskimo, Aleut	0	0.0%	0.5%
Other	0	0.0%	0.2%
2000 Population**	173	100.0%	100.0%
White	165	95.4%	82.3%
Black or African American	5	3.0%	14.4%
Asian or Pacific Islander	0	0.0%	0.3%
American Indian and Alaska Native	1	0.6%	0.7%
Some Other Race	0	0.0%	1.3%
Two or More Races	2	1.2%	1.0%
Male	89	51.4%	49.1%
Female	84	48.6%	50.9%

*Racial breakdown available for the 1990 Census.

**Racial breakdown available for the 2000 Census.

Source: 2000 US Census.

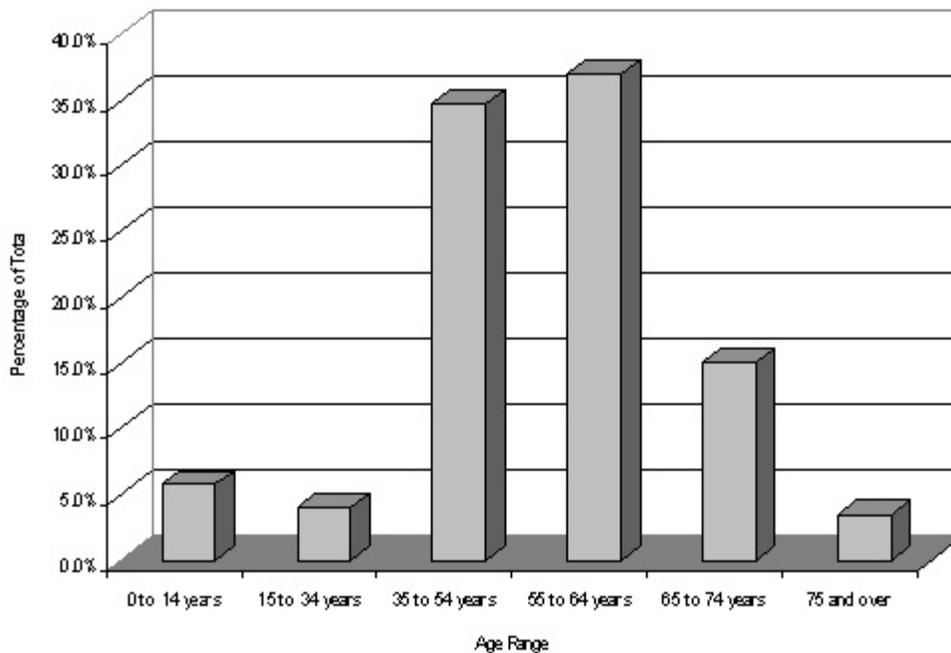
A majority of the permanent population living within the Village can be considered middle aged according to the 2000 US Census. Approximately 72% of the population is between the ages of thirty-five and sixty-four. The population has aged slightly since 1990, with the fifty-five to sixty-four age brackets increasing by 14%. This increase can also be attributed to in-migration experienced over the same period. The school age population in the Village has increased by six individuals between 1990 and 2000. However, the percentage of total population for this age range remained at approximately 5%. The retired age population decreased slightly during this same period. Table 4 provides a detailed breakdown of age composition for the Village and Brunswick County.

**Table 4: Village of Bald Head Island and Brunswick County
Age Composition, 1990 and 2000**

	Village of Bald Head Island				Brunswick County	
	1990 Total	1990 % of Total	2000 Total	2000 % of Total	1990 % of Total	2000 % of Total
0 to 14 years	4	5.1%	10	5.8%	19.4%	17.6%
15 to 34 years	7	9.0%	7	4.0%	27.5%	22.2%
35 to 54 years	33	42.3%	60	34.7%	25.9%	28.6%
55 to 64 years	18	23.1%	64	37.0%	12.5%	14.7%
65 to 74 years	15	19.2%	26	15.0%	10.3%	11.1%
75 and over	1	1.3%	6	3.5%	4.4%	5.8%
Total population	78	100.0%	173	100.0%	100.0%	100.0%
Median age	n/a	n/a	56.3	n/a	n/a	42.2
School Age Population (5-18)	4	5.1%	9	5.2%	18.3%	18.0%
Working Age Population (16-64)	58	74.4%	131	75.7%	64.4%	65.5%
Retired Population (65+)	16	20.5%	32	18.5%	14.7%	16.9%

Source: 2000 US Census.

Chart 1: Village of Bald Head Island
Age Composition



The permanent population within the Village is well educated. According to the 2000 US Census, 69% of residents have completed their Bachelor’s Degree or higher. It should be noted that this is based on individuals 25 years of age and over. Out of 150 persons recorded in this count, only 38 did not obtain some form of college degree. The following table summarizes the educational attainment for Village residents.

**Table 5: Village of Bald Head Island
Educational Attainment, 2000
Based on Persons 25 Years Old or Older**

	Village of Bald Head Island		Brunswick County	North Carolina
	Total	% of Total	% of Total	% of Total
Less than 9 th grade	0	0.0%	6.3%	7.8%
Ninth to twelfth grade, no diploma	0	0.0%	15.4%	14.0%
High school graduate	10	6.7%	33.2%	28.4%
Some college, no degree	28	18.7%	22.5%	20.5%
Associate degree	9	6.0%	6.5%	6.8%
Bachelor’s degree	64	42.7%	11.0%	15.3%
Graduate/Professional degree	39	26.0%	5.1%	7.2%
Total population 25 years and over	150	100.0%	100.0%	100.0%
Percent High School Graduate or higher		100.0%	78.3%	78.1%
Percent Bachelor’s degree or higher		68.7%	16.1%	22.5%

Source: 2000 US Census.

c. Population Summary

The following provides a summary of the population demographic information for the Village:

- ▶ The permanent population in the Village increased by 127 individuals or 162.8% between 1990 and 2003.
- ▶ The total peak seasonal population for the Village is 4,210.
- ▶ The permanent population within the Village is predominantly Caucasian (95.4%); the remaining population is predominantly African American comprising 3% of the total population.

- ▶ A majority of the Village population is between the ages of thirty-five and sixty-four (72%).
- ▶ Approximately 69% of Village residents age 25 and over have received an education equivalent to a Bachelor’s Degree or higher.

2. Housing

a. *Housing Occupancy and Tenure*

The Village exists primarily as a second home community and is a well known tourist and/or seasonal destination. Because of this, a majority of the housing stock is comprised of vacant housing units. Based on the 2000 Census, 87.1% of the Village’s total housing stock is comprised of vacant housing. Approximately 95.5% of the vacant housing units are considered to be either for rent or are second homes. The following table summarizes housing occupancy and tenure for the Village, as well as Brunswick County.

Table 6: Village of Bald Head Island and Brunswick County Housing Occupancy and Tenure, 1990 and 2000

	Village of Bald Head Island		Brunswick County
	1990 % of Total	2000 % of Total	2000 % of Total
Total Housing Units	100.0%	100.0%	100.0%
Vacant:	90.1%	87.1%	40.8%
For rent*	1.1%	28.3%	10.2%
For sale only*	3.7%	2.7%	4.7%
Rented or sold, not occupied*	0.0%	1.7%	1.9%
For seasonal, recreational or occasional use*	94.6%	67.2%	74.0%
For migrant workers*	0.0%	0.0%	0.1%
Other vacant*	0.6%	0.0%	9.2%
Occupied:	9.9%	12.9%	59.2%
Owner-Occupied**	94.9%	90.8%	82.2%
Renter-Occupied**	5.1%	9.2%	17.8%

*Indicates breakdown of vacant household types.

**Indicates breakdown of occupied household types.

Source: US Census Bureau.

b. Age of Structure

Table 7 and Chart 2 provide a summary of residential construction activity dating back to the early 1900s. Based on this information, it is very clear that Bald Head was discovered during the seventies. Once the picturesque island was established as not only a destination but a residential development, construction increased substantially. Between the years of 1980 and 1989, approximately 34% of the island's entire housing stock was constructed.

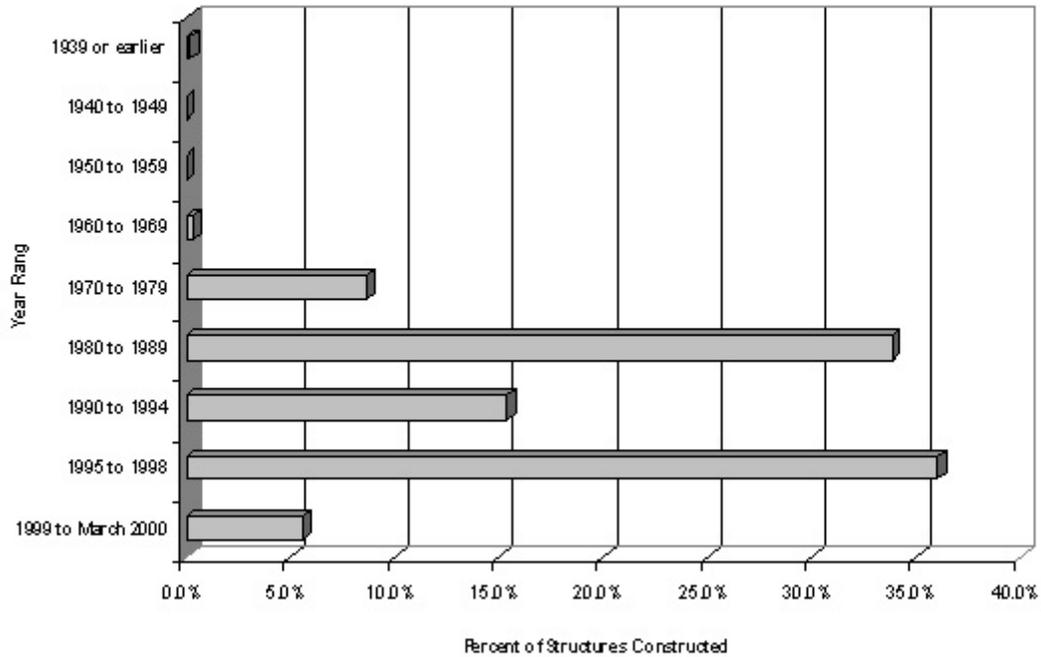
Table 8 is a summary of residential building permit activity dating back to 1992. This information was provided by the Village of Bald Head Planning and Inspections Department. According to this information there have been 775 total building permits issued since 1992. Since the year 2000 43.8% or 340 of these permits have been issued. This clearly shows that residential development continues to increase on the island.

Table 7: Village of Bald Head Island Housing Structure, 2000

<u>Year</u>	<u>% of Total</u>
1999 to March, 2000	5.6%
1995 to 1998	36.0%
1990 to 1994	15.4%
1980 to 1989	33.8%
1970 to 1979	8.6%
1960 to 1969	0.3%
1950 to 1959	0.0%
1940 to 1949	0.0%
1939 or earlier	0.2%
Total Structures	100.0%
Median Year Structure Built	1992

Source: US Census Bureau.

Chart 2: Village of Bald Head Island
Year Structure Built



**Table 8: Village of Bald Head Island
Building Permit Data 1992-November 2004**

Year	# of Residential Building Permits
1992	31
1993	15
1994	61
1995	110
1996	61
1997	52
1998	55
1999	50
2000	62
2001	63
2002	88
2003	71
2004	56
Total	775

Source: Village of Bald Head Island Planning and Inspections Department.

The following table provides a breakdown of improved and unimproved properties throughout the Village. The data is further broken down by land use. This information accounts for all development within each of these stages.

**Table 9: Village of Bald Head Island
Improved and Unimproved Properties**

Residential	Improved	Unimproved	% Developed
Stage I	700	826	45.9%
Stage II	188	299	38.6%
Middle Island	26	81	24.3%
Total	914	1,206	43.1%

Commercial	Improved	Unimproved	% Developed
Stage I*	19	27	41.3%
Stage II	0	14.62 acres**	0.0%
Middle Island	0	0	0.0%
Total	19	27	55.6%

Acreage Open Space	Unimproved
Stage I	135
Stage II	32
Middle Island	19
Total	186

*Improved commercial properties in Stage I consist of properties that are located in the Harbor, Maritime Market Way, and Edward Teach Extension.

**Stage II commercial properties are shown in acres due to the fact that none of the commercial properties have been subdivided. The Shoals Club is considered a recreational property, and is not reflected in the commercial figures. Source: Village of Bald Head Island.

c. Housing Conditions

The housing stock within the Village is in outstanding condition. Based on the tables above, it is clear that a majority of the residential structures on the island are of fairly new construction. This not only results in more structurally sound homes, but ensures that they have been built under more recent building codes. Building codes have been updated over time to better deal with strong winds and storm surge associated with tropical storm events. Residential units within the Village average 5.4 rooms per unit. Approximately 77% of the residences have three or more

bedrooms. The following table summarizes a few key statistics regarding housing conditions with comparisons to Brunswick County and North Carolina overall.

Table 10: Village of Bald Head Island, Brunswick County, and North Carolina Housing Conditions

	Village of Bald Head Island	Brunswick County	North Carolina
Average Rooms Per Unit	5.4	5.3	5.5
Percent with no bedroom	0.3%	0.7%	1.1%
Percent with 3+ bedrooms	76.5%	62.5%	60.8%
Percent lacking complete kitchen facilities	0.0%	0.7%	1.1%
Percent lacking complete plumbing	0.3%	0.9%	1.1%
Percent occupied with telephones	100.0%	96.2%	86.2%

*The average rooms per unit does not include crofters. Crofters are single units with plumbing for a bathroom situated separate from the primary residence. These are typically located over garages.

Source: US Census Bureau.

d. Units in Structure

Nearly the entire housing stock within the Village (90%) is comprised of single-family residential construction. Additionally there are a small number of multi-family units located on the island. Table 11 summarizes the units in structure count for housing construction in the Village, as well as Brunswick County.

Table 11: Village of Bald Head Island and Brunswick County Units in Structure and Mobile Home Count, 2000

Units in Structure	Village of Bald Head Island	Brunswick County
	% of Total	% of Total
1-unit, detached	87.6%	55.7%
1-unit, attached	2.0%	1.3%
2 units	5.8%	1.2%
3 or 4 units	4.6%	2.1%
5 to 9 units	0.0%	1.9%
10 to 19 units	0.0%	1.1%
20 units or more	0.0%	0.6%
Mobile home	N/A	35.9%
Boat, RV, van, etc.	0.0%	0.2%
Total	100.0%	100.0%

Source: US Census Bureau.

The demographic information presented in Table 12 is an interesting account of when owner occupants moved into their homes. This is not only an additional indicator of population growth but provides the reader with a brief account of when sharp increases in permanent population and owner-occupant housing development occurred. According to this information, 43.4% of owner-occupants moved to the island between 1995 and 1998. A total of 67 residential units became home to year round residents between the years 1990 and 2000.

**Table 12: Village of Bald Head Island
Year Householder Moved Into Unit**

Year	Total	% of total
Total Occupied Units	90	100.0%
1999 to March 2000	18	19.7%
1995 to 1998	39	43.4%
1990 to 1994	23	25.0%
1980 to 1989	8	9.2%
1970 to 1979	2	2.6%
Before 1970	0	0.0%
Median year householder moved into unit	1996	

Source: US Census Bureau.

e. *Housing Summary*

The following provides a summary of significant points identified through the housing demographics discussion:

- ▶ A majority of the housing units in the Village (87.1%) are vacant; of these 67.2% are considered to be for seasonal, recreational, or occasional use.
- ▶ The median for the year in which residential structures have been built within the Village is 1992.
- ▶ Since the year 2000, 340 residential building permits have been issued by the Village Planning and Inspections department.
- ▶ Residential housing units on average have 5.4 rooms per unit, and 76.5% have three or more bedrooms.

- ▶ Nearly the entire housing stock (89.6%) within the Village is comprised of single-family residential homes.

3. Employment and Economy

a. General Economic Indicators

Table 13 provides a summary of general economic indicators for the Village, as well as Brunswick County and North Carolina. According to this table, the per capita income for the Village residents is \$45,585. The Village’s per capita income is over twice that of the state and Brunswick County. The percent of the population currently in the workforce is approximately 56.7%. This percentage is comparable to that of Brunswick County. It is difficult to determine how accurate these economic indicators are for the Village, due to the methodology used to calculate the census. This information should be viewed as estimates only.

**Table 13: Village of Bald Head Island, Brunswick County and North Carolina
Summary of Economic Indicators**

	Year	Bald Head Island	Brunswick County	North Carolina
Per Capita Income	2000	\$45,585	\$19,857	\$20,307
Mean Income	2000	\$73,392	\$43,808	\$50,814
Unemployment Rate	2000	3.3%	2.6%	3.4%
% of Population in labor force	2000	56.7%	57.7%	65.7%

*Per capita income is calculated by totaling all reported annual incomes for permanent Bald Head Island residents and dividing that figure by the total population. This figure may appear low due to the fact that approximately 19% of the Village’s total population are of retirement age and are no longer producing an annual income.

Source: NC Department of Commerce & US Census Bureau.

b. Household Income

Household income for the Village is much higher than that of Brunswick County. It is clear that the income range for Village residents is fairly high. This is evidenced by property values across the island. Approximately 80.2% of the households on the island report an annual income in excess of \$50,000 per year. The median income of Village residents is \$62,083, compared to \$35,888 for Brunswick County. Table 14 provides a comprehensive breakdown of household income for the Village and Brunswick County.

Table 14: Village of Bald Head Island and Brunswick County Household Income, 2000

	Village of Bald Head Island		Brunswick County
	Total	% of Total	% of Total
Less than \$10,000	4	4.9%	10.3%
\$10,000 to \$14,999	2	2.5%	7.7%
\$15,000 to \$24,999	1	1.2%	15.5%
\$25,000 to \$34,999	0	0.0%	15.2%
\$35,000 to \$49,999	9	11.1%	18.0%
\$50,000 to \$74,999	31	38.3%	18.6%
\$75,000 to \$99,999	7	8.6%	7.4%
\$100,000 to \$149,999	15	18.5%	4.6%
\$150,000 to \$199,999	3	3.7%	1.2%
\$200,000 or more	9	11.1%	1.5%
Total Families	81	100.0%	100.0%
Median Income	\$62,083		\$35,888

Source: 2000 US Census.

c. *Employment By Industry*

Table 15 provides a breakdown of employment by industry for Village residents. This table accounts for all permanent residents age sixteen or over. Based on this information the largest employer of Village residents is the finance, insurance, real estate, and rental and leasing industry. This group of businesses account for 30.0% of the jobs for eighty individuals age sixteen or over reported to be in the work force. Other notable industries providing employment of Village residents are: professional, scientific, management, administrative, and waste management services; and retail trade.

Table 15: Village of Bald Head Island Employment By Industry, 2000

Industry	# Employed	% Employed
Agriculture, Forestry, Fishing, and Mining	0	0.0%
Construction	5	6.3%
Manufacturing	3	3.8%
Wholesale Trade	3	3.8%
Retail Trade	8	10.0%
Transportation, Warehousing, and Utilities	2	2.5%

**Table 15: Village of Bald Head Island
Employment By Industry, 2000 (continued)**

Industry	# Employed	% Employed
Information	1	1.3%
Finance, Insurance, Real Estate, and Rental and Leasing	24	30.0%
Professional, Scientific, Management, Administrative, and Waste Management Services	19	23.8%
Education, Health, and Social Services	1	1.3%
Arts, Entertainment, Recreation, Accommodation, and Food Services	2	2.5%
Other Services (except Public Administration)	0	0.0%
Public Administration	12	15.0%
Total Persons Employed 16 Years and Over	80	100.0%

Source: US Census Bureau.

d. Employment Commuting Patterns

Table 16 provides a summary of commuting patterns for Village residents. The information provided in this table is slightly inaccurate because it does not factor the ferry transit time into the overall commute. The table represents driving time only. Taking this into account, it is difficult to determine how many of the individuals who reported a commuting time of ten minutes or less are commuting to work on the island. It is known, however, that there are very few businesses and offices operating on the island. One notable statistic in this table is that 43.8% of the 80 individuals reported to be currently working are working out of their home.

**Table 16: Village of Bald Head Island
Travel Times to Work**

Travel Time	Total	% of Total
Total workers 16 years and over	80	
Did not work at home	45	11.1%
Travel Time:	5	31.1%
Less than five minutes	14	24.4%
5 to 9 minutes	11	22.2%
10 to 14 minutes	10	8.9%
15 to 19 minutes	4	0.0%
20 to 24 minutes	0	0.0%
25 to 29 minutes	0	0.0%
30 to 34 minutes	0	0.0%

**Table 16: Village of Bald Head Island
Travel Times to Work (Continued)**

Travel Time	Total	% of Total
35 to 39 minutes	0	0.0%
40 to 44 minutes	0	0.0%
45 to 59 minutes	0	0.0%
60 to 89 minutes	0	0.0%
90 minutes or more	1	2.2%
Mean travel time to work	14.1	
Worked at home	35	43.8%

Source: 2000 US Census.

e. Industries

There is no industrial activity within the Village corporate limits. There is some commercial activity, but this is primarily limited retail trade including: grocery, hardware, and restaurants. Additionally, golf cart repair and servicing is also available within the Village. Other than retail trade, the only other non residential construction activity involves the marina, country club, multi-family common areas, Bald Head Island Conservancy, office space, and town-owned facilities.

f. Employment and Economy Summary

The following is a summary of the economic data that has been discussed in this section:

- ▶ The per capita income for the Village’s residents is \$45,585.
- ▶ Out of the total families recorded in the 2000 Census within the Village, approximately 80% reported an annual house hold income of \$50,000 or greater.
- ▶ The largest employer of the Village’s working age population is the finance, insurance, real estate, and rental and leasing industries. This figure only takes into account the occupations of permanent residents.
- ▶ Approximately 44% of the Village’s working population reported working out of their homes.

4. Population Projections

The following table provides permanent and peak seasonal population estimates for the Village. These estimates are based on population growth trends experienced since the Village incorporated in 1985. The overall population growth in terms of numbers has been modest; however, the population percentage growth rate has been fairly rapid. This trend is expected to continue. If these trends do continue, the permanent population on Bald Head is expected to reach 665 individuals by the year 2025. This would result in an 284.3% increase from the 2000 Census report.

The estimates for peak seasonal population have been compiled based on the average building permit activity over the last ten years. Since 1995, the Village has issued an average of 66 residential building permits per year. The peak seasonal population estimates assume that this trend will continue. Additionally, a 2003 estimate of peak seasonal population has been established based on available parking at Indigo Plantation, and estimates of usage at the Village’s marina.

**Table 17: Village of Bald Head Island
Permanent and Seasonal Population Projections, 2000-2025**

	2000	2003	2010	2020	2025	% Change '00-'25
Permanent Population	173	205	301	490	665	284.3%
Peak Seasonal Population	N/A	4,210	5,519	7,346	9,917	135.5%*

*Percentage change is for 2003-2025.

Source: US Census Bureau, North Carolina Office of State Planning, Holland Consulting Planners, Inc.

B. NATURAL SYSTEMS ANALYSIS

I. Mapping and Analysis of Natural Features

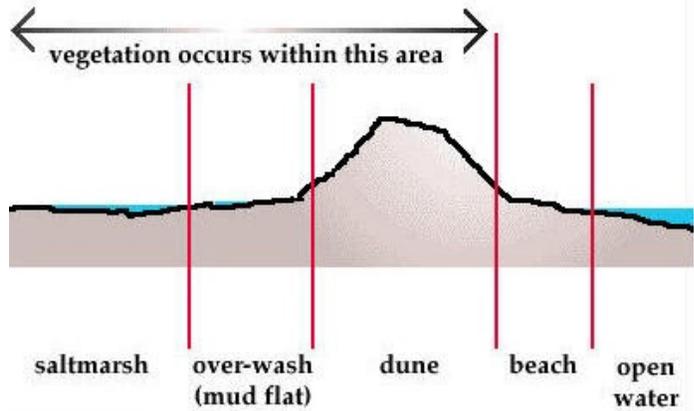
a. *Topography*

Bald Head Island is a semi-tropical barrier island located off the southern coast of Brunswick County, North Carolina. The Village is unique in that the island is home to many tropical plant species and birds that generally do not thrive in an environment located this far north. Barrier islands are a phenomenon that are still not fully understood by scientists. Barrier islands are fragile, constantly changing ecosystems that are important for coastal geology and ecology. These islands are separated from the mainland by a shallow sound. Barrier islands are

often found in chains along the coastline and are separated from each other by narrow tidal inlets. The Village is separated from the mainland by the Cape Fear River to the east and Corn Cake Inlet, also known as New Inlet, to the north. This inlet has been filled in over the years due to the shifting of the beach, and completely closed in 1999 as a result of Hurricane Floyd. Elevations on the island range from sea level to 38 feet. This determination was made based on a contour map with elevation intervals of two feet. This shows a significant change in elevation across the Village’s jurisdiction for a coastal barrier island.

A Typical Barrier Island

Barrier islands serve two main functions. First, they protect the coastlines from severe storm damage. Second, they harbor several habitats that are refuges for wildlife. In fact, the salt marsh ecosystems of the islands and the coast help to purify runoffs from mainland streams and rivers. Bald Head Island fits this overall description of a barrier island system. The island is home to a wide variety of wildlife including several endangered species.



b. Climate

The Village’s climate is marked by hot and humid summers, and cool winters with occasional cold spells. During summer months, the area is cooled by offshore breezes. Rain typically falls throughout the year and can be quite heavy at times. The Village is extremely vulnerable to tropical storms and the flooding associated with them because of the unique location of the barrier island. In the event of a cyclonic storm event, the island is situated between the turbulent waters of the Cape Fear River to the west, and the open Atlantic Ocean to the east and south, which exacerbates the problem of erosion along coastal portions of the island.

In winter, the average temperature in the Village is approximately 47°F, and the average daily minimum temperature is 37°F. The coldest recorded temperature on record for the region was 9°F occurring in 1977. During summer months, the average temperature is 78°F. The highest temperature on record for summer months was 103°F. Approximately 60% of all annual precipitation within the Village typically falls between the months of April and September. Thunderstorms typically occur on roughly 45 days annually. Snowfall in the area is rare; however, snow and winter storm events do occasionally occur.

c. *Flood Zones/Storm Surge*

Coastal flooding associated with tropical storm systems and nor'easters is a significant issue for the Village. Coastal flooding is the inundation of land areas along the oceanic coast by sea waters over and above normal tidal action. Such flooding can originate from the ocean front and/or adjacent sounds or riverine areas. Factors that contribute to the severity of coastal flooding include: tidal cycles, persistence and behavior of the storm that is generating the flooding, topography, shoreline orientation, and bathymetry (ocean floor contour) of the area.

The most significant concern for the Village with regards to coastal flooding is the storm surge that is generated by tropical storm events, including tropical storm systems and hurricanes. A storm surge is a dome or bulge of water that is caused by wind and pressure forces. It is a rise above the normal water level along a shore that is caused by strong onshore winds and/or reduced atmospheric pressure. The surge height is the difference of the observed water level minus the predicted tide.

A storm surge is caused by powerful coastal storms that move toward or adjacent to the coastline. It may be worsened by higher than normal astronomical tide levels. Two factors key in the development of a storm surge:

Low barometric pressure reduces the weight of the air on the ocean surface causing a slight rising (1 to 2 feet) of the surface of the water. This rising creates a dome and a new balance of forces.

Wind sweeps around the dome of water and induces currents that spiral toward the center of the storm. The force of the winds induces high waves that travel away from the storm. Wind is the dominant force at landfall, often bringing violent wave action far inland. The battering of these waves causes damage beyond mere flooding.

There are two different sets of data that will be used in the context of this plan to determine what portions of the Village fall within a flood hazard area: Federal Emergency Management Agency (FEMA) designated flood zones; and National Oceanic and Atmospheric Administration (NOAA) Storm Surge Inundation Model.

The Flood Insurance Rate Maps (FIRMS) for Brunswick County are currently being updated in response to inaccuracies in the data exposed during Hurricane Floyd in 1999. On September 15, 2000, the first anniversary of the Hurricane Floyd disaster, FEMA and the State of North

Carolina announced a historic agreement to develop a model program to maintain accurate flood hazard information for the State. As part of this program, the flood maps for the County are currently under revision. The portion of the County that falls within the Lumber River Basin has already been completed.

The Village, however, falls within the Cape Fear River Basin. The overall flood map updates are adopted on a county-by-county basis. The Cape Fear River Basin flood maps are expected to be complete and ready for review over the next few months. Once these maps are completed and have been through the formal review process, Brunswick County will move to adopt the updated County FIRM's. Once adopted, this plan will be updated to reflect data and Special Flood Hazard Area (SFHA) locations outlined on the new FIRMs.

It should be noted that in order to get secured financing to buy, build, or improve structures in Special Flood Hazard Areas you will be required to purchase flood insurance. Lending institutions that are federally regulated or federally insured must determine if the structure is located in a SFHA and must provide written notice requiring flood insurance.

Table 18 provides a summary of the acreage within the Village that falls within various flood zones outlined on existing FIRMs. Additionally, Map 2 provides the locations of these flood zones. The following provides an explanation of how FEMA defines each of the Special Flood Hazard Areas or flood zones designations that encompass portions of the Village:

Zone AE: Zone AE is the flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined in the Flood Insurance Study by detailed or limited detailed methods. In most instances, whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone VE: Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Shaded X: Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than one foot or with drainage areas less than one square mile; and areas protected by levies.

MAP 2 - FLOOD ZONES

**Table 18: Village of Bald Head Island
Flood Zones in Acres**

Flood Zone	Acres	% of Total Town Acreage
AE	571.64	22.8%
Shaded X	115.94	4.6%
VE	1,814.50	72.5%
Total Acres in Floodplain	2,502.08	100.0%
Total Village Acres	3,128.00	

Source: Federal Emergency Management Agency.

A majority of the Village’s jurisdiction falls within either the velocity (VE) or one hundred year (AE) flood hazard area. There is a significant portion of the island that is designated as falling within the five hundred year (X) flood hazard area. This portion of the Village is generally aligned with an elevated ridge centrally located across the eastern side of the island. This ridge ranges in elevation from 18 to 38 feet above sea level. The Village has submitted a letter of appeal protesting the proposed flood zone change along the shoreline of Bald Head Island Creek from an AE zone to a VE zone.

NOAA National Weather Service forecasters model storm surge using the SLOSH (Sea, Lake and Overland Surges from Hurricanes) model. The SLOSH model is a "diagnostic" model in that the hurricane's track, size, and intensity must be specified before the model is run. When these parameters are put into the model, a model wind field is produced, which in turn gives the surface stresses. The stresses act as the driving forces to move the water. Friction, the surface wind stress, and the pressure gradient cause the water to pile up along the coast.

Generally, shallow areas will experience greater storm surges than areas with a shelf that drops off rapidly. NOAA has run the SLOSH model for coastal areas of the United States assuming average parameters in order to determine the general locations of storm surge impact associated with fast and slow moving hurricanes. Table 19 provides a summary of the impact that varying storm events will have on the Village. Maps 3 and 4 show the location of the storm surge inundation.

MAP 3 - FAST MOVING STORM SURGE INUNDATION

MAP 4 - SLOW MOVING STORM INUNDATION

The data in these models is broken down by storm magnitude. The following provides a summary of hurricane strength according to the Saffir-Simpson Scale:

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 3 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 roof 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 damage 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.

**Table 19: Village of Bald Head Island
Storm Surge Inundation Acreage (Fast & Slow Moving Hurricanes)**

Hurricane Strength	Fast Moving		Slow Moving	
	Acreage*	% of Total Village Acreage	Acreage*	% of Total Village Acreage
Category 1 - 2	2,450	78.3%	2,434	77.8%
Category 3	2,599	83.1%	2,588	82.7%
Category 4 - 5	2,749	87.9%	2,657	84.9%
Total Village Acres	3,128			

*It should be noted that all acreage falling within a Category 1 - 2 storm surge area will also fall within the storm surge boundary of a Category 3 storm. The same applies to a Category 5 storm.
Source: National Oceanic and Atmospheric Administration.

d. Man-Made Hazards

There are no man-made hazards located within the Village. It should be noted, however, that there are two underground storage tanks located at the Bald Head Island Limited Marina Facility. These tanks are documented and inspected by the North Carolina Department of Environment and Natural Resources (NCDENR) Underground Storage Tanks Program. 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. According to NCDENR, there have been no reported problems associated with the underground storage tanks at this facility.

Although there are no man-made hazards immediately within the Village, the western side of the island is immediately adjacent to a shipping channel that is utilized by cargo ships accessing the NC State Port Facility in Wilmington. The location of this shipping channel has a minimal impact with regards to development within the Village. One benefit to the Village is that when this channel is periodically dredged, the least cost option for disposal of the spoil is on the south and east facing beaches of the island. The Village currently has a contract with the US Army Corps of Engineers to receive this sand through 2006.

e. Soils

There are four different soil series within the Village’s jurisdiction. Observations regarding the soils and soils conditions were taken from the Soil Survey of Brunswick County, North Carolina, which was issued in November 1986. All of the four soil series identified within the Village are considered to have severe conditions for septic tank usage. When making determinations regarding the installation of septic tanks, the County soil survey should not be utilized. The soil survey is intended for use only as a general reference, and not for site specific determinations. Slight elevation and soil condition changes can have a drastic effect on the permeability of soils, and in turn the suitability for septic tank installation. There is not a substantial number of individual septic tank systems installed within the Village. Residential developments on the island are moving toward the use of advanced package treatment facilities.

Of the four soil series identified, two are comprised entirely of hydric soils. The definition of a hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. Also, soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some series, designated as hydric, have phases that are not hydric depending on water table, flooding, and ponding characteristics. The presence of hydric soils is significant due to the fact that these soils are typically poorly suited for development. Additionally, these soils may meet the definition of 404 wetland areas if found in combination with certain 404 vegetation and require permitting by the U.S. Army Corps of Engineers’ Wilmington office prior to any disturbance. Map 5 shows the location of all soil types within the Village, and the following table provides a summary of the soil conditions.

Table 20: Village of Bald Head Island Soil Conditions

Soil	Acreage	Septic Tank Conditions	Flooding Frequency
BO - Bohicket	893.7	Severe: flooding, ponding, percs slowly	Frequent
Co - Corolla	583.5	Severe: wetness, poor filter	Rare
Du - Duckston	63.2	Severe: flooding, wetness, poor filter	Occasional
NeE - Newhan	1,051.6	Severe: poor filter, slope	None
Water	536.6	N/A	N/A
Total	3,128.6		

Source: Soil Survey of Brunswick County, North Carolina.

MAP 5 - SOILS MAP

f. *Water Supply*

Water is by far the most abundant natural resource in Brunswick County, as well as Bald Head Island. The water supply for the Village comes from a combination of sources. There is a main trunk line that extends onto Bald Head Island from Caswell Beach to the southeast. This line is operated by the Brunswick County Utilities Department. The water from this system is taken from the Castle Hayne Aquifer.

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 county's water system. 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. 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.

Throughout the low lying and coastal areas of Brunswick County, 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 portions underlying Brunswick County, have been designated as a capacity use area by the NC Groundwater Section. 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.

In addition to the water supplied through the county's system, Bald Head Island Utilities, Inc., operates a series of wells across the island that are tapped into the semi-confined aquifer running beneath the Village. These wells average about sixty feet in depth. Operation of these wells is crucial in the event that the county water source is cutoff. The well system on the island is sufficient to support current demand; however, if the county line is shut down water conservation measures must be considered. The aquifer beneath the Village is also vulnerable to issues associated with salt water intrusion as discussed above pertaining to the Castle Hayne Aquifer.

g. *Fragile Areas*

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 degradation 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.

This section will evaluate the following AECs and fragile areas within the Village: 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)

Estuaries are transition zones between fresh and salt water, usually where a river or stream flows into the ocean. Estuaries are protected from the full force of ocean waves and wind by barrier islands, mudflats, or sand. The sheltered waters support an abundance and diversity of plant and animal life, including marine mammals, shore birds, fish, crabs, clams and other shellfish, and reptiles. A number of marine organisms, including many of the commercially valuable fish species, depend on the estuaries for spawning, nursing, or feeding.

Besides serving as an important habitat for wildlife, estuaries also serve as a water filtration system by removing sediments, nutrients, and pollutants before they reach the ocean. The filtration process creates cleaner water, which is of benefit to both marine life and people who inhabit the surrounding areas. Estuaries also are important sources of flood control, with porous salt marsh soils and grasses absorbing flood waters and dissipating storm surges. Like barrier islands, they provide natural barriers between the land and the ocean. The Village's entire

jurisdiction falls adjacent to the estuarine waters of Middle Island. Due to the increased development occurring throughout the Village, protection of these waters will be a focus throughout the context of this plan.

Estuarine shorelines are shorelines immediately adjacent to or bordering estuarine waters. The areas are immediately connected to the estuary and are very vulnerable to heavy erosion caused by wind and water. In shoreline areas not contiguous to waters classified as ORW by the Division of Water Quality, all land 75 feet leeward from the normal water level are considered to be estuarine shorelines. The Village is not adjacent to any Outstanding Resource Waters. Development along estuarine shorelines can exacerbate water quality problems within estuarine waters, and expedite the threats of shorefront erosion and flooding.

Under CAMA rules, all estuarine shorelines are subject to CAMA development regulations at 15A NCAC 7H.0205-.0208, as follows:

- ▶ The location, design and construction of the 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.

- ▶ The 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.

- ▶ The project must follow the air and water quality standards set by the N.C. 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).

- ▶ The project must not significantly increase siltation or erosion, which can smother important habitats, block sunlight from aquatic plants, and choke fish and shellfish.
- ▶ The 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.
- ▶ Construction of the project must be timed 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.
- ▶ The 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 N.C. Division of Archives and History in the Department of Cultural Resources.
- ▶ The project must not reduce or prevent the use of, and public access to, estuarine waters and public trust lands and waters.
- ▶ The project must comply with the local land use plan. A land use plan is a "blueprint" developed by local leaders to help guide decisions that affect the growth of the community. CAMA requires each of the 20 coastal counties to prepare a local land use plan and update it according to CRC guidelines. More than 70 cities and towns have adopted their own plans.

ii. Public Trust Areas

The public trust area is comprised of submerged lands waterward of the mean high water line in tidal, coastal, or navigable waters adjacent to the Village. On the ground, the public trust area extends from the water up to a prominent debris line or high water mark. In general, if an area is regularly wet by the tides, it is probably safe to assume that it is in the public trust area. The public trust area is also sometimes referred to as tidelands, and can be generally defined as

"public beach." In almost every case, private property ends and public trust property begins at the mean high water line. The following provides a detailed description of areas that 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 does not 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.

These areas are significant because the public has rights in these areas, including navigation and recreation. The public trust areas also support valuable commercial and sports fisheries, have aesthetic value, and are important resources for economic development. All of the land within the Village that falls immediately adjacent to waters of the Cape Fear River, estuarine areas throughout Middle Island, and the Atlantic Ocean are considered public trust areas. Under CAMA regulations, all lands 30 feet leeward of public trust areas are subject to the restrictions specified above for estuarine shoreline areas.

iii. Coastal Wetlands

Coastal Resources Commission rules define "Coastal Wetlands" as any marsh in the 20 coastal counties that regularly or occasionally floods by lunar or wind tides, and that includes one or more of the following ten 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 the Village. They protect against flooding, help maintain water quality, provide habitat to wildlife, and serve as part of the estuarine system.

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 all portions of Brunswick County. 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 Village, and throughout coastal North Carolina. The location of all wetlands identified within the Village are shown on Map 6.

According to NCDPCM’s 2003 Coastal Wetlands Inventory, approximately 18.8% of the Village’s land area, or 271.6 acres, are coastal wetlands (see Table 21).

**Table 21: Village of Bald Head Island
Coastal Wetlands by Type and Aerial Extent**

Wetlands	Acres	% of Total Town Acreage
Cleared Depressional Swamp Forest	0.01	0.001%
Cleared Estuarine Shrub/Scrub	0.19	0.020%
Cutover Depressional Swamp Forest	0.01	0.001%
Cutover Estuarine Shrub/Scrub	5.79	0.540%
Depressional Swamp Forest	0.24	0.020%
Estuarine Forest	18.22	1.700%
Estuarine Shrub/Scrub	153.37	14.300%
Managed Pineland	3.93	0.370%
Salt/Brackish Marsh	890.48	83.050%
Total	1,072.24	100.000%

Source: NCDPCM Wetlands Inventory, 2003.

MAP 6 - WETLANDS

The following provides the DCM descriptions of the various wetland areas found in the Village. These descriptions are followed by the modifiers cleared and cutover as indicated in the table above:

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

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

Estuarine Forest - A forested wetland community subject to occasional flooding by tides, including wind tides (whether or not the tide waters reach these areas through natural or artificial watercourses). Examples include pine-dominated communities with rushes in the understory or fringe swamp communities.

Managed Pineland - Seasonally saturated, managed pine forests (usually loblolly pine) occurring on hydric soils. This wetland category may also contain non-managed pine forests occurring on hydric soils. Generally these are areas that were not shown on National Wetlands Inventory maps. These areas may or may not be jurisdictional wetlands. Since this category is based primarily on soils data and 30 meter resolution satellite imagery, it is less accurate than the other wetland categories. The primary criteria for mapping these areas are hydric soils and a satellite imagery classification of 'pine forest'.

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.

The following provides the definition of the modifiers used in the wetlands table above:

Cleared Wetland - Areas of hydric soils for which satellite imagery indicates a lack of vegetation in both 1988 and 1994. These areas are likely to no longer be wetlands.

Cutover Wetland - Areas for which satellite imagery indicates a lack of vegetation in 1994. These areas are likely to still be wetlands; however, they have been recently cut over. The vegetation in cutover areas may be regenerating naturally, or the area may in use for silvicultural activities.

iv. Ocean Beaches and Shorelines & Inlet Hazard Areas (Areas of Excessive Erosion)

Ocean beaches and shorelines are lands consisting of unconsolidated soil materials that extend from the mean low water line landward to a point where either (1) the growth of vegetation occurs, or (2) a distinct change in slope or elevation alters the configuration of the land form, whichever is farther landward. The entire southern length of the Village is an ocean beach. The Village contains approximately 5.5 miles of ocean erodible areas and high hazard flood areas.

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.

The average annual erosion rates and the respective setback limits for each boundary is shown on Map 7. The erosion rates, and in turn the setbacks, vary substantially along the shoreline of the Village. On Map 7, there are two different sets of setback requirements. One set applies to lots that were platted under prior setback requirements as set by NCDCCM. These

setbacks are referred to as grandfathered setback requirements. The second set indicates the current requirements and applies to newly established lots. When a lot is subdivided, the setback requirements that are in place at that time will apply in perpetuity unless a particular lot is subdivided at a later date when new requirements are in place. The CRC updates these 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.

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

- ▶ The 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.
- ▶ The 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.
- ▶ The 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.
- ▶ The 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.

MAP 7 - EROSION RATES

- ▶ Moving a building that is in an ocean hazard area will require 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.
- ▶ The project must meet all local minimum lot-size and setback requirements. Counties and towns often require a setback from roads, property lines, or dunes.
- ▶ The 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.
- ▶ A mobile home must not be placed 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.
- ▶ The public's ability to reach, use, and enjoy the resources that belong to all the people of the state must not be interfered with or blocked. 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.
- ▶ The 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 N.C. 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;
 - do not promote additional development in ocean hazard AECs;
 - will not damage natural buffers to erosion, wave wash, and flooding;

-- will not otherwise increase existing hazards.

- ▶ Meet all setback requirements for all development in the Ocean Hazard AEC.

Inlet hazard areas are portions of land that lie adjacent to turbulent waters associated with inlet navigation channels. Land adjacent to the inlet hazard area is extremely vulnerable to inlet migration, rapid and severe changes in watercourse, flooding and strong tides. The location of the inlet hazard area along the eastern coast of the island is shown on Map 7. Erosion rates along this portion of beach are extremely high. The US Army Corps of Engineers has just completed a channel maintenance project for this inlet. As part of this project approximately 1.2 million cubic yards of sand was placed on the east facing beach. This channel is dredged on a periodic basis every three to five years. Restrictions regarding development along the shoreline adjacent to the inlet hazard area follow the same provisions as shorelines within an ocean hazard area, however, the following additional restrictions apply:

- ▶ Permanent structures can be permitted at a density of no more than one commercial or residential per 15,000 square feet of land area.
 - ▶ Only residential structures of four units or less or non-residential units of less than 5,000 square feet total floor area will be allowed.
- v. Protected Land and Significant Natural Heritage Areas

Natural resource fragile areas are generally recognized to be of educational, scientific, or cultural value because of the natural features of the particular site. Features in these areas serve to distinguish them from the vast majority of the landscape. These areas include complex natural areas, areas that sustain remnant species, pocosins, wooded swamps, prime wildlife habitats, or registered natural landmarks.

Within the Village, the State of North Carolina recognizes three primary sites as protected lands. These include the Bald Head Woods Coastal Reserve, comprising the maritime forest centrally located on the island, and the Bald Head Island Natural Area, which comprises the estuarine waters adjacent to Middle Island, as well as the large parcel at Cape Fear on the island's southeastern point. Additionally, the NC Division of Parks and Recreation has also identified four Significant Natural Heritage Areas that fall within the jurisdiction of the Village. These include

central Bald Head Island, Bluff Island and East Beach, the Lower Cape Fear Aquatic Habitat, and Middle Island. The locations of all these areas are shown on Maps 8 and 9. The maritime forest is a state-defined conservation area, and falls under the state’s jurisdiction. The remaining protected lands either fall under the jurisdiction of the Smith Island Land Trust or are overseen by the Bald Head Island Conservancy.

The Smith Island Land Trust is a non-profit organization that was formed in 1996. The organization’s mission is as follows: “to acquire and preserve historically and ecologically significant lands on Smith Island for the benefit of current and future generations.” The Smith Island Land Trust merged with the Bald Head Island Conservancy in 2002. In conjunction, these two entities work to maintain and conserve the natural and pristine environment that exists throughout the Village. Since 1996, the Smith Island Land Trust has secured two large tracts of land totaling 24 acres, and have received private donations of an additional 25 lots that will remain in their natural state in perpetuity. The intent of these actions is to alleviate development density in an effort to preserve the ecological environment and water quality throughout the Village, as well as Bluff Island. To provide additional protection, the Conservation Trust of North Carolina has placed conservation easements on these properties. The Bald Head Island Conservancy has ongoing efforts to acquire additional properties and conservation easements throughout the Village to further this cause. The acreage figures for these areas are summarized in Table 22.

**Table 22: Village of Bald Head Island
Significant Natural Heritage Areas and Protected Lands**

Area	Acres	% of Total Town Acres
Bald Head Woods Coastal Reserve	191.1	6.1%
Bald Head Island Natural Area	1,143.3	36.5%
Bald Head Island SNHA	1,753.1	56.0%
Bluff Island and East Beach SNHA	49.1	1.6%
Lower Cape Fear River Aquatic Habitat SNHA	51.7	1.7%
Middle Island SNHA	1,026.3	32.8%

Source: North Carolina Parks and Recreation Department and CGIA.

MAP 8 - PROTECTED LANDS

MAP 9 - SNHA

vi. 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.

The Village is not adjacent to any waters classified as ORW by the Division of Water Quality.

h. *Areas of Resource Potential*

i. Regionally Significant Parks

There are no public parks of regional or statewide significance within the corporate limits of the Village, aside from the state-defined protected areas discussed above. There are, however, regional beach access sites located throughout the Village’s jurisdiction. 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.

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. Excluded from this definition are boat ramp facilities allowing access only, temporary docking and none of the preceding services. There is one large marina facility located within the Village that is operated by Bald Head Island Limited. The marina has recently undergone expansion, and currently has 150 full service boat slips. Of the 150 boat slips at the marina, approximately 90 are under a year round lease agreement. This leaves 60 slips available for overnight and/or weekly use. As stated, all slips provide full services, meaning the provision of electric and water services. Several of the slips also have cable service available. This marina accommodates both long term and short term rentals. It is not anticipated that additional marina facilities will be constructed within the Village.

A “freestanding mooring” is any means to attach a ship, boat, vessel, floating structure, or other water craft to a stationary underwater device, mooring buoy, buoyed anchor, or piling (as long as the piling is 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 commonly referred to as a mooring field. There are no mooring fields within the Village.

iii. Floating Homes

A floating home or structure is any structure, not a boat, supported by means of flotation, designed to be used without a permanent foundation, which is used or intended for human habitation or commerce. A structure will be considered a floating structure when 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 when its means of propulsion has been removed or rendered inoperative and it contains at least 200 square feet of living space area. There are currently no floating homes within the Village.

iv. Channel Maintenance

There are navigable channels that run into the Village that are utilized by residents, as well as the island’s ferry system. This channel serves as the gateway to the island, and maintenance of this channel is an integral part of day-to-day operations on the island. The US

Army Corps of Engineers oversees the maintenance of this channel. Additionally, the US Army Corps of Engineers is responsible for maintenance of the shipping channel located off the western end of the Village. One benefit to the Village is that when this channel is periodically dredged, the least cost option for disposal of the spoil is on the south and east facing beaches of the island. The Village currently has a contract with the US Army Corps of Engineers to receive this sand through 2006.

v. Marine Resources (Water Quality)

The North Carolina Division of Water Quality (DWQ) monitors approximately one-third of the state’s stream miles for water quality. For stream miles not monitored, DWQ uses professional judgement to evaluate whether the streams are supporting their designated uses. The State categorizes miles of stream as Fully Supporting, Support Threatened, Partially Supporting or Not Supporting. Partially Supporting and Not Supporting mean that a stream is supporting only part or none of its designated uses. These streams are considered by the State to be impaired. Support Threatened means that though the stream is currently supporting its full uses, there is reason to believe it may not support them in the future. The following table provides a detailed breakdown of water quality classifications as defined by the North Carolina Division of Water Quality.

**Table 23: NC Division of Water Quality
Water Body Classifications**

PRIMARY FRESHWATER AND SALTWATER CLASSIFICATIONS*	
<u>CLASS</u>	<u>BEST USES</u>
C and SC	Aquatic life propagation/protection and secondary recreation
B and SB	Primary recreation and Class C uses
SA	Waters classified for commercial shellfish harvesting
WS	<i>Water Supply watershed.</i> There are five WS classes ranging from WS-I through WS-V. WS classifications are assigned to watersheds based on land use characteristics of the area. Each water supply classification has a set of management strategies to protect the surface water supply. WS-I provides the highest level of protection and WS-V provides the least protection. A Critical Area (CA) designation is also listed for watershed areas within a half-mile and draining to the water supply intake or reservoir where an intake is located.
SUPPLEMENTAL CLASSIFICATIONS	
<u>CLASS</u>	<u>BEST USES</u>
Sw	<i>Swamp Waters:</i> Recognizes waters that will naturally be more acidic (have lower pH values) and have lower levels of dissolved oxygen.
Tr	<i>Trout Waters:</i> Provides protection to freshwaters for natural trout propagation and survival of stocked trout.

**Table 23: NC Division of Water Quality
Water Body Classifications (Continued)**

<u>CLASS</u>	<u>BEST USES</u>
HQW	<i>High Quality Waters:</i> Waters possessing special qualities including excellent water quality, Native or Special Native Trout Waters, Critical habitat areas, or WS-I and WS-II water supplies.
ORW	<i>Outstanding Resource Waters:</i> Unique and special surface waters that are unimpacted by pollution and have some outstanding resource values.
NSW	<i>Nutrient Sensitive Waters:</i> Areas with water quality problems associated with excessive plant growth resulting from nutrient enrichment.

*Primary classifications beginning with an “S” are assigned to saltwaters.
Source: NC Division of Water Quality.

There are only 13 different water bodies or segments immediately adjacent to Village. Table 24 provides a listing of all water bodies that are classified by the NC Division of Water Quality. Also included are their stream index number and assigned classification. Map 10 identifies the location of these water bodies.

**Table 24: Village of Bald Head Island
Listing of Water Bodies**

Name of Stream	Description	Stream Index Number	Class
Cape Fear River	From a line across the river from Snows Point (through Snows Marsh) to Federal Point to Atlantic Ocean	18-(87.5)	SA; HQW
Buzzard Bay	Entire bay	18-88-8-2	SA; HQW
Muddy Slough	Entire slough	18-88-8-2-1	SA; HQW
Still Creek	From Muddy Slough to Buzzard Bay	18-88-8-2-2	SA; HQW
Burris Creek	From Muddy Slough to Buzzard Bay	18-88-8-2-3	SA; HQW
Cedar Creek	From Cape Fear River to Buzzard Bay	18-88-8-2-4	SA; HQW
Cape Creek	From source to Cape Fear River	18-88-8-3	SA; HQW
Bay Creek	From source to Cape Creek	18-88-8-3-1	SA; HQW
Deep Creek	From source to Bay Creek	18-88-8-3-1-1	SA; HQW
Bald Head Creek	From source to Cape Fear River	18-88-8-4	SA; HQW
Fishing Creek	From source to Bald Head Creek	18-88-8-4-1	SA; HQW
Bald Head Island Marina Basin	All waters of the basin and entrance channel	18-88-8-5	SC:#
Atlantic Ocean	The waters of the Atlantic Ocean contiguous to that portion of the Cape Fear River Basin that extends from the edge of the White Oak River Basin to the southwestern end of Smith Island at a point called Bald Head	99-(3)	SB

Source: NC Division of Water Quality.

MAP 10 - WATER BODIES

2. Environmental Composite Map

Under the updated CAMA Planning Guidelines, there is a requirement for the preparation of an Environmental Composite Map. The preparation of this map involves an overlay analysis of geographic data layers involving natural features and environmental conditions. The layers are classified into three categories based on their environmental sensitivity. The intent of this analysis is to break the jurisdiction into three separate land classifications in an effort to identify what portions of land are most and least suitable for future development with respect to environmental conditions and sensitive areas. A land suitability analysis will also be performed in the context of this plan that will incorporate community facilities into an analysis similar to the environmental composite map. The following table details the Geographic Information System (GIS) data that was utilized in the preparation of the environmental composite map.

Table 25: Village of Bald Head Island 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	✓		
Flood Zones		✓	
Storm Surge Areas		✓	
HQW/ORW Watersheds		✓	
Water Supply Watersheds		✓	
Significant Natural Heritage Areas		✓	
Protected Lands			✓

In order to make this analysis more useful, a slightly different approach was taken in compiling this map. NC Division of Coastal Management has provided the Village with a model that breaks the Village’s jurisdiction into one-acre cells. Breaking the planning jurisdiction into these one-acre cells distorts the outcome of this analysis, mainly because a majority of the lots within the Village are smaller than one-acre in total area. In order to produce an environmental composite map that more accurately depicts the true nature and location of environmentally sensitive areas within the Village, a different approach was taken.

Table 25 above lists all of the GIS data that was utilized in the preparation of the environmental composite map. Additionally, this table lists whether each data layer was classified as Class I, II, or III. This classification corresponds to the development potential of a defined area with respect to environmentally sensitive areas located throughout the corporate limits of the Village. The following provides a definition of the three classes:

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.

Map I I displays the outcome of the environmental composite overlay analysis. This map was compiled by merging all of the GIS data listed under each of the classes above. All data listed under Class III was merged to form the boundaries shown on the environmental composite map. This process was repeated for Classes I and II. Table 26 provides a summary of the land area within the Village that falls within each of the defined classes.

**Table 26: Village of Bald Head Island
Environmental Composite Acreage**

	Acreage	% of Total
Class I	0.0	0.0%
Class II	1,238.5	50.1%
Class III	1,234.5	49.9%
Total	2,473.0	100.0%

Source: NC Division of Coastal Management, Holland Consulting Planners, Inc., and Brunswick County GIS.

MAP 11 - ENVIRONMENTAL COMPOSITE

3. Environmental Conditions

a. Introduction

A river "basin," or watershed, is the entire land area drained by a river. All life that resides within the defined boundaries of a particular river basin are linked by this water course. Due to this linkage, any pollution that occurs in a basin, even if it occurs far away from the river itself, can eventually wind up in the river, and in turn affect water quality throughout the basin.

In response to this issue, the NC Department of Environment and Natural Resources launched the Basinwide Water Quality Planning Program. The Village falls completely within the Cape Fear River Basin, and therefore falls under the recommendations and analysis included in the Cape Fear River Basinwide Water Quality Plan. The Cape Fear River Basinwide Water Quality Plan was adopted by the Division of Water Quality in 1996 and updated in November 2000. The following are the goals of DWQ's basinwide program:

- ▶ 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.

As existing and future land uses are considered within the Village, these goals should be kept in mind. More detailed water quality information is available for municipal jurisdictions at the subbasin level. 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. Within the Cape Fear River Basin, the Village is located entirely within subbasin 03-06-17. The Cape Fear River Basin and subbasin boundaries are shown on Map 12.

b. Cape Fear River Basin

The Cape Fear River Basin is the largest river basin in the State of North Carolina. The basin encompasses 9,149 square miles and covers a total of 24 different counties. There are 6,300 miles of rivers and streams traversing through the river basin. The Cape Fear River Basin forms at the confluence of the Deep and Haw rivers adjacent to the border of the Chatham/Lee County line.

MAP 12 - RIVER BASINS

Within this river basin, there are several large urban centers including: Greensboro, High Point, Burlington, Chapel Hill, Durham, Fayetteville, and Wilmington. The Fort Bragg Military Base is also centrally located within the Cape Fear River Basin. Rapid growth within and adjacent to these urban areas has resulted in significant impacts on water quality throughout the Cape Fear River Basin. At the time the 2000 Basinwide Water Quality Plan was adopted, nearly half of the overall river basin was undeveloped. Since that time this number has decreased quite significantly. Swine operations are also detrimental to water quality within the Cape Fear River Basin. This basin alone is home to approximately 54% of the state's overall swine operations. These operations are scattered throughout the river basin, although a majority of them are located inland away from coastal and estuarine waters.

The Cape Fear River Basin supports a wide variety of aquatic ecosystems, as well as many species of aquatic and recreational fish. These include wetlands, estuaries, blackwater rivers, and rocky streams, all of which support varying aquatic wildlife including 30 endangered species.

c. Hydrologic Unit 03030005 (Subbasin 03-06-17)

Most federal government agencies, including the US Geological Survey (USGS) and the US Natural Resources Conservation Service (NRCS), use a system of defining watersheds that is different from that used by the Division of Water Quality (DWQ) and many other state agencies in North Carolina. Under the federal system, the Cape Fear River Basin is made up of six hydrologic areas referred to as hydrologic units. Each hydrologic unit is defined by an 8-digit number. DWQ has a two-tiered system in which the state is subdivided into 17 river basins with each basin further subdivided into subbasins. The Village falls within Hydrologic Unit 03030005 (Lower Cape Fear River), which is broken down into three subbasins by the North Carolina Division of Water Quality. Subbasin 03-06-17 encompasses the extreme southern portion of the Cape Fear River Basin including the Village and the City of Southport.

The Village is not a major contributor to water quality problems within subbasin 03-06-17 of the Cape Fear River Basin. Development within the Village has been steady over the years, but as growth has occurred careful steps have been taken to ensure the long term environmental quality of the island and its surrounding waters. Rapid growth and urban expansion on the mainland portions of Brunswick County have had a much more substantial impact on water quality within the subbasin, as well as the entire Cape Fear River Basin. The following section is an excerpt from the 2000 Cape Fear River Basinwide Plan that summarizes the condition of water quality within subbasin 03-06-17. This excerpt also includes recommendations for improving

water quality. Water quality ratings for specific water bodies within and around the Village were discussed earlier in the plan (page 56).

d. *Summary of Water Quality Subbasin 03-06-17*

i. Introduction

Subbasin 03-06-17 is located in the outer coastal plain and in estuarine regions of the basin. The subbasin contains portions of the City of Wilmington, City of Southport, and the Village. Most tributaries in this subbasin are backwater and slow moving or tidal. The primary land uses are forest and agriculture. However, Wilmington and surrounding suburban areas also contribute to nonpoint source pollution. There are currently no defined Outstanding Resource Waters (ORW) within or adjacent to the corporate limits of the Village. The following table provides a summary of population and land cover characteristics for subbasin 03-06-17.

Table 27: Characteristics of Subbasin 03-06-17

Land and Water Area (sq. miles):	
Total Area	547
Land Area	498
Water Area	49
Land Cover (%):	
Forest/Wetland	74.7%
Surface Water	9.3%
Urban	4.1%
Cultivated Crop	7.6%
Pasture/Managed Herbaceous	4.3%

Source: NC Division of Water Quality Cape Fear River Basinwide Water Quality Management Plan.

There are 49 permitted dischargers in subbasin 03-06-17. Ten of these are major dischargers (> 1 MGD). The largest of them are International Paper, Wilmington North Side WWTP, and Wilmington South Side WWTP.

Waters are classified according to their best intended uses. Determining how well a waterbed supports its designated uses is an important method of interpreting water quality data and assessing water quality. Water bodies are fully supporting (FS), partially supporting (PS), or not supporting (NS). Streams that are classified PS or NS are considered impaired waters. In

subbasin 03-06-17, there are 251.5 miles of fully supporting freshwater streams, 3.8 miles of partially supporting freshwater streams, and 65.5 miles are not rated. There are no freshwater streams classified as NS in the subbasin. There are 16,314 acres of fully supporting estuarine waters, 7,211 acres of partially supporting estuarine waters, and 925 acres that are not rated. There are no estuarine waters that are classified as NS.

Seventy-six percent (76%) of estuarine waters in subbasin 03-06-17 are fully supporting. Twenty-two percent (22%) are partially supporting. The Village is adjacent to 1,325 acres of estuarine waters. There are 1,125 acres that are classified as PS and 200 acres are not rated. The major cause of the impaired waters is fecal coliform bacteria. The possible sources include the Southport WWTP, marinas, and urban runoff.

2000 Recommendations: There are 2,211 acres of impaired estuarine waters (Southport, Buzzard Bay, The Basin, and the Cape Fear River) in subbasin 03-06-17 according to recent DWQ and DEH Shellfish Sanitation Section monitoring (not including 5,000 acres of the Cape Fear Estuary). These waters have been closed to shellfishing by the Division of Marine Fisheries (DMF) based on recommendations by the Division of Environmental Health Shellfish Sanitation Section. DEH regulations specify closure of growing areas when fecal coliform bacteria levels exceed 14 colonies per 100 ml of water. These waters are on the state's year 2000 303(d) list.

In the Cape Fear River Basin, there are a variety of activities that contribute to the degradation and impairment of shellfish waters. These include, but are not limited to, urban stormwater runoff, failing septic tanks, channelized waters, draining wetlands, and marinas. Management of various land use activities is needed to decrease fecal coliform bacteria levels in shellfish growing areas, thereby decreasing the acreage closed to harvesting. Actions that can reduce impacts to coastal waters are: Stormwater Control Program Improvements and Growth Management Initiatives.

According to reports issued by the NC Department of Environment and Natural Resources - Shellfish Sanitation and Recreational Water Quality Section, the following water bodies within and adjacent to the corporate limits of the Village are closed for shellfishing. It should be noted that no water bodies in this area are currently closed for recreational uses.

- ▶ All those waters in Cape Fear River north and west of a line beginning on Federal Point at 33°57'33" N - 77°56'42" W; thence in a west-northwesterly direction to FL

Beacon at 33°57'41" N - 77°56'59" W' thence in a southwesterly direction to FL Beacon #22 at 33°56'06" N - 77°58'54" W; thence in a west-southwesterly direction to FL Beacon #18 at 33°54'43" N - 78°00'58" W; thence to the Southport Range Marker at 33°54'26" N - 78°01'22" W; thence to FL Beacon #2 at 33°54'04" N - 78°01'14" W; thence to a point on Fort Caswell at 33°53'46" N - 78°01'01" W; and all waters in Elizabeth River, Dutchman Creek, Intracoastal Waterway, and all tributaries to a line across the Intracoastal Waterway beginning at a point on the south shore at 33°55'11" N - 78°12'31" W; thence to a point on the north shore at 33°55'16" N - 78°12'30" W.

- ▶ Bald Head Island Marina - All those waters within Bald Head Island Marina and extending beyond the entrance canal 100 feet.

- ▶ Bald Head Creek - All those waters in Bald Head Creek upstream of a line across the mouth of the creek beginning at a point on the east shore at 33°52'51" N - 77°59'43" W; thence to the west shore at 33°52'51" N - 77°59'47" W, to include all tributaries.

ii. Registered Animal Operations/Population Densities within Cape Fear River Basin

The following table provides a summary of registered swine operations within Cape Fear River subbasin 03-06-17. The numbers only reflect those operations required by law to be registered. There are no registered cattle operations in the subbasin or adjacent to the Village.

**Table 28. Cape Fear River Basin - Subbasin 03-06-17
Registered Animal Operations**

Subbasin	Swine*		
	No. of Facilities	No. of Animals	Total Steady State Live Weight**
03-06-17	7	45,216	6,381,110

*There are no other registered animal operations located within subbasin 03-06-17.

**Steady State Live Weight (SSLW) is the result, in pounds, after a conversion factor has been applied to the number (head count) of swine, cattle, or poultry on a farm. The conversion factors, which come from the Natural Resource Conservation Service (NRCS) guidelines, vary depending on the type of animals on the farm and the type of operation (for example, there are five types of hog farms). Since the amount of waste produced varies by the size of the animal, SSLW is the best way to compare the sizes of the farms.

Source: NC Division of Water Quality Cape Fear River Basinwide Water Quality Plan.

Table 29 provides population densities and land area summaries for the Cape Fear River Basin. Some of the population figures are estimates because census block group boundaries do not necessarily coincide with subbasin boundaries. Census data is collected within boundaries such as counties and municipalities. By contrast, subbasin lines are drawn along natural drainage divides separating watersheds. Therefore, where a census block group straddles a subbasin line, the percentage of the population that is located in the subbasin is estimated, assuming that population density is evenly distributed throughout a census block group. This is not always the case; however, the level of error associated with this method is not expected to be significant for the purposes of this document. It is also important to note that the census block groups change every ten years so comparisons between years must be considered approximate.

**Table 29. Cape Fear River Basin
Population Densities (1970, 1980, 1990) and Land Area Summaries**

Subbasin	Population (Number of Persons)			Population Density (Persons/Sq. Mile)			Land and Water Areas			
	1970	1980	1990	1970	1980	1990	Total Land & Water (Acres)	Water Area (Sq. Miles)	Land Area (Sq. Miles)	
03-06-01	20,250	21,894	25,897	108	117	138	120,794	189	2	187
03-06-02	222,954	254,617	279,034	402	459	503	359,634	562	7	555
03-06-03	61,354	59,377	66,593	235	227	255	167,494	262	1	261
03-06-04	13,600	18,949	20,213	42	58	62	211,750	331	4	327
03-06-05	69,772	77,357	102,058	278	308	407	171,940	269	18	251
03-06-06	37,469	47,017	57,917	506	635	783	47,695	75	1	74
03-06-07	35,520	37,704	39,713	88	94	99	266,019	415	12	403
03-06-08	87,537	91,778	101,430	495	519	573	114,385	179	2	177
03-06-09	40,171	51,405	55,755	90	116	125	285,450	446	1	445
03-06-10	19,222	21,691	21,107	43	49	47	287,088	448	2	446
03-06-11	14,599	21,083	22,221	111	160	168	84,842	133	1	132
03-06-12	14,622	14,326	16,015	60	59	66	155,909	244	1	243
03-06-13	15,743	16,443	23,913	72	75	109	141,134	221	2	219
03-06-14	51,713	60,635	67,587	108	127	141	309,699	484	6	478
03-06-15	186,209	222,582	247,765	313	374	416	384,138	600	5	595
03-06-16	12,424	15,992	14,811	29	37	34	280,559	438	8	430
03-06-17	38,646	48,954	56,467	78	98	113	349,828	547	49	498
03-06-18	32,256	38,068	39,895	65	77	81	316,587	495	2	493
03-06-19	39,703	43,577	40,575	54	59	55	473,136	739	2	737
03-06-20	4,556	5,229	5,231	13	15	16	219,740	343	5	338

**Table 29. Cape Fear River Basin
Population Densities (1970, 1980, 1990) and Land Area Summaries (continued)**

Subbasin	Population (Number of Persons)			Population Density (Persons/Sq. Mile)			Land and Water Areas			
	1970	1980	1990	1970	1980	1990	Total Land & Water (Acres)	Water Area (Sq. Miles)	Land Area (Sq. Miles)	Land Area (Sq. Miles)
03-06-21	7,076	9,271	7,582	59	78	64	76,297	119	0	119
03-06-22	35,696	39,552	39,144	43	48	47	530,335	829	1	828
03-06-23	41,623	60,632	64,540	53	77	82	508,688	795	6	789
03-06-24	33,295	36,748	49,988	234	259	352	103,962	162	20	142
Totals	1,136,010	1,314,881	1,465,451	124	143	160	5,967,103	9,325	158	9,167

Source: NC Division of Water Quality Cape Fear River Basinwide Water Quality Plan.

iii. Growth Trends

Between 1970 and 1990, the population within the Cape Fear River Basin increased 29.3%. The Cape Fear River Basinwide Water Quality Plan projects percent growth between 1997 and 2010 for counties in the basin. Since river basin boundaries do not coincide with county boundaries, these numbers are not directly applicable to the Cape Fear River Basin. They are estimates of county-wide population changes.

Population growth trends for the basin between 1990 and 2010 indicate five counties with growth rates in excess of 30% and seven counties with growth rates of 20% to 30%, with a total population increase in the basin of 17.8%. According to the Water Quality Plan, Brunswick County is expected to experience a 34% population increase between 1997 and 2010. Growth rates and demographic information specific to the Village has been discussed earlier in the plan.

e. *Wastewater Treatment Facilities*

Originally the Village relied solely on private septic tank systems for the disposal and treatment of wastewater. As development increased within the Village, it became very apparent that an alternative method would be required due to the rapid increase in development that occurred between 1980 and 1990. The utilities in the Village are owned and operated by Bald Head Island Utilities, Inc., and therefore, do not fall under the jurisdiction of the Village’s municipal government. In response to concerns related to wastewater treatment, Bald Head Island Utilities

installed two 50,000 gpd package treatment plants, and began installing central sewer system lines throughout main thoroughfares of the Village.

This system became antiquated over time, so the two plants were replaced by a single batch processing plant that is capable of serving the entire Village. Bald Head Island Limited is working toward running the central sewer system to all portions of the Village; however, this process is taking time. Although a majority of the Village is currently served, several private septic systems still exist. Eventually it is anticipated that all properties will be served by the system, except those located at Middle Island. According to the Brunswick County Health Department, the private septic tank systems that do still exist within the Village are operating properly and do not pose a threat to water quality conditions within or adjacent to the Village.

f. *Natural Hazards*

The Village is very vulnerable to the effects of natural hazards in the form of hurricanes, coastal flooding, and nor'easters. One of the most significant impacts of these events is the flooding and beach erosion that occurs. The Village has a proactive approach to dealing with the issue of beach erosion; however, there is no straight forward approach to ensuring the safety of personal property when a hurricane and/or flooding event occurs. The locations of both flood zones and storm surge inundation areas have been discussed in detail earlier in the plan (refer to page 27). These two areas aim to define boundaries around portions of land that will potentially flood in storm events of varying magnitude.

In order to further define how significant an impact a major storm event may have on the Village, the following table provides the acreage within the AE and VE flood zones by land use type. These two flood zones are considered to be high hazard areas, where there is a one percent annual chance of a flooding event. The primary distinction between these two zones is that properties within the VE zone are also vulnerable to coastal wave action. All properties within these two zones are required to carry federal flood insurance. Additionally, development within these areas must comply with the Village's Flood Damage Prevention Ordinance, which has provisions for construction and finished floor elevation to increase the safety of a structure if a flooding event occurs. Table 30 provides the Village's acreage that falls within the AE and VE flood zones by land use. According to this table, 693 or 84.5% of the housing units within the Village fall within or are immediately adjacent to a flood hazard area. This includes both single- and multi-family housing units.

**Table 30: Village of Bald Head Island
Developable Land Use Acreage within Flood Hazard Areas**

Land Use	Acres	% of Total
Association Owned Properties	125.5	6.3%
Commercial	12.7	0.6%
Government	9.0	0.5%
Multi-Family Residential	12.3	0.6%
Office & Institutional	2.2	0.1%
Right-of-Way	104.4	5.3%
Recreation	116.2	5.9%
Single-Family Residential	195.2	9.8%
Utilities	9.9	0.5%
Vacant	1,396.2	70.4%
Total	1,983.6	100.0%

NOTE: There are 654.8 undevelopable acres within the Village. These areas are comprised of wetlands, estuarine areas, and other water bodies.

Source: Holland Consulting Planners, Inc., Brunswick County GIS, and Bald Head Island.

g. Natural Resources

The Village is home to many natural resources including significant natural heritage areas, wetlands, public trust areas, and state-defined protected lands. These areas have been discussed in detail earlier in the plan. This discussion begins on page 25 of the plan and includes maps showing the locations of all natural resources and areas of environmental concern within the jurisdiction of the Village.

C. ANALYSIS OF LAND USE AND DEVELOPMENT

I. Existing Land Use

In order to address future development within the Village, it is necessary to establish a snapshot of what is currently developed within the Village’s jurisdiction. Conducting a detailed land use survey allows for a review of existing land use patterns. This survey will assist in identifying land use patterns and trends that exist within the Village’s planning jurisdiction. This process will serve two main purposes: identifying key conflicts in land use and addressing the issue of future housing demand. This review will provide a solid foundation for decisions regarding future land use and policy development.

A detailed land use survey was conducted for the entire planning jurisdiction of the Village. This survey was completed through the use of aerial photography, county tax data, and on-site windshield surveys. The existing land use map was then submitted to the Village Planning and Inspections Department for review to address any errors. Land use within the Village was broken into the following land use categories: multi-family residential, commercial, office & institutional, recreational, single-family residential, governmental, utility, right-of-way, and undeveloped.

The following provides a summary of what types of facilities are included in each of the land use categories listed above:

Multi-Family Residential - all residential structures with two or more attached dwelling units on a single property.

Commercial - This land use category includes private business operations located throughout the Village. These include restaurants, the marina, retail shopping facilities, and any commercially operated overnight accommodations (bed & breakfast operations)

Office & Institutional - These properties include all professional office-related uses, as well as any institutional uses. Institutional uses include churches, membership organization meeting facilities.

Recreational - Recreational land uses on the land use map correspond to all public/private recreational facilities. In the case of the Bald Head Island Golf Course, the entire complex has been shown as recreational. The clubhouse and pro shop facilities, although a commercial establishment, have been classified as recreational, due to the fact that they are a service facility tied to the golf course.

Single-Family Residential - This land use category includes all single-family residential dwellings.

Governmental - This includes all structures that support government activities. This includes administration buildings, as well as police and fire department facilities.

Utility - This land use category is reserved for all properties that have utility system components or other infrastructure components situated on them.

Right-of-Way - This land use category includes all land utilized for the Village’s road infrastructure network.

Undeveloped - All vacant land falls under this category.

Map 13 provides an overview of existing land use within the Village based on the land use categories listed above. The following table provides a breakdown of land use acreage that corresponds to the existing land use map. All data regarding land use acreage have been provided for the Village’s total jurisdiction.

Table 31: Village of Bald Head Island Existing Land Use*

Land Use	Acreage	% of Total
Association Owned Properties	115.7	4.8%
Commercial	14.2	0.6%
Government	14.0	0.6%
Multi-Family Residential	15.7	0.6%
Office & Institutional	2.4	0.1%
Right-of-Way	149.3	6.2%
Recreation	134.7	5.5%
Single-Family Residential	240.5	9.9%
Utilities	21.0	0.9%
Vacant	1,696.6	69.9%
Water	23.2	1.0%
Total	2,427.2	100.0%

*The existing land use map is intended to show existing uses. The map does not take into account who owns the property, or whether there is public access to a given property.

Source: Holland Consulting Planners, Inc., Brunswick County GIS, and Village of Bald Head Island.

2. Land Use Conflicts

Land use conflicts often exist within a municipality’s planning jurisdiction resulting from a variety of circumstances. Issues leading to land use conflicts can result from a lack of proper land use controls, demand for increased development, and situations beyond the municipality’s control. The Village has been very conscious of these issues over the past, and has addressed many problems related to land use conflicts through adoption of local ordinances and installation of infrastructure. Although steps have been taken to address potential problems that may be detrimental to environmental conditions, several conflicts still exist within the Village planning jurisdiction. These issues are summarized on page 74 immediately following Map 13.

MAP 13 - EXISTING LAND USE

Residential Development within Flood Hazard Areas. The Village lies on a barrier island and is extremely vulnerable to coastal flooding associated with tropical storm events. The Village's vulnerability to flood hazards is discussed in detail beginning on page 27. As with other barrier island communities, this fact has not slowed development. The Village aims to ensure the safety of all property within its jurisdiction through proper land use controls. All residential structures are subject to requirements outlined in the Village's Flood Damage Prevention Ordinance, as well as the North Carolina State Building Code.

Encroachment of residential and urban type uses into forested areas. The Village is situated in the center of a maritime forest. As discussed in the natural systems analysis portion of the plan, the entire island is considered a protected land by the State of North Carolina. From the Village's origin, there has been a focus on preserving the maritime forest wherever feasible. The large Bald Head Woods Coastal Reserve centrally located on the island will never be developed, along with many other properties that have been established as conservation areas under the Smith Island Land Trust. The Village aims to protect the natural setting throughout the island by preserving the forest where possible, and promoting moderate density development. Additionally, there is a provision in the PUD ordinance that states where the peripheral property line is the boundary between the Planned Unit Development and the State of North Carolina Maritime Preserve, the required minimum setback shall be 20 feet. The issue of preserving the forest in light of continued development pressures will be addressed in the policy statement section of the plan.

3. Development Trends

The Village is a very unique municipality in that the entire jurisdiction exists primarily as a planned development. Because of this, development trends throughout the Village's jurisdiction are very predictable. From its origin, the Village has been developed as a residential community intended to support year round residents, as well as second homeowners and seasonal visitors. All nonresidential development within the Village's corporate limits exists solely to support the residents and visitors to the island. This includes governmental structures, retail commercial operations, recreational facilities, and utility facilities.

According to the land use survey conducted as part of the plan, approximately 59% of the Village's total parcels remain vacant. With the exception of several large conservation easements, nearly

all of these vacant parcels have been platted for single-family residential development. These parcels are scattered throughout the Village’s jurisdiction. It is anticipated that a majority of these vacant parcels will be developed as single-family residential homes, although some multi-unit complexes may be developed in conjunction with planned unit developments.

In order to provide a forecast of how vacant land will be developed throughout the Village’s jurisdiction, an overlay analysis was performed based on the existing land use survey and the Village’s zoning map. Based on this analysis, the zoning district of each undeveloped parcel has been identified. Table 32 provides a summary of how all vacant parcels will be developed, if this development follows existing zoning patterns.

**Table 32: Village of Bald Head Island
Zoning Classification of Undeveloped Properties**

Zoning District	Parcels	% of Total Vacant Parcels	Acreage by Land Use	% of Total Vacant Acreage
PD - 1	760	60.0%	406.3	41.5%
PD - 2	323	25.5%	367.4	37.5%
PD - 2C	41	3.2%	39.6	4.1%
PD - 3	51	4.0%	14.2	1.5%
PD - 3C	13	1.0%	5.8	0.6%
PD - 3C - I	6	0.5%	9.8	1.0%
PD - 4	67	5.3%	134.4	13.7%
PD - NC	5	0.4%	1.7	0.2%
Total	1,266	100.0%	979.3	100.0%

Source: Holland Consulting Planners, Inc., and Village of Bald Head Island.

Refer to page 97 for a summary of the zoning districts included in the table above, as well as the intended use of each zoning district as defined in the Village’s zoning ordinance.

According to this information, 1,078 or 86.7% of the Village’s undeveloped land is zoned for moderate density single-family development. It is difficult to judge how rapidly this development will take place. The Village planning and inspections office has issued an average of 68 building permits per year over the last five years. It is anticipated that development of all vacant parcels will continue at this rate across the Village’s jurisdiction. It is not expected that rapid development will occur in specific portions of the Village’s jurisdiction.

In addition to falling under the land use controls established for the zoning districts designated above, approximately 407 acres of vacant property also fall within the Maritime Forest Protection Overlay District. The standards for this overlay district are intended to establish restrictions on development beyond those outlined in a property’s primary zoning district. These restrictions are intended to promote development that is compatible with the environmentally sensitive nature of the Bald Head Island and Middle Island maritime forest. The overall purpose of this district is to protect natural features and functions of the area in the interest of health, safety and general welfare of the residents and visitors of the Village.

4. Historical, Cultural, and Scenic Areas

There are several Protected Lands and state-defined Natural Heritage areas that fall within the planning jurisdiction of the Village. These areas have been thoroughly discussed in the Natural Systems Analysis portion of this plan beginning on page 25. All fragile areas are discussed and maps detailing the locations of these areas are provided.

5. Land Use in Relation to Environmental Composite Map

The environmental composite map (Map I I) was discussed beginning on page 58 of the plan. This map is intended to break the Village’s jurisdiction into varying classes in accordance with environmentally sensitive areas. For a detailed discussion of how this map was compiled and what the various classes mean, refer to Section B(2). The following table provides a summary of how the undeveloped parcels in the Village relate to the classes established on the environmental composite map. If a parcel was located in more than one class as defined in the environmental composite analysis, the most environmentally sensitive class was assigned to that parcel.

**Table 33: Village of Bald Head Island
Undeveloped Land in Relation to Environmental Composite Analysis (Class I-III)**

Environmental Composite Map	Acreage by Land Use	% of Total Vacant Acreage
Class I	0.00	0.0%
Class II	571.76	33.0%
Class III	1,161.17	67.0%
Total	1,732.93	100.0%

Source: NC Division of Coastal Management and Holland Consulting Planners, Inc.

6. Land Use Demand Forecast

In order to gauge the rate of growth within the Village, it is necessary to establish estimates of how rapidly development is expected to occur. Many times land use demand is established based on the growth rate of a jurisdiction's population. The Village, as well as other barrier island communities, faces a different situation than a typical inland municipality.

One issue is that there is no space to grow. The Village has no means through which to expand. The Village cannot establish an extraterritorial jurisdiction, which would establish land use control over land beyond the Village's primary corporate limits. Another issue is that the Village is growing rapidly and the amount of vacant land available for development is diminishing rapidly. Approximately 59% of the Village's total platted tax parcels remain undeveloped. Of the 1,291 vacant parcels, 1,078 or 87% are zoned for single-family residential development.

The Village does not have a problem supporting the permanent or seasonal population in terms of housing. There is more than adequate housing to support these two populations. As the housing stock increases, so will the peak seasonal population until total build out occurs. Due to the unique nature of development within the Village, residential development estimates have been established based on building permit activity over the last five years. Over the last five years, an average of 68 residential building permits have been issued annually. Table 34 provides a summary of these estimates.

**Table 34: Village of Bald Head Island
Residential Land Use Demand Estimates**

	2005**	2010	2015	2020
Residential Acreage (Single- and Multi-Family)*	268.4	430.9	593.4	755.9
Residential Unit Increase	820	1,145	1,470	1,795

*Residential acreage increase is based on the average lot size of all remaining undeveloped land within the Village's jurisdiction. The average lot size is 0.3 acre. Unbuildable land was eliminated prior to calculating the average lot size for vacant properties.

**Figure based on the existing land use survey.

Sources: Holland Consulting Planners, Inc., and Village of Bald Head Island Planning Department.

D. ANALYSIS OF EXISTING COMMUNITY FACILITIES/SERVICES

I. **Transportation**

The Village is a very unique location in that no automobiles are permitted on the island for personal transportation. Travel to and from the Village is provided by a private ferry system that operates year round. The ferry system is operated by the primary developer on the island, Bald Head Island Limited, and provides residents and visitors with round trip service originating from Indigo Plantation located in Southport, NC. The road network present throughout the Village does support passenger vehicles and full size vehicles are allowed in the Village by permit only. These vehicles are generally present on the island to support construction activity. The vehicles are transported to the island by barge. There are several trucks that remain on the island year round to support municipal operations, including emergency management and police operations.

The roads within the Village are not state maintained. A majority of the road network throughout the Village is maintained by the Village. There are several right-of-ways that fall under the jurisdiction of Property Owners Associations; however, over time some of these roads may be dedicated to the Village. Once this transaction is complete, the Village assumes all maintenance responsibility in these areas. For all municipally maintained rights-of-way, the Village receives state street-aid or Powell Bill allocations for the purposes of maintaining, repairing, constructing, reconstructing, or widening of local streets. Powell Bill funds are distributed on both a per capita (based on permanent population) and a total mileage basis. For fiscal year 2004, the per capita distribution was \$23.43, while the per mile distribution was \$1,718.80. Additionally, the speed limit throughout the Village is eighteen miles per hour. Because the speed limit is below the state minimum for a municipality, speed limit and other traffic related laws are enforced through Village Ordinances.

2. **Health Care**

There are no medical facilities within the corporate limits of the Village. There are systems in place to emergency evacuate a patient, if necessary. A summary of the fire/EMS operations within the Village will be provided below. The closest hospital, as well as emergency medical facilities, is located in Southport.

J. Arthur Doshier Memorial Hospital in Southport, founded in 1930, provides comprehensive medical care to residents of Southport and the Smithville Township. The hospital is owned by the Smithville Township taxpayers and is managed by an elected seven member Board of Trustees. Doshier Memorial Hospital and the Skilled Nursing Center are both accredited by the Joint

Commission on Accreditation of Healthcare Organizations. The laboratory and Cardiopulmonary Service are accredited by the College of American Pathologists. The Diagnostic Imaging Department is accredited by the American College of Radiology in Mammography and the hospital has been certified in Mammography by the Food and Drug Administration. The hospital is licensed for 36 acute care beds and 64 nursing center beds and has a staff of 300.

Last year the hospital served 11,624 patients in the Emergency Room, over 2,000 outpatients in the OR, 500 inpatients in the OR, 83,000 outpatients in Lab Services, 33,000 inpatients in Lab Services, 5,400 outpatients in Cardiopulmonary, 30,000 inpatients in Cardiopulmonary, 26,000 outpatients in Diagnostic Imaging, and 4,000 inpatients in Diagnostic Imaging. Following are services provided at the facility:

- ▶ Acute Nursing Care
- ▶ Cardiopulmonary and Respiratory Therapy
- ▶ Diagnostic Imaging
- ▶ Emergency Services
- ▶ Lab Services
- ▶ Nutritional Counseling
- ▶ Skilled Nursing Center
- ▶ Social Services
- ▶ Therapy Services (Speech, Physical, and Occupational)
- ▶ OR Procedures and Surgeries (General, Gynecology, Ophthalmology, Orthopedic, Otolaryngology, and Urology)
- ▶ Cardiac Rehabilitation - (2005)

There are also a large number of specialists with offices located in Southport. These include dentists, family practice doctors, general practice doctors, and physical therapy. The Village fire/EMS department works in cooperation with Airlink, the emergency response evacuation service run through New Hanover Regional Medical Center. There are several evacuation spots located through the corporate limits of the Village.

3. Police Department

The Village operates a 12 person full-time police department located in a 3,200 square foot facility at 253 Edward Teach Wynd Extension. The department employs 11 sworn officers and one administrative assistant. At least two police officers are on duty at all times, and staffing levels are

increased during peak summer months. All emergency response calls to the department are routed through the Brunswick County Emergency 911 call center. The Village police department does not house any jail facilities. All custody arrests are transported to the Brunswick County Detention Center. The following provides a summary of the operations vehicles utilized by the department:

- ▶ 3 gas powered four wheel drive trucks
- ▶ 2 electric powered golf carts
- ▶ 3 bicycles

4. Fire/EMS Services

The Village Fire and Emergency Management operations center is located immediately adjacent to the police department at 251 Edward Teach Wynd Extension. The department employs seven full-time and eight part-time firefighters. All firefighters are also paramedics. The department is also assisted by 41 local volunteers. The Village is under a mutual aid agreement with departments on both Oak Island and the City of Southport. If needed fire trucks from Oak Island are transported by barge, while fireman are transferred to the island by the US Coast Guard. Fireman from the Southport Fire Department are transferred to the island by ferry if their services are required. The Village Fire Department receives service from Airlink, an air ambulance service that operates out of New Hanover Regional Medical Center. There are several sites located throughout the island that serve as landing sites for the Airlink helicopters. The following provides a listing of all service equipment utilized by the Village Fire/EMS department:

- ▶ 1,250 GPM Ladder Truck
- ▶ 1,250 GPM Pumper Truck
- ▶ 1,500 GPM Pumper (Fire Truck)
- ▶ 2 Ambulances (housed at the Village Fire Department)
- ▶ 1 Ambulance (located at Indigo Plantation)
- ▶ 1 seven man Zodiac Inflatable Rescue Boat
- ▶ 1 beach rescue truck
- ▶ 1 command vehicle

5. Administration

The Village utilizes a mayor-council-manager form of government. The Village currently has 33 full-time employees. The following provides a summary of governmental organizations and employees.

▶ Administration/Building Inspections	9
▶ Fire/EMS	7
▶ Police Department	12
▶ Public Works	5

6. Water System

The Village operates a community public water system that serves all but 14 of the Village's residents. The water system operates off a series of 16 wells throughout the Village that are tapped into a semi-confined aquifer underneath the island. The water from these wells is treated and served to all residential and nonresidential units. A major water line from the Brunswick County Water System also ties into the Bald Head Island Utilities water system from Oak Island. This county water supplies approximately 40% of the water currently utilized by Village residents.

In the event that this county water line is damaged or shut down, the Village must rely on the water supplied by the local well system. The water provided by these wells is sufficient to support current demand. In peak summer months, however, water conservation measures may have to be taken if the county water line is not in operation. Map 14 provides a view of the water system that currently exists on Bald Head Island. It should be noted that the Village Fire Department has a boosting station that will increase fire flow.

7. Sewer System

The Village recently acquired both the water and sewer systems from Bald Head Island Limited. The North Carolina Division of Water Quality has jurisdiction over all wastewater treatment facilities located throughout the Village. In the 1970s and early 1980s, a majority of the residential units on the island relied heavily on private septic tank systems or cluster systems. Cluster systems, also known as mound fields, are septic systems where several units are tied to one large septic tank, which utilizes a single drain field.

MAP 14 - EXISTING WATER LINES

Prior to the utilities acquisition, Bald Head Island Utilities, Inc., developed two independent wastewater treatment facilities to address concerns regarding the traditional septic systems. These two plants have been shut down and converted to lift stations since the construction of the new Batch Processing Plant in 1996, which now handles a majority of the waste treatment throughout the Village. The only portion of the Village not served by Bald Head Island Utilities is Middle Island, which still relies on private septic tank systems. The lack of service in this area was a matter of choice by the developer.

The batch processing plant now serving the Village is an innovative system that allows for extreme fluctuations in wastewater flow. Traditional sewage treatment plants require constant wastewater flow in order to keep the system up and running. This new system allows the utilities department to shut down portions of the system during winter months. As peak summer months arrive, the system can be revived at a fairly rapid pace, allowing the Village to deal with the additional wastewater flows generated during summer months. The new system works extremely well, and is currently operating well below maximum capacity. It is estimated that approximately 94% of the Village's residential and nonresidential units are currently being served by the central treatment system.

8. Solid Waste

Solid waste disposal services are provided by Waste Industries. The Village is billed for the service, and in turn recoups the cost through property tax revenues. Trash pickup is provided in the Village once per week during winter months (Labor Day through Memorial Day), and twice per week during summer months. Yard debris is picked up once per month during winter months (first Wednesday) and twice per month during the summer (first and third Wednesday).

9. Schools

The Village is served by the Brunswick County School System. Students in grades K-12 must take the public ferry to Indigo Plantation, in order to receive either private or public transportation to their respective school. Brunswick County school bus service is provided to/from the Indigo Plantation Ferry Terminal. Southport Elementary School serves grades K-5. The school is located at 701 West 9th Street. Village students in grades 6-8 attend South Brunswick Middle School and students in grades 9-12 attend South Brunswick High School. Both the middle and high schools are in nearby Boiling Spring Lakes. Table 35 provides a summary of the schools that serve the Village's school age children.

Table 35: Schools Serving the Village’s School Age Children

School	Enrollment	Staff	Recreational Facilities
Southport Elementary School Grades K-5	594	93	Playground, gym
South Brunswick Middle School Grades 6-8	907	99	Gym, soccer field, baseball/softball field, fitness walk
South Brunswick High School Grades 9-12	1,050	90	Gym, auxiliary gym, track, football field, baseball/softball fields, tennis courts

Source: Brunswick County School System.

Higher education is offered in nearby Southport at a Brunswick Community College (BCC) annex facility. The community college offers a variety of continuing education classes including: Art, Southport-Brunswick County History, Computer, Basic Law Enforcement, Calligraphy, and Sign Language. Village residents are also in close proximity to the BCC main campus where one can earn an Associate Degrees in Applied Science or a technical certificate. The University of North Carolina at Wilmington (UNCW) is also within commuting distance to the Village’s residents. UNCW is a major four-year university, and is part of the University of North Carolina system.

10. Recreation

The Village does not operate any municipal park facilities. A majority of the recreational facilities provided throughout the Village are operated by one of several property owners’ associations that operate within the Village. Additionally, the Bald Head Island Golf Course and Country Club provides golfing, tennis courts, and a swimming pool for members, as well as visitors. The Village does have public beach access points through its corporate limits. These public access points provide easements that the general public may utilize to access the beach. A majority of these municipal accesses provide parking areas for golf carts and bicycles. There is also a public creek access that is maintained and operated by the Village. This creek access provide residents with a place to store small boats and kayaks. Kayaks may also be rented for daily use by visitors to the Village. Provision of a municipal recreational facility is a concern of the Village, and this issue will be addressed in the policy statement section of the plan.

The Shoals Club is a private facility providing recreational opportunities that is available to Village residents. The club offers an oceanfront clubhouse, dining areas, lounge, fitness room, shower and locker facilities, swimming pools, and direct beach access. Membership in the Bald Head Island Club is required prior to establishing membership in the Shoals Club.

11. Post Office

In late 1989 and early 1990, negotiations were being formulated to handle the transport and delivery of the United States Postal Service Mail to Bald Head Island, NC. The growth and rapid development of the Village created this need for its permanent residents. Representative Redwine proposed House Bill 608, which was ratified June 20, 1991, in the General Assembly of North Carolina. This act allowed the Village to operate a United States Post Office facility, under contract with the United States Postal Service. This act applied to the Village of Bald Head Island only. Today, the Village's Contract Postal Unit has grown along with the development of Bald Head Island.

The United States Postal Service places the mail from Southport on the 11 a.m., ferry originating from the Indigo Ferry Landing. The ferry arrives at the Marina Ferry Landing at 11:30 a.m. The Public Works Department unloads the mail and transports it to the Village Post Office as soon as possible.

All Registered mail and packages, Express mail and packages, Priority mail and packages, First Class mail and packages, Wall Street Journals and other daily papers are distributed before 1 p.m. The window hours are from 1 p.m., to 3 p.m., Monday through Friday, except for Federal Holidays.

The Postmaster for the CPU must close the window at 3 p.m., and leave on the 3:30 p.m., ferry arriving at the Indigo Ferry Landing at approximately 4 p.m. The Southport USPS closes at 4:30 p.m. All mail transactions from Bald Head Island must be taken to the loading dock at the back of the Post Office in Southport before 4:15 p.m. Except for Registered Mail, Express Mail, International Express Mail, Global Priority, Customs mail and packages, this must be taken to a Window Clerk for electronic scanning.

12. Electric Service

All residences and businesses within the Village's planning jurisdiction receive electric service from Progress Energy.

13. Stormwater Management

a. Introduction

Stormwater is pure rainwater plus anything the rain carries along with it. In urban areas, rain that falls on the roof of a house, or collects on paved areas like driveways, roads, and footpaths is carried away through a system of pipes that is separate from the sewerage system. Unlike sewage, stormwater is not treated. In some cases it is filtered through traps, usually located at the end of the pipe system, but it still flows directly from streets and gutters into the Cape Fear River and ocean, straight from the street to waterways inhabited by fish and other aquatic animals and plants in these estuarine environments. There are three main types of stormwater pollution: litter, such as cigarette butts, cans, paper, or plastic bags; chemical pollution, such as detergents, oil, or fertilizers; and 'natural' pollution, such as leaves, garden clippings, or animal droppings.

b. Existing Drainage Problems

An issue that the Village is constantly dealing with is stormwater management. There are many areas within the corporate limits that experience localized flooding and ponding of water subsequent to significant rains and storm events. The location of these stormwater problem areas are outlined on Map 15. Problems related to stormwater management are generally situated within the Phase I or western portion of the Village's corporate limits. The Village has taken a proactive approach to dealing with the problems that have been experienced with stormwater drainage. A study and proposed design for a municipal storm sewer system was prepared by Cape Fear Engineering in 2000. This report is intended to deal with stormwater issues within the Phase I portion of the Village. The report cites general recommendations for collecting and treating stormwater generated within this portion of the Village. For further details regarding this study, refer to the report document entitled Design Report for Stormwater Controls at Bald Head Island, Stage One. This document is available at Village Hall. At this time, the village is preparing to review the existing plan and work with McKim & Creed and Coastal Land Design to move forward with implementation.

MAP 15 - STORMWATER CONCERNS

c. *Water Quality Problems*

Stormwater runoff is a significant problem with respect to water quality. Water quality within and adjacent to the corporate limits of the Village has been discussed in detail in the Natural Systems Analysis (Page 25) and Environmental Conditions (Page 58) sections of the plan. The Village does not currently have a comprehensive stormwater management system, but as noted will be installing a system to address stormwater runoff throughout large portions of the Village's corporate limits. This system will not only collect stormwater, but will treat the water prior to disposing of it into the adjacent water bodies. Addressing this problem through development of a stormwater management system will help reduce the impact the Village's runoff is having on the waters of the Cape Fear River, as well as the Atlantic Ocean.

d. *EPA Regulations*

The Environmental Protection Agency (EPA) has begun implementation of Phase II of the National Pollutant Discharge Elimination System (NPDES). These policies apply to municipalities with populations greater than 10,000 and 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 apply to all entities that meet these criteria based on both the 1990 and 2000 census. This will apply only if the entity is operating a Small MS4 (Small Municipal Separate Storm Sewer System). An MS4 is 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. At this time, the Village is not required to meet the new EPA Phase II Stormwater Management Program regulations.

The Village may be required to submit a stormwater management permit application under Phase III of the NPDES program. It is more likely, however, that the Village will fall under the jurisdiction of the Brunswick County Comprehensive Stormwater Management Program.

e. *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 an 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 (5) acres of land – which were included in the Phase II final rule. Construction activities that disturb over one (1) 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

f. 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 groundwater supply and promoting groundwater 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 predation. Vegetated buffers help increase the diversity of wildlife while providing site for foraging and corridors for dispersal.

E. LAND SUITABILITY ANALYSIS

A thorough analysis of all impediments to development, as well as existing community facilities, has been completed in the preceding sections. 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 Village, an overlay analysis was performed. This overlay analysis is a Geographic Information System (GIS)-based process geared toward evaluating the suitability of land for development. The procedure is very similar to the practice developed by Ian McHarg, 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 (NCGIA). 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 16). This map can be used as a foundation for the discussion and formation of village-wide land use policy and should be compared to the future land use map.

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

MAP 16 - LSA

All of these steps have been completed, and as noted above, the end product is displayed on Map 16. There were no additions or adjustments to the default layer sets and weighting factors provided by the Division of Coastal Management to the Village 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 Village 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 36. Land Suitability Analysis Criteria Table

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: NCGIA and CAMA.

Overall, land in the Village is moderately suitable for development. Table 38 provides a summary of land suitability acreage based on the results of the overlay analysis.

Table 37. Village of Bald Head Island LSA Acreage

Suitability	Acreage	% of Total
Least Suitable	1,642	52.5%
Low Suitability	568	18.2%
Medium Suitability	704	22.5%
High Suitability	215	6.9%
Total	3,129	100.0%

Source: Holland Consulting Planners (April, 2003); North Carolina Center for Geographic Information and Analysis.

F. CURRENT PLANS, POLICIES, AND REGULATIONS

I. Introduction

The Village has adopted a comprehensive Municipal Code that addresses a wide range of topics with respect to development, environmental protection, and daily operations. This code serves as the primary tool for construction and future development for the Village’s planning and inspections department. The code is enforced by the Village Administration, as well as the Village Council and Planning Board. The Village Code addresses the following topics: Administration; Animals; Buildings and Building Regulations; Civil Emergencies; Environment; Fire Prevention and Protection; Floods; Offenses and Miscellaneous Provisions; Parks and Recreation; Solid Waste Management; Stormwater Management; Streets, Sidewalks, and other Public Places; Subdivisions; Traffic and Vehicles; Utilities; and Zoning. The following provides a summary of all Village Codes that relate to land use and future development/redevelopment.

2. Buildings and Building Regulations (Chapter 6)

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. This chapter also outlines the procedures related to applying for and obtaining a building permit for construction. Additionally, the general duties and powers of the Village’s inspections department are outlined in this chapter.

3. Environment (Chapter 10)

Chapter 10 of the Village Code addresses issues related to protection of environmentally sensitive areas. Specifically, this chapter provides provisions for the process of identifying and removing junked vehicles, dune protection, and groin protection. The Village has adopted a dune protection ordinance to ensure the safety of the frontal dune line which runs along oceanfront portions of the Village's corporate limits. According to this ordinance, it is unlawful to disturb or infringe on any frontal dune areas except at marked public access points, which are located throughout the Village. It is also illegal to construct a dune crossing or oceanfront access without the issuance of a building permit and CAMA permit from the Village Building Inspector. The groin protection ordinance is intended to protect the geo-textile tube installed on the east and west facing beaches of the Village. These tubes are installed to stabilize the beach, and are imperative to slowing down the effects of beach erosion.

4. Floods (Chapter 14)

The Village is a standard member of the National Flood Insurance Program (NFIP). The NFIP has recently completed updated floodplain maps, and these maps are in the final review stage prior to adoption. The floodplain maps have been discussed further in the Natural Systems Analysis Constraints section of the plan.

In accordance with regulations under the NFIP, the Village has an updated Flood Damage Prevention Ordinance. The purpose of the new ordinance is as follows:

- (1) Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion, flood heights or velocities;
- (2) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- (3) Control the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of flood waters;
- (4) Control filling, grading, dredging, and all other development which may increase erosion or flood damage; and

- (5) Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

5. Stormwater Management (Chapter 22)

This ordinance is intended to address the issue of stormwater management throughout the Village's planning jurisdiction. It is important to take a proactive approach to dealing with stormwater for the protection of both surface and ground water within and adjacent to the corporate limits of the Village. This ordinance contains language outlining all standards for development as outlined by NC Department of Environment and Natural Resources and NCDRCM. The intent of this ordinance is summarized as follows:

- (1) Regulate existing developments, new development, and construction activities in accordance with state requirements and institute additional mandatory requirements to prevent careless pollution of surface waters, groundwaters, and the creation of additional floodprone areas;
- (2) Establish the authority of the Village to administer and enforce stormwater regulations;
- (3) Create public education programs so that the citizens of the Village will have knowledge of how to reduce and prevent pollution from their homes and businesses.

6. Streets, Sidewalks, and Other Public Places (Chapter 24)

The use and maintenance of streets, sidewalks, and all other public access locations is regulated by Chapter 24 of the Village Code. Damage to streets, bridges, lights, and signs is regulated and prohibited. Additionally, the use of vehicles and the standards related to motorized vehicles are also outlined in this ordinance.

7. Subdivisions (Chapter 26)

Chapter 26 of the Village Code provides the Village's subdivision regulations. The following excerpt from the subdivision ordinance provides the purpose of the subdivision regulations:

“The purpose of this chapter is to regulate and control the subdivision of land within the limits of the Village in order to promote the public health, safety, and general welfare of the community. They are designed to lessen congestion in the streets and roadways; to further the orderly layout and use of land; to ensure 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, open space, recreational areas, and other public requirements; and 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.

8. Utilities (Chapter 30)

Chapter 30 of the Village Code establishes regulations regarding the installation of utility lines throughout the Village’s planning jurisdiction. It is unlawful to install or construct above ground utility lines at any location throughout the corporate limits unless a property owner falls under one of the exemptions outlined under Section 30-34 of the Village Municipal Code.

9. Zoning Ordinance (Chapter 32)

The Village zoning ordinance is included in Chapter 32 of the Municipal Code. The purposes of the zoning ordinance, as stated in the Section 32-1 of the ordinance, are as follows:

“(1) Secure safety from fire, panic, and other dangers; (2) Promote health and general welfare; (3) Provide adequate air and light; (4) Prevent the overcrowding of land; (5) Avoid undue concentration of population; (6) Facilitate the adequate provisions of public requirements; (7) Conserve the value of buildings and encourage the most appropriate use of land throughout the Village; and (8) Protect

the areas ecology through full cooperation with the County, State, and Local authorities.”

The zoning ordinance includes the following seven land use districts, and two overlay districts. Each parcel of land in the Village is included in at least one of the following districts:

PD - 1. Planned Development 1 District is established as a district in which the principal use of land is for dwellings. It is encouraged that this land be utilized primarily for single-family residential development. Uses in this district shall not include any commercial or trade activity except that associated with a golf course or clubhouse. It is the intent of this district to preserve the natural environment as much as possible.

PD - 2. Planned Development 2 District is established as a district in which the principal use of land is for residential dwellings. Uses compatible with those outline in PD - 1 are promoted. It is also the intent of this district to protect the natural environment by limiting maximum lot coverage, providing common areas adjacent to all lots, clustering residential nodes, and preserving a sizeable maritime forest area without intrusions.

PD - 2C. Planned Development 2 Commercial District is established as a district in which the principal uses of land are for commercial, municipal, and utility service areas for the entire island.

PD - 3. Planned Development 3 District is established as a district in which the principal use of land is residential but with some offices allowed and bed and breakfast without commercial restaurant facilities.

PD - 3C. Planned Development 3 Commercial District is established as a district in which the principal use of land is for mixed uses which includes residential uses, commercial services, offices, marina and marina related uses, club facilities, transient inn uses and leisure activities and their attendant uses.

PD - 4. Planned Unit Development 4 District is established as a district in which the principal use of land is for single-family residential dwellings on large lots, leisure activities, and the protection of the natural environment.

NC. The Neighborhood Commercial District is primarily intended to accommodate very low intensity office, and personal service uses within residential areas. The district is established to provide convenient locations for businesses, which serve the needs of Island residents and visitors without disrupting the character of the neighborhood. The neighborhood commercial district is a transitional land use zoning district in which the principal use of land is residential with some office and service uses allowed to serve the surrounding residential districts and in which traffic and parking congestion can be reduced to a minimum in order to preserve residential values and promote the general welfare of the surrounding residential districts.

PD-3C-1. The Lighthouse-Chapel Overlay District is established in order to permit development that is compatible with the pastoral environment of this district.

MFPO. The Maritime Forest Protection Overlay District is established in order to permit development that is compatible with the environmentally sensitive nature of the Bald Head Island and Middle Island maritime forests, and to preserve land in a natural state where such land is considered to be a vital link in the local groundwater replenishment cycle and where the destruction of natural vegetation could have a harmful effect on the stability of the soil and its resistance to erosion.

10. Village of Bald Head Island Hazard Mitigation Plan

Developed by the Village Planning Director, the Hazard Mitigation Plan (HMP) identifies potential natural hazards that may affect the Village, identifies the extent of the risk the Village 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 (April, 2005).

11. Village of Bald Head Island Stormwater Management Ordinance

The central environmental goals of the Village of Bald Head Island are to restore and preserve water quality and the natural ecological functions of the surface and ground waters that are included in its planning area and to reduce the potential for flooding residential areas. In order to meet these important goals, the Village of Bald Head Island Stormwater Ordinance was adopted for the following purposes:

- (1) To regulate existing developments, new developments, and construction activities in accordance with State requirements and to institute additional mandatory requirements to prevent careless pollution of surface waters, ground waters, and the creation of additional flood prone areas.
- (2) To establish the authority of the Village to administer and enforce stormwater regulations.
- (3) To create public education programs so that the citizens of the Village will have knowledge of how to reduce and prevent pollution from their homes and businesses.

12. Village of Bald Head Island - Vision 2010

Vision 2010 was a joint effort between the Village, Bald Head Island Limited, the Bald Head Island Association, the Bald Head Island Conservancy, and other interested parties. Members of each entity served on the steering committee for the process. This was a first attempt at coordination between all interest groups on the island. The visioning plan was broken into four separate segments including: roads and transportation; recreation, environment, tourism, and resource conservation; public facilities, utilities, and services; and community design and land use. Committees worked on establishing visioning statements under each of these categories. The input received through this process will be utilized as a basis for developing a comprehensive plan to address the long range needs of the community.

13. Village of Bald Head Island 2002 Long Range Plan

The long range planning sub-committee for the Village established an update to the Village long range plan in 2002. Priorities established in the Vision 2010 visioning process were utilized in

working through the updated long range plan. This planning document identifies strengths and weaknesses that exist throughout the planning jurisdiction of the Village, and establishes goals for addressing identified weaknesses. As of May 2006, the committee has completed the update of this document. Policies outlined in the long range plan will be addressed in the policy statement section of this plan.

14. Review of the 1996 Brunswick County CAMA Land Use Plan

In 1997, Brunswick County completed its current CAMA land use plan update. The Village currently falls under the jurisdiction of this plan. Within the context of this plan, policy statements were established specific to the Village. The Coastal Resources Commission certified this document on November 20, 1998. The current plan addresses a variety of issues, with a focus on resource protection policies, resource production and management policies, economic and community development policies, continuing public participation and coordination policies, and storm hazard mitigation & post disaster recovery policies.

The following summarizes the policy statements from the Brunswick County Plan that were established for the Village. All policy statements from the plan have been implemented.

1. The Village of Bald Head Island supports the concept of a family oriented island developed in harmony with nature, promoting responsible development with respect for the environment.
2. Educational programs and other efforts targeted to property owners and visitors will be utilized in order to further Bald Head Island's goal of preserving the beauty of its beaches, creeks, maritime forest, and other natural resources which make it unique.
3. The Village of Bald Head Island supports state and federal laws designed to manage development in Ocean Hazard Areas of Environmental Concern as well as Estuarine Shoreline Areas of Environmental Concern.
4. The Village of Bald Head Island realizes the importance of its shoreline from an aesthetic and economic standpoint. The Village will establish a shoreline management plan to evaluate methods of beach and dune stabilization. The Village supports all State and Federal programs for beach stabilization and encourages the active funding of these programs.

5. The Village of Bald Head Island supports efforts to maintain a high level of water quality in order to enhance fisheries resource and recreational value of its waters.
6. Protection of sea turtle nesting areas will continue to be enforced through recognized ordinances.
7. The Village of Bald Head Island recognizes its natural resources as one of its greatest assets. To help preserve these resources the development of a maritime forest management plan and consistent open space plan have become a point of focus.
8. Bald Head Island restricts the use of vehicles powered by internal combustion engines, because of the fragile nature of its unique habitat, in order to prevent adverse environmental impacts. Bald Head Island will continue to enforce its Internal Combustion Engine Ordinance, which prohibits the use of internal combustion engines on the Island with certain exceptions.
9. Bald Head Island advocates a strong local government that supports effective community planning and appropriate land use controls.
10. Bald Head Island will attempt to facilitate the expansion of public services and facilities to meet the needs of existing and future populations, as resources allow.
11. Bald Head Island supports innovative transportation programs related to improved road and water transportation system improvements, including an enhanced emergency transportation system.
12. Residential and commercial development in accordance with applicable Village ordinances is encouraged.
13. Bald Head Island supports and encourages the restoration and/or appropriate adaptive reuse of significant and architecturally important historic and cultural structures and sites.
14. Bald Head Island supports a completed and well-maintained infrastructure, including the development of a state of the art solid waste collection system.

15. Bald Head Island supports regional intergovernmental planning as it relates to transportation, emergency services, etc. Bald Head Island encourages improved regional cooperation covering all local government units including Brunswick County area municipalities, neighboring counties, and the State.
16. Measures to enhance public safety will be supported, such as regulation of golf cart safety, as well as enhanced emergency medical service programs. Bald Head Island encourages equitable application of county resources to all municipalities, specifically emergency services such as EMT-paramedic and fire protection.
17. The Village of Bald Head Island supports continued public participation in Village government. Every effort will be made to improve channels of communication to property owners and residents to obtain input and ideas at the front-end of the decision making process.
18. The Village of Bald Head Island believes that the core of strong local government is active citizen involvement and open communication between Village representatives and their constituents. The Village will continue to support efforts to further this purpose, such as the establishment of Village committees, including but not limited to: Finance, Beach, Roads and Transportation, Public Safety, and Public Works.
19. The Village of Bald Head Island will continually pursue methods and procedures to minimize the loss of life and property during major storm events. This includes establishment of an Emergency Mitigation Plan to effectively plan for evacuation/security measures, as well as provide an orderly method of post-disaster clean up and recovery.
20. The Village of Bald Head Island shall continue to enforce the North Carolina Building Code, which establishes design/construction standards to meet resistive factors such as high wind velocity. The Village will also continue to comply with CAMA regulations, whose standards dictate setbacks for structures particularly susceptible to storm surge.
21. Bald Head Island, in cooperation with County and State officials, continues to explore the safest, most expedient and efficient evacuation routes for citizens. Continued cooperation with appropriate officials to ensure proper implementation of emergency planning will be pursued.