

Town of Pine Knoll Shores

CAMA Core Land Use Plan 2015

Adopted by resolution of the Board of Commissioners

8/12/2015

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GUIDE FOR LAND USE DECISION MAKING

It is intended that this document be an integral part of the Town of Pine Knoll Shores decision making process concerning future land use. This document should be consulted prior to any decision being made by the Pine Knoll Shores staff, Planning Board, and/or Town Council concerning land use and development.

SECTION I: INTRODUCTION

The Fiscal Years 2004/2005 - 2008/2009 Core CAMA Land Use Plan was 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 Subchapter 7B guidelines provide that each of the twenty coastal counties and the municipalities within those counties prepare and adopt a Core CAMA Land Use Plan (hereinafter referred to as the "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 and the municipalities in the county which choose not to prepare their own plan. Municipalities not preparing their own plan will be included in the plan for the county in which the municipality is located.

In general, Subchapter 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 Town of Pine Knoll Shores will take to ensure implementation of this plan.

At the beginning of the preparation of the 2008 Land Use Plan, the Town of Pine Knoll Shores adopted a Citizen Participation Plan that was intended to ensure that all interested citizens had 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 Pine Knoll Shores Board of Commissioners, it was submitted to the CRC for certification. Certification of the plan was achieved on November 20, 2008.

Recognizing the availability of additional data and citizen inputs over the time period 2008-2014, the Town of Pine Knoll Shores Board of Commissioners created a Land Use Plan working group at their meeting on March 13, 2014 to recommend amendments to the Town's

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Land Use Plan. The purpose of the working group was to review and update the Land Use Plan so that it will conform to the Town's needs and strategic vision in 2014 and beyond.

The update of the Pine Knoll Shores Land Use Plan built upon the base text prepared by Holland Consulting Planning firm for the 2008 Land Use Plan, but updates the data. The fundamentals are still largely shaped by the citizen input received in preparing the 2008 plan, but refined based on subsequent citizen input initiatives.

SECTION II: HISTORY

The following history of Pine Knoll Shores, North Carolina, is a compilation of excerpts from *The Story of Pine Knoll Shores* written in 2007 by Mary Korff, Ken Hanan and Art Browne. Their work was based on the original history by Ken Haller, written in 1984. The Town's History Committee has recently updated this material.

A. THE BEGINNING

The story of Pine Knoll Shores as we know it, begins with Alice Hoffman, who bought substantial acreage on Bogue Banks (known then as "Isle of the Pines") in 1917. She made her home here, off and on, until her death in 1953. In 1944, the property was put in what became known as the Roosevelt Trust, which consisted of her niece Eleanor's four children: Theodore Roosevelt III, Quentin Roosevelt, Grace Roosevelt and Cornelius Roosevelt. Quentin died in the 1948, and his share went to his wife, Frances.

It was these Roosevelts, the grandchildren of President Teddy Roosevelt, who envisioned the development of the Town of Pine Knoll Shores. To carry this out, they engaged a nationally known management consultant firm and later a prominent local engineering firm. Together they came up with a plan which not only set up the physical structure of the town but also established a long range plan, allowing each stage of development to gel before the next stage was begun. Throughout this development, the Roosevelts stood by to assist and encourage those who came to carry it out, as we shall see.

Early builders began in the easternmost section of the town, constructing mostly vacation homes. By 1964, lots were selling for \$1,150 to \$1,600. The first three motels, the Atlantis Lodge, the Sea Hawk and the John Yancey (later the Royal Pavilion), went up on the oceanfront during this period.

The Roosevelts began to notice that this new community had appeal for permanent residents as well. It was time to draw up covenants to regulate its growth.

With the further development of the central area, a homeowners' association was established known as Pine Knoll Association, Inc. This became the organization responsible for maintaining streets, parks, and waterways; providing utilities such as water; and enforcing building standards. Later the eastern section would also form an association called PIKSCO. These associations eventually worked together to incorporate the town.

With these homeowners' associations began the tradition of volunteerism so much a part of the development of Pine Knoll Shores and which still exists today. The town had attracted prominent citizens of the area and retirees from outlying areas who contributed their talents

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honed in the professions, business, government and the military. They gave generously of their services. Nor were their services confined to their expertise. *The Shoreline*, the town newsletter, was conceived and published by its co-editors, a housewife and a former librarian. Former corporate vice presidents could be seen helping to clear and maintain public areas, repairing potholes and building docks, to name but a few examples.

Another very important influence of the homeowners' associations was, and continues to be, their emphasis on residential growth as opposed to commercial development. Farsighted planning by the Roosevelts' representatives had designated park areas, areas to be kept natural, those to be developed commercially and those to be held to single-family dwellings.

Major emphasis of these associations, and later the incorporated town, was to be on Pine Knoll Shores as a residential community— and so it has remained.

B. ORGANIZING A TOWN GOVERNMENT

By the close of the '60s, as the Roosevelts began to bow out, the first homeowners' associations assumed responsibility for many town functions. By the early 1970s, they were recommending incorporation.

In January 1972, a public meeting was arranged at which a representative of the North Carolina League of Municipalities discussed the advantages of incorporation. As a result of the meeting, a steering committee of nine volunteers, broadly representative of all sections of the area then subdivided, was formed to study all aspects of the proposal to incorporate.

In June, the committee reported its findings and had also prepared a draft of a proposed charter of incorporation. A second public meeting was held. Most residents were receptive to the plan. Therefore, the committee contacted Carteret County's representative in the North Carolina General Assembly, submitted the proposed charter and requested that the proposal be presented for enactment.

The General Assembly responded by ratifying the charter on April 25, 1973. Pine Knoll Shores was now officially The Town of Pine Knoll Shores! The original government for the town was defined, under North Carolina law, to be the Mayor - Council form of government. In Pine Knoll Shores this consisted of a board composed of six members each elected to serve for a four year term. The Commissioners, as they were termed, elected one of their members to serve as the Mayor. Each Commissioner was assigned the responsibility to manage specific portions of the Town's functional elements. In 2003 the citizens of the Town voted to change the composition of the Board to include an elected mayor and five elected commissioners. The charter was revised to include a Mayor to be elected for two year terms and for the Commissioners to be elected for four year terms. In 2006 the Town Board recognized the ever increasing complexity of managing the business of the community and

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voted to amend the charter to hire a professional Town Manager and to operate under the Council - Manager form of government. In this form of government the Manager is responsible to the Commissioners for all aspects of the Town's operations.

C. TOWN HALL

Upon incorporation, one of the most immediate problems facing the new town was to find quarters in which to conduct its business. This problem was solved when the owners of the Atlantis Lodge offered a small office space for the Town Clerk and use of a large recreation room for public meetings. Need for a larger and more permanent office space, however, soon became apparent. The solution came when the Roosevelts gave the town the little house (formerly a part of Mrs. Hoffman's home) that was then the office for the Roosevelts' resident manager. In July 1974, the house was moved to a 25-acre plot on Pine Knoll Boulevard donated by the Roosevelts as a town hall site. The Pine Knoll Shores Garden Club, already well organized, provided the landscaping.



This building served for the next five years until the present structure was completed. Serious consideration of the need for a larger and more adequate town hall began as early as 1976. One of the major considerations was the desire for the town's own fire department and a space to house its equipment when acquired.

Planning, in conjunction with the architect, continued until May 1978, when bids for construction were accepted. Still another year went by before the building was completed, and fire and rescue vehicles acquired. When the move to the new building had been accomplished by May 1979, there was a joyful official opening ceremony celebrating the result of years of planning and effort.



D. VOLUNTEERS

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Critical to the evolution of this community as it is today has been the contribution of the hundreds of dedicated volunteers who have given so freely of their time and talents. In the years leading up to incorporation, but especially in the years since that time, the spirit of volunteerism has been a hallmark of the Town. Counted among the hundreds of unpaid volunteers are those who have served as mayors, firefighters; emergency medical personnel; emergency management staff; members of boards, commissions, and committees.

Because of these caring, involved townspeople, a distinctive community has been created which today offers many advantages to its residents. Among these is the benefit of having one of the lowest tax rates of any incorporated town in this part of the state.

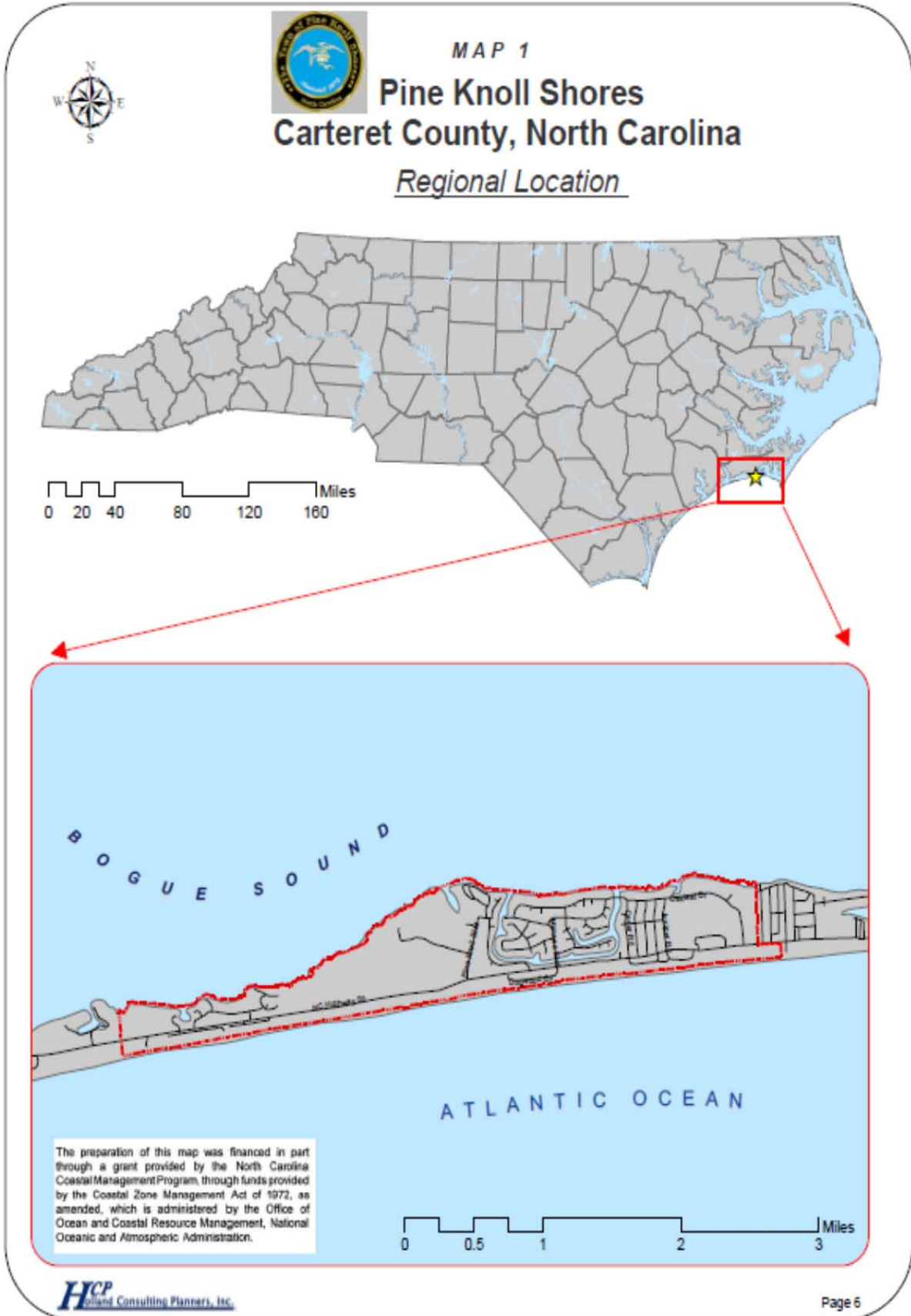
Our residents also have the comfort and security of a first-class, well-trained and equipped group of paid employees and volunteers serving as fire, EMS and emergency management personnel, ready to respond immediately to nearly every type of disaster.

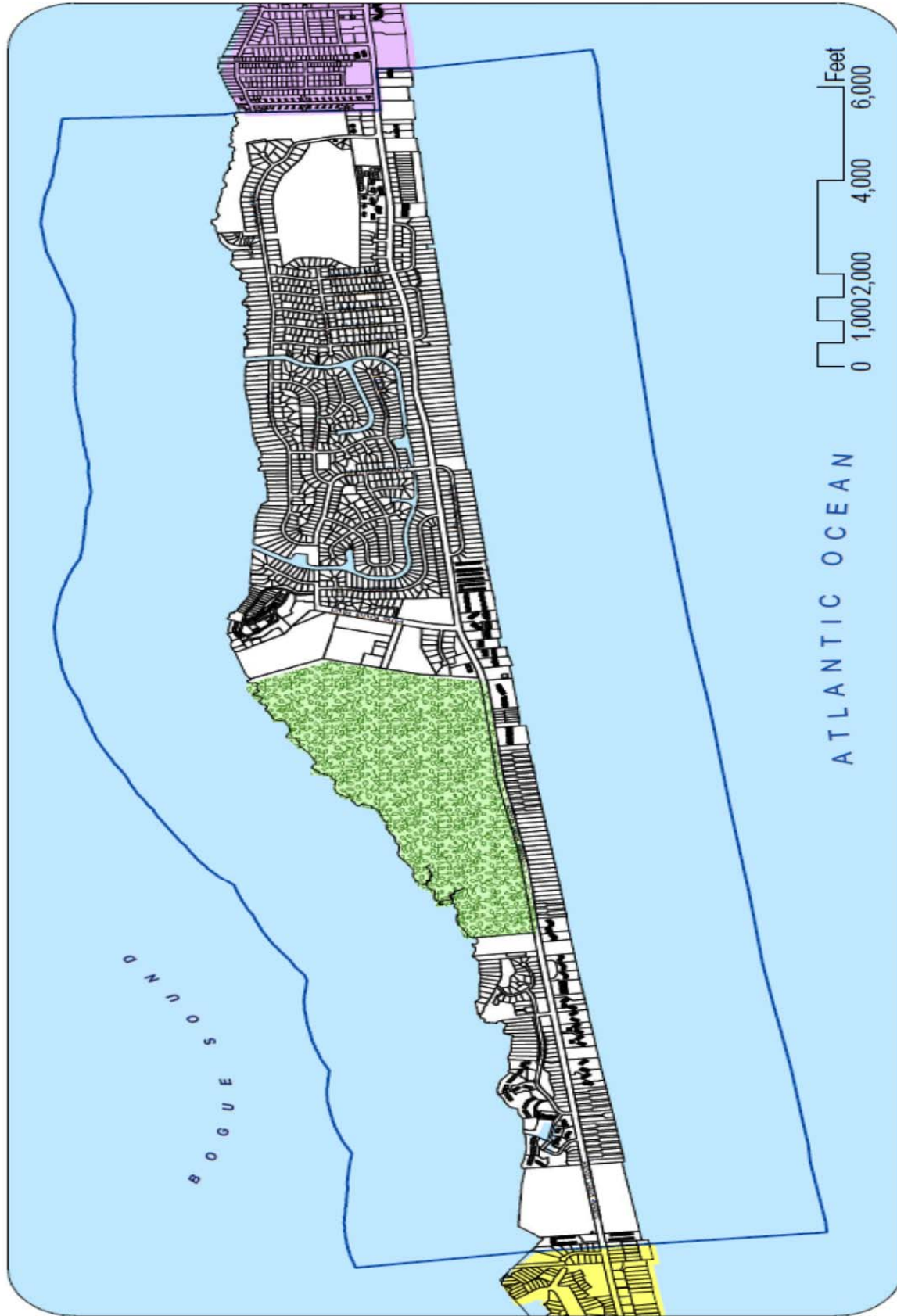
Less tangible but just as beneficial is the ambience throughout the town created by the spirit of neighbor helping neighbor. This makes Pine Knoll Shores a community in the truest sense of the word!

SECTION III: REGIONAL SETTING

The Town of Pine Knoll Shores is centrally located on Bogue Banks in south central Carteret County. Pine Knoll Shores is located between Atlantic Beach to the east and Indian Beach to the west. North Carolina Highway 58 is the main thoroughfare running the length of the Town's corporate limits. This highway connects all of the beach communities along Bogue Banks. Maps 1 and 2 provide an overview of the Town's regional location, as well as a detailed street level map which indicates the location of the Town's street rights-of-way.

Pine Knoll Shores is also centrally located for access by residents of several large urban centers throughout the state's Coastal Plain and Piedmont regions. For this reason, the Town is a desirable tourist destination as well as a place to live. The following summarizes the distance in miles to several major urban centers in close proximity to the Town of Pine Knoll Shores: Beaufort (10 miles), Morehead City (6 miles), New Bern (41 miles), Jacksonville (29 miles), Greenville (83 miles), Rocky Mount (128 miles), Raleigh (146 miles), and Wilmington (81 miles). As road by-passes are built and other transportation improvements are made, Pine Knoll Shores and the surrounding areas will be more accessible for visitors and property owners.





The preparation of this map was financed in part through a grant provided by the North Carolina Coastal Management Program, through funds provided by the Coastal Zone Management Act of 1972, as amended, which is administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.



MAP 2
Pine Knoll Shores

Legend

- Pine Knoll Shores Town Limits
- Indian Beach Town Limits
- Atlantic Beach Town Limits
- Maritime Forest Reserve (Conservation Area)
- Hydrology



SECTION IV: PINE KNOLL SHORES
COMMUNITY CONCERNS AND ASPIRATIONS

A. KEY ISSUES/DOMINANT GROWTH-RELATED ISSUES

It is very useful for a community to determine the key concerns and growth-related issues at the beginning of the planning process. In order to solicit input from Pine Knoll Shores citizens, an issues identification meeting was held on November 11, 2004. Approximately 30 Town residents attended this work session. The 1,600+ citizens of Pine Knoll Shores were notified of this meeting via normal open meeting procedures. At this meeting, an open floor discussion was held regarding issues that Town residents feel will have a significant impact on the future of Pine Knoll Shores. The list provided below is a ranking of the issues identified at this meeting. During the course of this meeting, all issues identified were listed. Subsequent to the discussion portion of the meeting, all attendees were asked to vote on what they felt were the most significant concerns or issues listed. There are several issues whose rank is tied, due to receiving the same number of votes.

RANK	ISSUE	SCORE
1	Maintain strict residential zoning restrictions	13
2	Develop a recreational facility (indoor - senior)/Address issue of providing youth recreational facilities (multi-use)	12
3	Phase in underground utilities	11*
3	Solve problems involved with water system (purchase and/or improvements)	11*
3	Develop long term plan for beach renourishment 20-30 years	11*
3	Maintain the canal	11*
4	Preserve the maritime forest	10*
4	Identify strategy for use and preservation of Roosevelt natural area	10*
5	Address stormwater management issues	9*
5	Maintain housing standards	9*
6	Address traffic issues along Highway 58	8*
6	Determine a proper use for Roosevelt tract (10 acre) to be gifted to the Town	8*
7	Recognize need for ongoing beach renourishment	7
8	Encourage redevelopment	6*
8	Develop additional access into the canal (ingress/egress) to Intracoastal Waterway	6*
8	Identify central storage area for recreational vehicles (boats, Rvs)	6*
9	Install a central sewer system	5*
9	Take status quo approach to traffic issue	5*
10	Oppose third right-of-way access proposed for the middle of Bogue Banks	4
11	Identify ways to make the Town more senior friendly	3
12	Develop improved Town signage at entrances	2*
12	Address the issue of demographic shift (housing occupancy)	2*
12	Develop recreational programs (Town-sponsored)	2*
13	Develop a storm (hurricane) shelter	1*
13	Recycle stormwater	1*

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RANK	ISSUE	SCORE
13	Provide adequate parking at beach access sites to comply with section 933 standards	1*
14	Identify potential sites for sewer system infrastructure	0*
15	Address sewer need for commercial operations along Highway 58	0*
16	Develop Town-wide bicycle paths	0*

*Indicates a tie score.

Additionally, a land use plan survey was mailed to 1,975 (617 in-Town; 1,358 absentee) property owners. A total of 959 (333 in-Town; 626 absentee) completed questionnaires were received. See Appendix II for a comparison of these results as well as the tabulation of additional questions from the property owners survey.

The 2008 Pine Knoll Shores CAMA Core Land Use Plan also resulted in the creation of a Community Vision Statement:

To the fullest extent possible, Pine Knoll Shores will strive to maintain a community dedicated to preserving its diverse forestlands, Roosevelt Natural Area, wetlands, marine life, and native wildlife while at the same time offering its citizens a quiet, respectable, predominantly single-family community. Residential areas will be strictly preserved and protected. Population growth should continue at a moderate growth rate. Commercial development will be limited and not allowed to infringe upon non-commercial land uses. Pine Knoll Shores will continue to be a community in which the best possible services are provided to its citizens at the most reasonable cost.

This vision statement formed the basis of the 2008 plan and drove the development of its policies. The Community Vision Statement still largely seems to reflect the temperament of the Town, but has been supplemented by a Mission and Vision Statement developed and adopted by the Town's leadership, its mayor and commissioners:

Town Vision Statement, Adopted April 13, 2010, Amended February 13, 2014:

Our vision is to provide a quality environment in which all residents and visitors are safe and secure, where individual talents flourish, and everyone enjoys the natural resources of our area.

Town Mission Statement, Adopted April 13, 2010, Amended February 13, 2014:

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It is the mission of the Town of Pine Knoll Shores to provide for the safety and well-being of all residents and visitors in an efficient and well-organized manner; and develop and implement plans for the continuous improvement of the town, its services, and its beach; and encourage the participation of residents in service to the Town and community.

The Town's Mission and Vision statements drive the activities of the Town's elected officials and staff, and formed the basis of the Town's strategic planning effort in 2013.

As part of the Town's strategic planning process in 2013, the Town conducted a survey, which was distributed via *The Shoreline* and via town-email. The survey had about 380 responses, which was split about 50-50 between full time and part time residents and property owners. Respondents identified 5 essential areas of interest:

- Beach Nourishment
- Infrastructure (streets, public facilities)
- Fiscal and Financial Planning
- Taxes
- Parks and Recreation

The Strategic Planning Committee also conducted a SWOT analysis, which identified the following Strengths, Weaknesses, Opportunities, and Threats (bold items have direct relationships to land use):

Strengths

Natural Environment/Outdoor rec opportunities
Aquarium, Trinity Center, Country Club, Library
Stable due to physical constraints and build out
Affordable cost of living & high property values
Low density with car access to most of needs
Affluent part time residents
Good police, fire, and rescue

Residential community

Low crime, friendly, small town attitude

Accomplished & capable citizens & volunteers
Sense of place
Efficient government

Opportunities

Expanded beach funding
Services for the elderly

Increased number of visitors
Aging in place
Second homeowners become permanent residents
Recovering economy
Hwy 70 study
Active retirees
Welcoming attitude towards youth
Engagement with govt agencies (state, federal)
Technology & 2nd homeowners (social networking)
Consolidation of services
Professional outreach
Kayaks for Warriors event

Weaknesses

Lack of urban amenities

Lack of deep water access

Aging community & shrinking population

No public transportation

Capital risk and indebtedness

Fixed revenue & rising costs
Dependence on beach renourishment as the Town's main economic driver
Resident versus visitor issues
Isolationist views & decisions made in a vacuum

Negative view of Town from outside

Lack of long range planning
Low participation in government by part-time residents
Not taking advantage of volunteers

Threats

Rising Insurance and taxes
Hurricanes and other natural disasters
Shrinking state and federal budgets
Water pollution
Infrastructure maintenance

Growing short-term seasonal rentals
Not enough jobs for younger people
Paying for beach renourishment
State port or bridge loss
Cherry Point leaving (BRAC)

Environmental regulations

Closed community to the outside
Negative publicity (shark attacks etc)
Lack of quality healthcare

SECTION V: ANALYSIS OF EXISTING AND EMERGING CONDITIONS

A. POPULATION, HOUSING, AND ECONOMY

1. Pine Knoll Shores Permanent Population

a. *Pine Knoll Shores Permanent Population*

The permanent population within Pine Knoll Shores has increased substantially since the Town's incorporation. Overall the Town has experienced a growth rate of 107% since the 1980 Census was released. The 1980 Census was the first census in which Pine Knoll Shores was reported since the Town was incorporated in 1973.

Subsequent to experiencing a huge in-migration of 714 persons between 1980 and 1990 for a growth rate of 110.5%, the Town saw a more modest increase of 164 individuals for a growth rate of 12.1% between the years 1990 and 2000. Between 1980 and 2000, Pine Knoll Shores experienced the second highest growth rate of any Town in Carteret County. Emerald Isle experienced the most rapid growth by far, with a 303.2% growth rate from 1980 to 2000. A detailed breakdown of population growth throughout Carteret County is provided in Table 1. Between 2000 and 2010, the growth rate of the majority of the towns on Bogue Banks slowed significantly, and the towns of Pine Knoll Shores and Atlantic Beach encountered declines in their full time populations. Carteret County over the same time period maintained a fairly consistent rate of growth in its permanent population.

Table 1. Pine Knoll Shores and Carteret County Population Growth by County and Municipality

Municipality	1980	1990	2000	2010	00 to '10	80 to '10
Atlantic Beach	941	1938	1781	1495	-16.1%	58.9%
Beaufort	3826	3808	3771	4039	7.1%	5.6%
Cape Carteret	944	1008	1214	1917	58.0%	103%
Cedar Point	0	628	929	1279	37.7%	1279%
Emerald Isle	865	2434	3488	3655	4.8%	323%
Indian Beach	154	153	95	112	17.9%	-27%
Morehead City	4359	6046	7691	8661	12.6%	99%
Newport	1883	2516	3349	4150	23.9%	120%
Pine Knoll Shores	646	1360	1524	1339	-12.1%	107%
Total Municipalities	13618	19891	23842	26647	11.8%	96%
Total Unincorporated Areas	27574	32662	35537	39822	12.1%	44%
Total County	41192	52553	59379	66469	11.9%	61%

* Cedar Point was incorporated in 1988, therefore census data is not available prior to 1990.

Source: US Census Bureau.

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Peak seasonal population can be defined as the total number of overnight visitors in the Town of Pine Knoll Shores on the busiest day of the year, which typically occurs on holiday weekends such as the Fourth of July and Labor Day. The estimate provided below is based upon a study conducted by Paul D. Tschetter in 1988 in conjunction with East Carolina University.

This study was aimed at addressing seasonal population in the Albemarle-Pamlico region. A summary of estimated persons per unit for different types of lodging units and residences were provided in the study. Table 2 is a breakdown of how these estimates were calculated. The private housing units figure was taken from the US Census and accounts for all of the vacant housing units within Pine Knoll Shores. These units are comprised of both single-family and multi-family units.

Table 2. Pine Knoll Shores Seasonal Population, 2013

Housing Type	Number of Units	Persons Per Unit	Seasonal Population
Motel/Hotel	385	4.00	1,540
Public Beach Access Visitors	171	3.00	513
NC Aquarium Visitors	1	5,000	5,000
Private Housing Units	1,396	5.00	6,980
Total	1,953		14,033

Permanent Population	1,339
Peak Seasonal Population	14,033
Total Peak Population	15,372

*NC Aquarium Visitors figure is current as of April 2014.

Source: Holland Consulting Planners, Inc., 2010 US Census, Town of Pine Knoll Shores

b. Population Profile

Table 3 summarizes the racial composition for Pine Knoll Shores and Carteret County in 2010. An overwhelming majority of the population in Pine Knoll Shores is Caucasian. Caucasians comprise 96.3% of the Town's population based on the 2010 US Census. Only 60 members of the Town's 1,339 person permanent population are minority, which make up less than five percent (4.5%) of the total population. The racial composition has been very consistent since the Town's incorporation, but the Town has become slightly more diverse since 2000. The ratio of male residents to female residents is split fairly evenly at 48.9% male and 51.1% female.

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Table 3. Pine Knoll Shores and Carteret County Racial Composition, 2010

	Pine Knoll Shores		Carteret County	
	Total	Percentage	Total	Percentage
2010 Population	1339	100	66469	100
White	1289	96.3	59346	89.3
African American	10	0.7	4041	6.1
Asian	14	1	580	0.8
American Indian and Alaska Native	1	0.1	316	0.5
Native Hawaiian or Pacific Islander	3	0.2	67	0.1
Some Other Race	9	0.7	812	1.2
Two or More Races	13	1	1307	2
Hispanic or Latino (of any race)	14	N/A	2241	N/A
Male	655	48.9	32829	49.4
Female	684	51.1	33640	50.6

Source: 2010 US Census.

The population within Pine Knoll Shores is comprised primarily of older people. According to the 2010 Census, 7.8% of the population is under the age of fifteen, compared to 15.4% for Carteret County overall. When comparing Census figures, it appears that the full time population of the Town is aging. The retired population grew 52.8% between 1990 and 2000, and retracted 12.1% between 2000 and 2010. Nonetheless, the retired population as a percentage of the permanent population has stabilized at 42.7%. The shift between 1990 and 2000 can be attributed to the aging of the existing population, as well as in-migration of retired age individuals. The stabilization can probably be traced to the recession of the late 2000s, which required many retirement-aged individuals to stay in the work force. The percentage working age population within the Town and the county has fallen between 2000 and 2010. 48.7% of the Town's population is considered working age, compared to 64.5% for the county overall. Table 4 provides an overall summary of age composition for both the 1990, 2000, and 2010 Census years. Graph 1 depicts changes in the Town's age composition between 1990 and 2010, and indicates a predominantly older population.

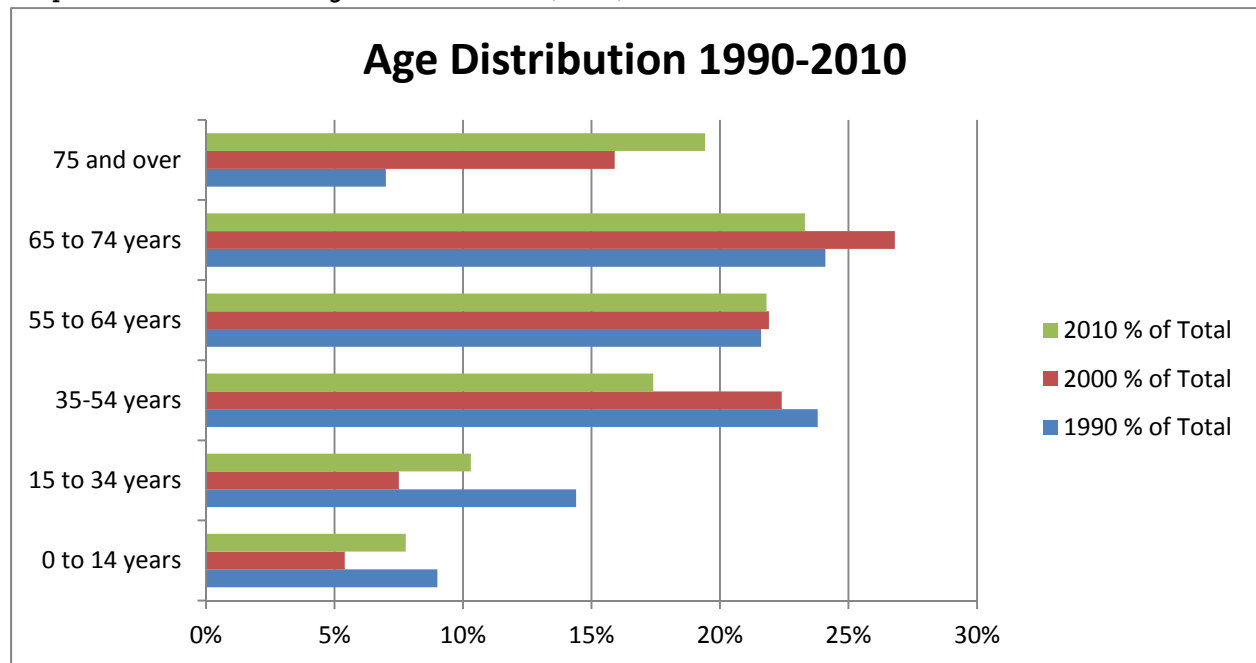
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Table 4. Pine Knoll Shores and Carteret County Age Composition, 1990-2010

Table 4	Pine Knoll Shores						Carteret County	
	1990 Total	1990 % of Total	2000 Total	2000 % of Total	2010 Total	2010 % of Total	2000 % of Total CC	2010 % of Total CC
0 to 14 years	123	9%	83	5.4%	104	7.8%	16.7%	15.4%
15 to 34 years	197	14.4%	115	7.5%	138	10.3%	21.9%	21.5%
35-54 years	326	23.8%	342	22.4%	233	17.4%	31.5%	28%
55 to 64 years	295	21.6%	333	21.9%	292	21.8%	12.7%	16%
65 to 74 years	330	24.1%	408	26.8%	312	23.3%	10.1%	11.1%
75 and over	96	7%	243	15.9%	260	19.4%	7.1%	7.9%
Total population	1367	100.0%	1524	100.0%	1339	100.0%	100.0%	99.9%
Median Age	N/A		61.8		62.1		42.3	45.8
School Age Population (5-18)	128	9.4%	104	6.8%	108	8.1%	17.7%	15.2%
Working Age Population (16-64)	800	58.5%	790	51.8%	652	48.7%	66%	64.5%
Elderly Population (65+)	426	31.2%	651	42.7%	572	42.7%	17.2%	19%

Source: 1990, 2000, and 2010 US Census.

Graph 1: Pine Knoll Shores Age Distribution 1990, 2000, 2010



The educational attainment for Pine Knoll Shores residents is quite high. An overwhelming majority (95.6%) have a high school education, while approximately 55.5% reported having a bachelor’s degree or higher. Additionally, 22.1% of the permanent population have received their graduate or professional degrees compared to 7.7% for Carteret County

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overall. Table 5 provides a comprehensive breakdown of educational attainment for permanent residents over 25 years of age for Pine Knoll Shores as well as Carteret County.

Table 5. Pine Knoll Shores and Carteret County Educational Attainment, 2012, Based on Persons 25 Years and Over

	Pine Knoll Shores			Carteret County
	Total	Margin of Error	% of Total	% of Total
Less than 9th Grade	0	+/-2.8	0.0%	3.2%
Ninth to twelfth grade, no diploma	41	+/-2.5	3.1%	8.3%
High School Graduate	184	+/-2.9	14.0%	28.9%
Some college, no degree	321	+/-4.2	24.4%	25.9%
Associate Degree	129	+/-2.7	9.8%	9.8%
Bachelor's Degree	429	+/-5.3	32.6%	16.2%
Graduate/Professional Degree	212	+/-3.8	16.1%	7.7%
Total Population 25 years and over	1316	+/-110	100.0%	
Percent High School Graduate or Higher	95.6%			88.5%
Percent Bachelor's Degree or Higher	48.7%			23.8%

Source: 2008-2012 American Community Survey (ACS), US Census Bureau

c. Population Summary

- The Pine Knoll Shores permanent population increased by 107% between 1980 and 2010, while the part time population has increased significantly as a percentage of the population.
- It is estimated that the Town’s peak seasonal population is approximately 15,372 persons.
- According to the 2008-2012 American Community Survey, 95.6% of Pine Knoll Shores residents have a high school degree, while 55.5% reported having a bachelor’s degree or higher.
- The minority population in Pine Knoll Shores is less than five percent (4.5%).
- Between the years of 1990 and 2010, the retired age population (65+) increased by 34.3%, but increased from 31.2% of the permanent population to 42.7% of the permanent population.

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- Between 1990 and 2010, the percentage of population aged 75+ has grown the most (277%), increasing from 7% in 1990 to 19.7% of the full time population in 2010.
- While age, sex, race, and ethnicity demographic data on the non-permanent population is not available, among Strategic Plan survey respondents, 41% of respondents who do not already live in the town full-time intended to in the future. This is fairly consistent with recent trends in estimating approximately a 2:1 ratio of part-time to permanent population.

2. Housing

a. *Housing Occupancy and Tenure*

Housing occupancy within the Town of Pine Knoll Shores is comprised predominantly of seasonally occupied structures. According to the 2010 US Census, 1,338 structures or 65.3% of the Town's total housing units were determined to be seasonally occupied. This large number of seasonally occupied housing units is made up of residences intended for seasonal, recreational, or occasional use. Of the 653 housing units that are permanently occupied, 89.3% are owner-occupied. The number of occupied dwelling units increased by 20% between 1990 and 2000, but declined 15.3% between 2000 and 2010. Occupied housing units as a percentage of all housing units has steadily declined from 41.6% in 1990 to 37.5% in 2000 and 31.9% in 2010. Table 6 provides an overview of housing occupancy and tenure for Pine Knoll Shores, as well as Carteret County overall.

The large number of seasonally occupied houses indicates a large population of non-full time residents of the Town. While precise demographics are unknown, it is reasonable to assume that these seasonal residents have significantly different demographics, needs, and service requirements than full time residents. Seasonal residents are a significant policy topic for the Town.

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Table 6. Pine Knoll Shores and Carteret County Housing Occupancy and Tenure, 1990-2010

Pine Knoll Shores Housing Occupancy and Tenure

	1990		2000		2010	
	Total	% of Total	Total	% of Total	Total	% of Total
Total Housing Units	1542	100.0%	2057	100.0%	2049	100.0%
Vacant:	900	58.4%	1286	62.5%	1396	68.1%
For rent	14	1.6%	6	0.5%	13	0.9%
For sale only	8	0.9%	12	0.9%	37	2.7%
Renter or sold, not occupied	6	0.7%	0	0.0%	3	0.2%
For seasonal, recreational, or occasional use	868	96.4%	1266	98.4%	1338	95.8%
For migrant workers	0	0.0%	0	0.0%	0	0.0%
Other vacant	4	0.4%	2	0.2%	5	0.4%
Occupied:	642	41.6%	771	37.5%	653	31.9%
Owner-occupied	530	82.6%	700	90.8%	583	89.3%
Renter-occupied	112	17.4%	71	9.2%	70	10.7%

Source: US Census Bureau. 1990, 2000, and 2010 US Census.

b. Structure Age

Development in Pine Knoll Shores has fairly well followed a bell curve from the 1960s to the present. The vast majority of structures (approximately 70%) were constructed between 1970 and 1989. To date, the housing stock has been adequate to meet the needs of the community, and there has not been a significant move towards redevelopment. Further analysis of development trends is available in the Analysis of Land Use and Development section of the plan. With older structures, septic tank upkeep and maintenance can also be an issue: this is addressed in the Analysis of Land Use and Development section of this plan.

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Table 7. Pine Knoll Shores Housing Structure Age, 2012

	Pine Knoll Shores Housing Structure		
	2012	Margin of Error	% of Total
2010 and later	0	+/-13	0.0%
2000 to 2009	169	+/-45	7.6%
1990 to 1999	322	+/-72	14.5%
1980 to 1989	970	+/-116	43.8%
1970 to 1979	605	+/-99	27.3%
1960 to 1969	113	+/-48	5.1%
1950 to 1959	27	+/-21	1.2%
1940 to 1949	0	+/-13	0.0%
1939 or earlier	9	+/-14	0.4%
Total Structures	2215	+/-66	100.0%

Source: 2008-2012 ACS, US Census Bureau

Building permits issued from 1997-2013 reflect a significant slow-down in construction activity since the economic recession of the late 2000s. With a recovering economy, construction rates could pick up, which may accelerate redevelopment. This topic is also covered in the Analysis of Land Use and Development Section.

Table 8. Pine Knoll Shores Residential Building Permit Activity, 1997-2013

Year	# of Permits	Construction Value	Average
1997	24	\$2,709,700	\$112,904
1998	23	\$2,038,800	\$88,643
1999	18	\$3,734,920	\$207,496
2000	13	\$2,753,270	\$211,790
2001	39 24 mf	\$5,154,209	\$132,159
2002	16	\$3,719,619	\$232,476
2003	18 12 mf	\$3,164,589	\$175,811
2004	30 6 mf	\$7,840,439	\$261,348
2005	19	\$5,900,000	\$310,526
2006	14 2 mf	\$4,900,000	\$350,000
2007	8 2 mf	\$4,300,000	\$537,500
2008	10	\$6,200,000	\$620,000
2009	3	\$1,300,000	\$433,333
2010	0	\$ -	\$ -
2011	5	\$1,700,000	\$340,000
2012	4	\$1,200,000	\$300,000
2013	8	\$1,702,628	\$212,829

Source: Town of Pine Knoll Shores.

*There are discrepancies between Tables 8 and 7 regarding structure construction. It should be recognized that the issuance of a Building Permit does not necessarily indicate that the structure was completed in a particular year. It should also be recognized that the American Community Survey is a five-year statistical estimate with error elements.

c. Housing Conditions

The housing stock within Pine Knoll Shores is comprised of larger, well-constructed homes (see Table 9, below). The average rooms per unit for housing units is 5.5 compared to 5.2 for Carteret County, and 73.5% of all homes have three or more bedrooms.

Table 9. Pine Knoll Shores, Carteret County, and North Carolina Housing Conditions, 2012

	Pine Knoll Shores	Margin of Error	Carteret County	North Carolina
Median Rooms per Unit	5.5	+/-0.2	5.2	5.5
Percent with no bedroom	2.7	+/-2.1	1.6	1.1
Percent with 3+ Bedrooms	73.5	+/-13.3	67.3	65.3
Percent lacking complete kitchen facilities	1.1	+/-1.3	0.5	0.7
Percent lacking complete plumbing	0	+/-4.5	0.9	0.5
Percent occupied with telephones	98.9	+/-1.2	97.1	97.5

Source: 2008-2012 ACS, US Census Bureau

d. Single- and Multi-Family Units

Approximately 57.7% of the overall residential structures within Pine Knoll Shores are single-family residences. Single-family residences are defined as stand-alone housing units with a single-family or individual living in the overall structure. Pine Knoll Shores was initially developed to accommodate single-family dwelling units while preserving the unique maritime forest landscape throughout what is now the corporate limits of the Town. Through strict zoning and various other land use controls the Town has achieved this goal. Forty-two percent (42.3%) of the housing units within the Town are considered to be multi-family units. Multi-family units are structures that are occupied by three or more dwellings. There are several large multi-family complexes within the Town, a majority of which are utilized for seasonal or recreational purposes. It should be noted that there are no mobile homes within Pine Knoll Shores' jurisdiction. This occurrence contrasts with other communities along Bogue Banks who accommodate large mobile home subdivisions. The Town will address this fact in the context of policy statements developed later in the document.

Table 10. Pine Knoll Shores and Carteret County Units in Structure and Mobile Home Count, 2012

Units in Structure	Pine Knoll Shores			Carteret County	
	Total	Margin of Error	% of Total	% of Total	
1-unit, detached	1099	+/-107	49.6	56.1	
1 unit, attached	179	+/-62	8.1	4.9	
2 units	8	+/-12	0.4	2.8	
3 or 4 units	66	+/-54	3	2.7	
5 to 9 units	196	+/-76	8.8	2.9	
10 to 19 units	268	+/-96	12.1	3	
20 units or more	399	+/-78	18	6.2	
Mobile Home	0	+/-13	0	21.4	
Boat, RV, Van, Etc.	0	+/-13	0	0	
	2215	+/-66	100	100	

Source: US Census Bureau.

e. *Part-time and Full-time residents*

Although the ratios are constantly changing, one of the most important dynamics in Pine Knoll Shores is the interaction between part-time and full-time residents. The ratios are fairly constant between parcel ownership and real property values, as can be seen in a comparison of Tables 11 and 12, but owners who get their tax bills sent outside the 28512 zip code own a far greater share of properties along the oceanfront (89%).

Table 11. Parcel Ownership, 2012-2013

	28512	Non-28512	Total
Ocean	83 4%	796 34%	879 38%
Non-Ocean	588 25%	900 38%	1488 63%
Total	671 29%	1696 72%	2367

Source: Carteret County Tax Office Data

Table 12. Real Property Values, 2012-2013

	28512	Non-28512	TOTAL
Ocean	\$ 53,313,199 11%	\$ 410,461,724 89%	\$ 463,774,923
Non-Ocean	\$ 228,207,402 42%	\$ 318,495,934 58%	\$ 546,703,336
Total	\$ 281,520,601	\$ 728,957,658	\$ 1,010,478,259
Percentage	28%	72%	

Source: Carteret County Tax Office Data

f. Tax Rates

The Town has created two municipal services district to fund future beach renourishment. These service district boundaries are distinguished by oceanfront and non-oceanfront properties. Emerald Isle and Indian Beach follow similar practices. There is discussion later in the plan about Beach Renourishment efforts, and the design is for the rates to be set to provide adequate funding. Tax rates tend to vary from year to year, but this provides a general sense of rates as of FY 2013-2014.

Table 13. Bogue Banks Tax Rates, FY2013-2014

	FY 2013-2014 Tax Rate				
	Ocean	Non-Ocean	Base Rate	Tot Ocean	Tot Non-Ocean
Pine Knoll Shores	5.2	1.4	15.6	20.8	17.0
Atlantic Beach	0	0	16.5	16.5	16.5
Indian Beach	8.5	3.25	16.5	25.5	19.75
Emerald Isle	4.5	1.5	12.5	17.0	14.0

Source: Town of Pine Knoll Shores, Town of Atlantic Beach, Town of Indian Beach, Town of Emerald Isle

The Town's tax base is almost entirely residential, as will become evident in maps later in the plan. This is fairly typical of most towns on the island, as reflected in Table 14.

Table 14. Bogue Banks Residential/Commercial Tax Bases, Spring 2014

	Tax Base		
	Residential	Commercial	% Commercial
Pine Knoll Shores	\$975,857,897	\$34,395,796	3.40%
Indian Beach	\$426,000,000	\$29,000,000	6.40%
Emerald Isle	\$2,896,543,195	\$48,000,824	1.63%
Atlantic Beach	\$1,467,000,000	\$119,700,000	7.54%

*Source: Town of Pine Knoll Shores, Town of Indian Beach, Town of Emerald Isle, Town of Atlantic Beach

g. Housing Summary

The total number of dwelling units that are permanently occupied by either renters or owner-occupants spiked by 20% between 1990 and 2000, but returned to 1990 levels by 2010, a 15.3% decrease from 2000 levels. However, occupied housing as a percentage of the overall housing stock steadily decreased from 41.6% to 31.9%. The vacant housing stock increased by 55.1%, and as a share of the overall housing stock, increased from 58.4% to 68.1%.

- According to Pine Knoll Shores building permit activity reports, 124 single-family residential structures were permitted between 2000 and 2009.

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- Residential structures within Pine Knoll Shores on average have 5.5 rooms per unit.
- According to the 2012 American Community Survey, 57.7% of the Town's housing stock is comprised of single-family homes.
- Research conducted as part of the strategic planning process indicated that the non-permanent population owns 72% of the local property tax base.
- Building permit data reflect the economic decline: 8 structures constructed in 2007 had an average construction value of \$537,500; 8 structures constructed in 2013 had an average construction value of \$212,829. The rate and values of construction do have bearing on future tax base growth.
- Much of the Town's tax base is owned by second homeowners, who pay for a significant portion of the Town's total expenditures.

3. Employment and Economy

a. *Introduction (General Economic Indicators)*

A majority of the Town's annual budget is comprised of proceeds from Ad Valorem Tax levies and Sales and Use Tax allocation. Table 15 is a summary of economic indicators for Pine Knoll Shores with a comparison to Carteret County and North Carolina overall. The per capita income for the Town is \$39,661, which is quite a bit higher than Carteret County and the state average. The mean income for the Town's residents according to the 2008-2012 American Community Survey was \$74,545. It should be noted that this figure is probably skewed due to the presence of several households or individuals with much higher than average annual incomes, a conclusion supported by the significantly lower median household income of \$62,733. While both mean and median incomes have increased between 1999 and 2012, they have neither kept up with inflation nor the rate of income growth in Carteret County, as depicted in Table 16. The percent of Pine Knoll Shores' full time population in the labor force also increased 16.6% between 1999 and 2012.

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Table 15. Pine Knoll Shores, Carteret County, and North Carolina Summary of Economic Indicators for Full Time Residents

	Year	Pine Knoll Shores	Carteret County	North Carolina
Per Capita Income	1999	\$34,618	\$21,260	\$20,307
Per Capita Income	2012	\$39,661	\$27,566	\$25,285
Mean Household Income	1999	\$60,860	\$49,509	\$50,814
Mean Household Income	2012	\$74,545	\$62,956	\$63,562
Median Household Income	1999	\$53,800	\$38,344	\$39,184
Median Household Income	2012	\$62,733	\$47,506	\$46,450
Unemployment Rate	2000	1%	2.9%	3.4%
Unemployment Rate	2012	2.2%	5.8%	6.6%
% of Population in labor force	2000	36.8%	60%	65.7%
% of Population in labor force	2012	42.8%	61.5%	64.2%
Poverty Rate	2000	3.6%	10.7%	15.2%
Poverty Rate	2012	5.6%	14.1%	16.8%

*No inflation adjustment reflected in Table 15. Source: 2008-2012 ACS, US Census Bureau

Table 16. Pine Knoll Shores, Carteret County, and North Carolina Percent Change and Percent Change with Inflation Adjustment: Summary of Economic Indicators, Full-time Residents, 1999-2012

	Pine Knoll Shores	Carteret County	North Carolina
Per Capita Income (% Change)	14.6%	29.7%	24.5%
Per Capita Income (% Change with Inflation Adjustment)	-17%	-6%	-9.8%
Mean Household Income (% Change)	22.5%	27.2%	25.1%
Mean Household Income (% Change with Inflation Adjustment)	-11.2%	-7.9%	-9.4%
Median Household Income (% Change)	16.6%	23.9%	18.5%
Median Household Income (% Change with Inflation Adjustment)	-15.5%	-10.2%	-14.1%
Unemployment Rate (% Change)	120%	100%	94.1%
% of Population in labor force (% Change)	16.3%	2.5%	-2.3%
Poverty Rate (% Change)	55.6%	31.7%	10.5%

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Source: NC Department of Commerce and US Census Bureau; BLS Inflation Rate: 1999 \$=1.38 2012\$

b. Household Income

The per capita income (\$39,661) in Pine Knoll Shores is the highest in Carteret County, and its median household income is second (\$62,733) behind Cedar Point (\$71,591).

Approximately sixty-five percent (64.7%) of all households reported making \$50,000 or more. Table 17 summarizes the household incomes for the Town as of 2012. The figures are based on 807 families recorded in the context of the 2008-2012 American Community Survey.

Table 17. Pine Knoll Shores and Carteret County Household Income, 2000, 2012

	Pine Knoll Shores				Carteret County	
	2000	2000	2012	2012	2000	2012
	Total	% of Total	Total	% of Total	% of Total	% of Total
Less than \$10,000	25	3.3	30	3.7	9.4	6.8
\$10,000 to \$14,999	19	2.5	26	3.2	7.7	6.3
\$15,000 to \$24,999	65	8.6	42	5.2	14.6	10.9
\$25,000 to \$34,999	101	13.3	71	8.8	13.5	12.5
\$35,000 to \$49,999	141	18.6	115	14.3	18.1	16.9
\$50,000 to \$74,999	179	23.6	236	29.2	19.8	18
\$75,000 to \$99,999	105	13.8	121	15	8.8	13.2
\$100,000 to \$149,999	74	9.7	110	13.6	5.4	8.7
\$150,000 to \$199,999	26	3.4	27	3.3	1.2	4
\$200,000 or more	25	3.3	29	3.6	1.5	2.6
Total Households	760	100	807	99.9	100	99.9
Median Income	\$53,800		\$62,733		\$42,307	\$47,506

Source: 2000 US Census, 2008-2012 American Community Survey, US Census Bureau.

c. Employment/Earnings By Industry

The 2008-2012 American Community Survey estimates the Pine Knoll Shores population at 1,547 individuals with a margin of error +/-151. It further estimates that 568, or 36.7%, of the population is employed, with a 2.2% unemployment rate. Table 18, below, provides an overview of industry categories in which the working age population of Pine Knoll Shores are employed. These figures account for all individuals over the age of 16 recorded in the 2008-2012 American Community Survey. The largest employer of Pine Knoll Shores' residents is Retail Trade, making up 17.6% of all jobs. This is followed by Arts, Entertainment, Recreation, Accommodation, and Food Services (17.1%) and Education, Health and Social Services (14.4%).

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Table 18. Pine Knoll Shores Full Time Population Employment By Industry, 2012

Industry	# Employed	Margin of Error	% Employed
Agriculture, Forestry, Fishing, and Mining	3	+/-5	0.5
Construction	91	+/-48	16
Manufacturing	13	+/-15	2.3
Wholesale Trade	23	+/-15	4
Retail Trade	100	+/-44	17.6
Transportation, Warehousing, and Utilities	23	+/-19	4
Information	0	+/-13	0
Finance, Insurance, Real Estate, and Rental and Leasing	36	+/-32	6.3
Professional, Scientific, Management, Administrative, and Waste Management Services	69	+/-38	12.1
Education, Health, and Social Services	82	+/-37	14.4
Arts, Entertainment, Recreation, Accommodation, and Food Services	97	+/-45	17.1
Other Services (except Public Administration)	20	+/-18	3.5
Public Administration	11	+/-14	1.9
Total Persons Employed 16 Years and Over	568		99.7

Source: 2008-2012 ACS, US Census Bureau

d. Employment Commuting Patterns

There are very few commercial operations within Pine Knoll Shores, and extremely limited office space. Thus, citizens must commute to neighboring municipalities for employment.

According to the 2008-2012 American Community Survey, the average commuting time for Pine Knoll Shores residents is 26 minutes. Table 19 breaks the overall commuting time for all working age residents within Town.

Table 19. Pine Knoll Shores Travel Times to Work, 2012

Pine Knoll Shores Travel Times to Work, 2012		
Travel Time	% of Total	Margin of Error
<10 mins	26.9	+/-9.7
10 to 14 mins	10.7	+/-6.1
15 to 19 mins	11.5	+/-4.7
20 to 24 mins	15	+/-7.1
25 to 29 mins	4.2	+/-4.8
30 to 34 mins	7.9	+/-6.0
35 to 44 mins	2.1	+/-2.4
45 to 59 mins	6.1	+/-4.3
60 to 89 mins	15.5	+/-7.7
Total did not work at home	521	
Worked at home	7.8%	
Total workers 16 and over	565	
Mean Travel Time	26	

Source: 2008-2012 ACS, US Census Bureau

e. *Industries*

As noted above, there is very little commercial activity within Pine Knoll Shores. The Town does; however, have several hotels that have a significant impact on the Town's revenue stream. These hotels are all located along Highway 58, and are scattered throughout the Town's jurisdiction. The provision of Town services to these facilities will be an important issue to discuss in the context of the policy development phase of the plan.

f. *Employment and Economy Summary*

- The per capita income for Pine Knoll Shores residents is \$39,661, according to the 2008-2012 American Community Survey.
- The 2008-2012 American Community Service reported that 64.7% of the Town's households had an annual income of \$50,000 or greater.
- The largest sector employer of Pine Knoll Shores' residents is Retail Trade.
- The average commuting time for Pine Knoll Shores residents is 26 minutes.
- The employed population of Pine Knoll Shores increased by 13.8% between 2000 and 2012, and represents 42% of the total 2012 ACS population estimate.

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4. Population Projections

Population is a difficult thing to predict in an area such as Pine Knoll Shores: the Town's CAMA Core 2008 plan projected a permanent population of 1,657 in 2010, but the actual number was 1,339. The American Community Survey 2008-2012 suggests that the population is 1,547, but the state's estimate is closer to 1,350. The primary reason is that there are many factors involved in making this determination: we anticipate some in-migration from retirees over the planning period, some deaths, and minimal births. In many jurisdictions, population growth is a trend that can be tracked back many years. Typically this trend can be expected to continue into the future. In a beach community such as Pine Knoll Shores, population is not as easy to predict. In most cases upon incorporation, the population within a Town increases very rapidly. Pine Knoll Shores' population increased by 110.5% between 1980 and 1990. This growth tapered off very quickly however, which is evidenced by the modest growth rate from 1990 to 2000 of 12.1%. The population similarly declined by 12.1% between 2000 and 2010.

The following provides population projections for both the permanent population and peak seasonal population for Pine Knoll Shores through the year 2035. These projections are based on historical growth rates, and extrapolation of the Holland Consulting formulae from the 2008 plan. It is closely in line with the 2008-2012 ACS data for permanent population. A 2008 to 2010 comparison reflects significantly faster growth than was predicted in the 2008 plan (2010 projection: 12,707, 2010 estimate: 14,033). The difference is largely based on the increased maximum daily traffic figure from the Aquarium, which increased by 25% (1,000 visitors). If it were not for that increase, the estimate would only be off by approximately 300. We would expect this figure to stabilize in line with the projections over the next planning period. It is projected that permanent population growth will continue to slow, as more homes within Town are utilized for seasonal, recreational, or occasional use. The estimates for peak seasonal population growth are based on trends experienced throughout Bogue Banks. It is also projected that the number of summer visitors to the community will continue to increase over the next five to ten years.

Table 20. Pine Knoll Shores Permanent and Peak Seasonal Population Forecast, 2015-2040

	2015	2020	2025	2030	2035	2040
Permanent Population*	1,370	1,400	1,431	1,461	1,492	1,522
Peak Seasonal Population*	14,723	15,414	16,105	16,796	17,487	18,178
Total	16,093	16,814	17,536	18,257	18,979	19,700

Sources:

* Extrapolation based on American Community Survey estimates using a linear model

**Holland Formulae from 2008 CAMA Land Use Plan extrapolated from updated figures for peak seasonal population.

B. NATURAL SYSTEMS ANALYSIS

1. Mapping and Analysis of Natural Features

a. *Topography/Geology*

Carteret County is underlain by an eastward thickening wedge of sedimentary deposits of Pleistocene-age, ranging from 2,000 feet thick in the northwest portions of the county to almost 7,000 feet thick beneath the easternmost sections of the offshore strand. Because of the depth of the surficial sand/siliceous deposits, little is known of the composition of underlying deposits. Well logs indicate that shell fragments and calcareous material are consolidated into limestone at a depth of less than 120 feet west of Morehead City.

Pine Knoll Shores is centrally located along the shores of Bogue Banks, which is encompassed by water and is predominantly a low-lying area. The Town is bordered on the north by Bogue Sound and the south by the Atlantic Ocean, this portion of the Atlantic Ocean is also referred to as Onslow Bay. Topography along this stretch of the island varies from sea level or zero along the shoreline to 36 feet further inland. Higher elevations within Pine Knoll Shores are generally located towards the center of the island or fall within the Roosevelt Natural Area. Pine Knoll Shores is a very unique setting, in that a great deal of the maritime forest within the Town's jurisdiction has been preserved. Throughout Bogue Banks, a substantial amount of clear cutting has occurred to allow for increased residential construction. Over the years, the Town of Pine Knoll Shores and its citizens have made it a top priority to preserve the maritime forest environment that exists along this portion of the island.

The majority of the Town's land is comprised of slopes within the 0 to 8% range; however, along dune lines the slopes may be as great as 30%. The shoreline along Pine Knoll Shores is constantly shifting, as demonstrated in the photo below from the Carteret County Shore Protection Office, which indicates changes to the shoreline profile as a result of beach erosion and renourishment. The Town has a proactive beach renourishment effort that is ongoing, and will be specifically addressed during the policy development phase of this plan. The Town does not anticipate significant sea level rise during the planning period, but believes that its existing setbacks and renourishment practices are sufficient to protect structures over the planning period. A map reflecting the National Oceanic and Atmospheric Administration's (NOAA) one foot sea level rise projection with certainties is included as Appendix X. of this plan. One foot exceeds the CRC's Science Panel's projections for the area, but provides some basis for future planning efforts.



b. Climate

Pine Knoll Shores is hot and humid in the summer, but is frequently cooled by sea breezes. Winter is cool with occasional, brief cold spells. Rain occurs throughout the year and can be heavy when it persists. In winter, the average temperature is 45.1° F, and the average daily minimum temperature is 34.9° F. The lowest temperature on record, which occurred on January 13, 1962, is 4° F. In summer, the average temperature is 78.8° F and the average daily maximum temperature is 85.4° F. The highest recorded temperature, which occurred on July 26, 1952, is 107° F.

The total average annual precipitation is roughly 57.26 inches. Of this, 32.65 inches, or 57%, usually falls in April through September. The heaviest one day rainfall during the period of record was 8.5 inches at Morehead City on June 11, 1966. Thunderstorms occur on about 45 days each year, and most occur in summer. The average seasonal snowfall is one inch. The deepest snowfall accumulation on record is 36 inches.

The average relative humidity in mid-afternoon is about 65%. Humidity is higher at night, and the average at dawn is about 80%. The sun shines 60% of the time in summer and 50% in winter. The prevailing wind is from the southwest. Average wind speed is 12 miles per hour in winter and spring.

*Source: NOAA National Climatic Data Center

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c. *Flood Zones and Storm Surge*

Coastal flooding associated with storm surge from tropical storm systems, hurricanes, heavy rainfall, and nor'easters is a significant issue for the Town of Pine Knoll Shores. 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, back bays, sounds, etc. Coastal flooding affects the general public and maritime interests along much of the U.S. coastline extending from the shoreline beaches to inland tidal waterways and the tidal portions of river mouths. 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 of the area. The most significant concern for Pine Knoll Shores 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. The Town maintains an emergency management plan to respond to severe weather events.

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 Pine Knoll Shores fall within a flood hazard area: Federal Emergency Management Agency (FEMA) designated flood zones; and NOAA Storm Surge Inundation Model.

Carteret County received updated flood maps for the county in November 2002. Table 17 provides a summary of the acreage within Pine Knoll Shores that falls within various flood

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zones outlined on the new flood insurance rate maps (FIRMs). Additionally, Map 3 provides the locations of these flood zones. In addition to updating the maps, FEMA has also updated the flood zone designations as well as the criteria associated with them. The new designations that fall within the Town's jurisdiction are as follows:

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 X: Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2% annual chance floodplain.

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.

Table 21. Pine Knoll Shores Flood Zones in Acres

Flood Zone	Acres	% of Total Town Acreage
AE	451.3	30.74%
X	180.4	12.29%
VE	194.2	13.23%
Shaded X	642.4	43.75%
Total Town Acres*	1,468.3	100.00%

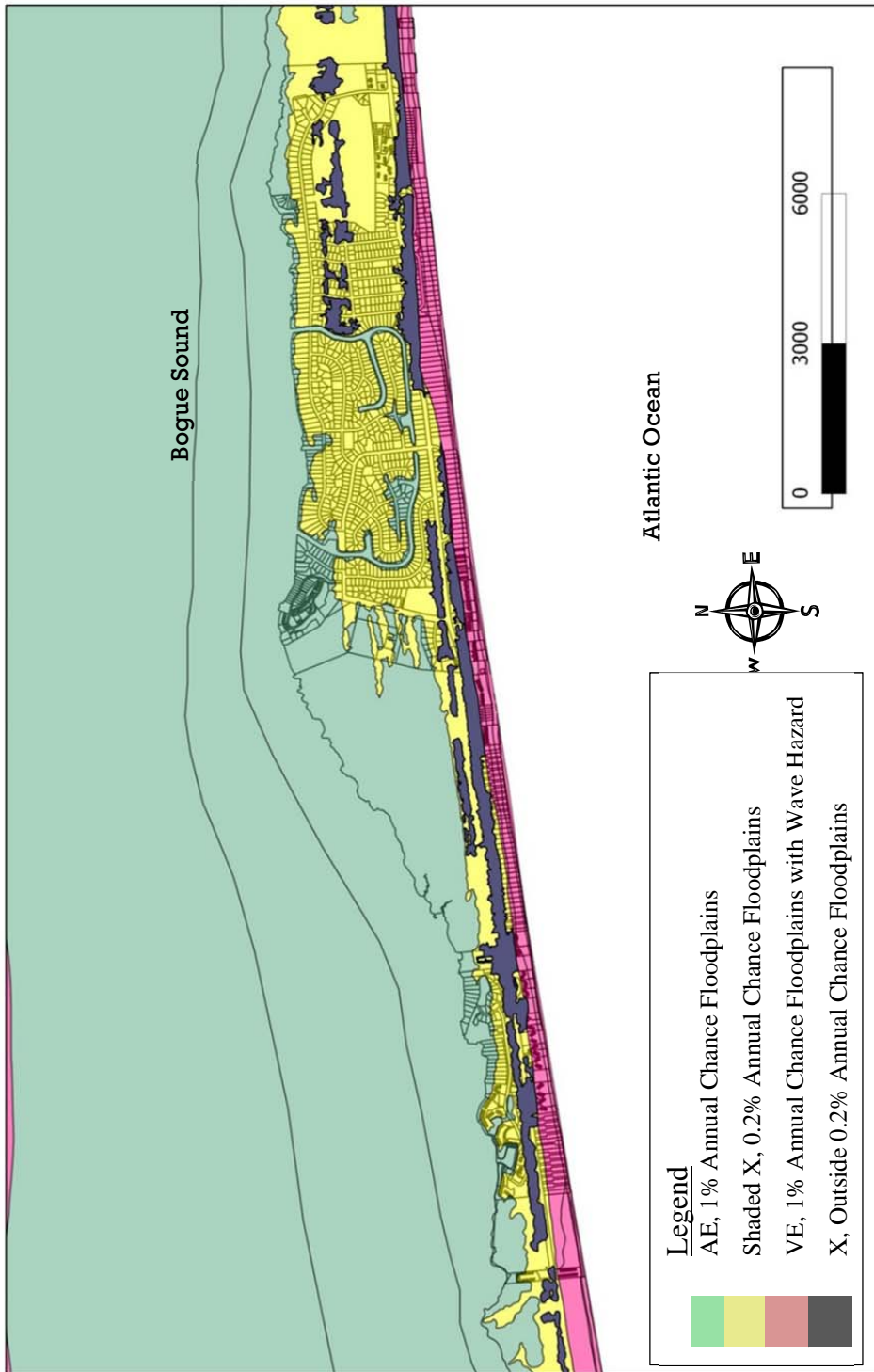
*Includes water and rights-of-way.

Source: Federal Emergency Management Agency.

NOAA has run the Sea, Lake and Overland Surges from Hurricanes (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 18 below provides a summary of the impact that varying storm events will have on the Town of Pine Knoll Shores. Maps 4A and 4B show the locations of the storm surge inundation.

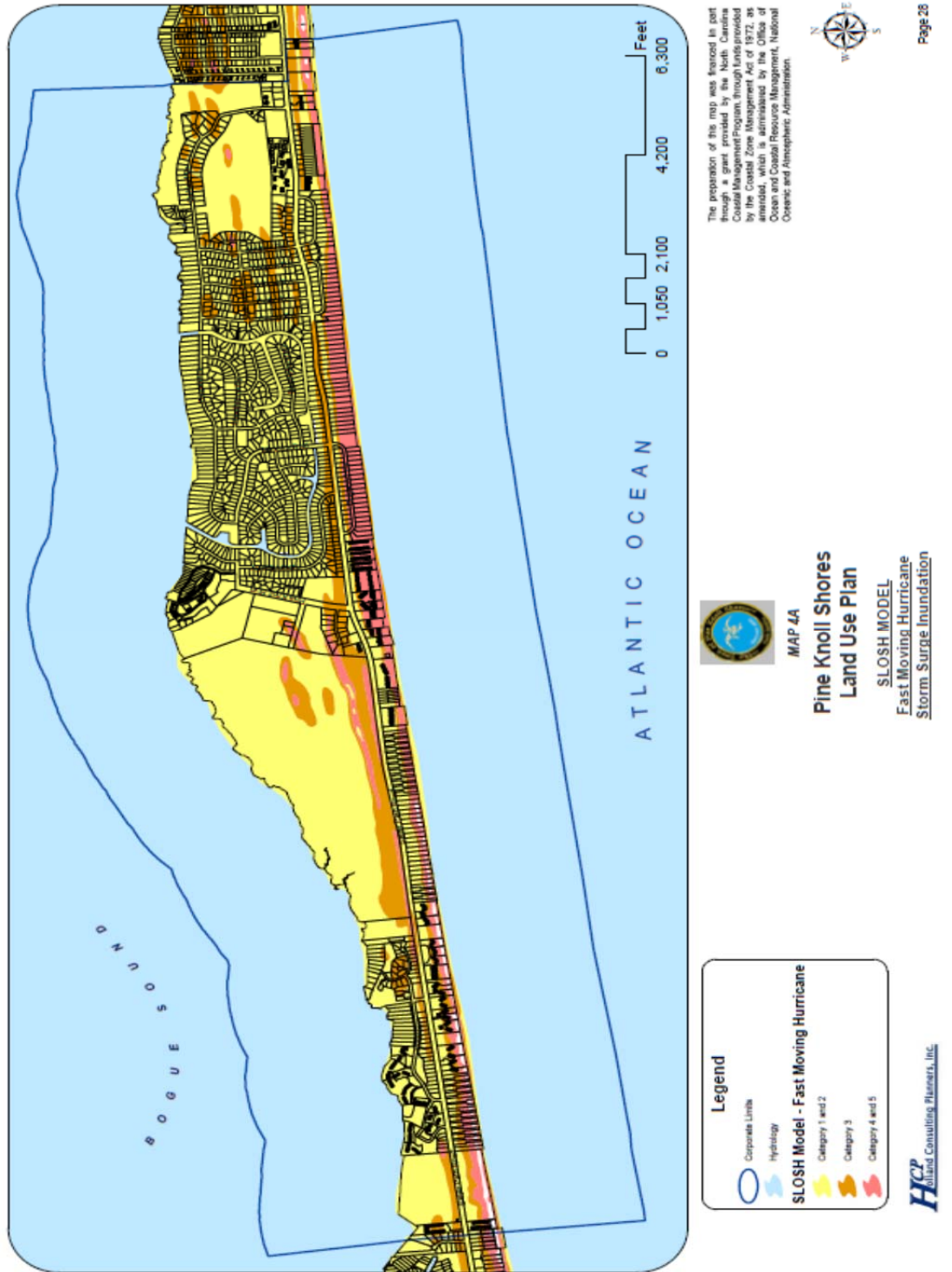
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Map 3 - Flood Hazard Areas



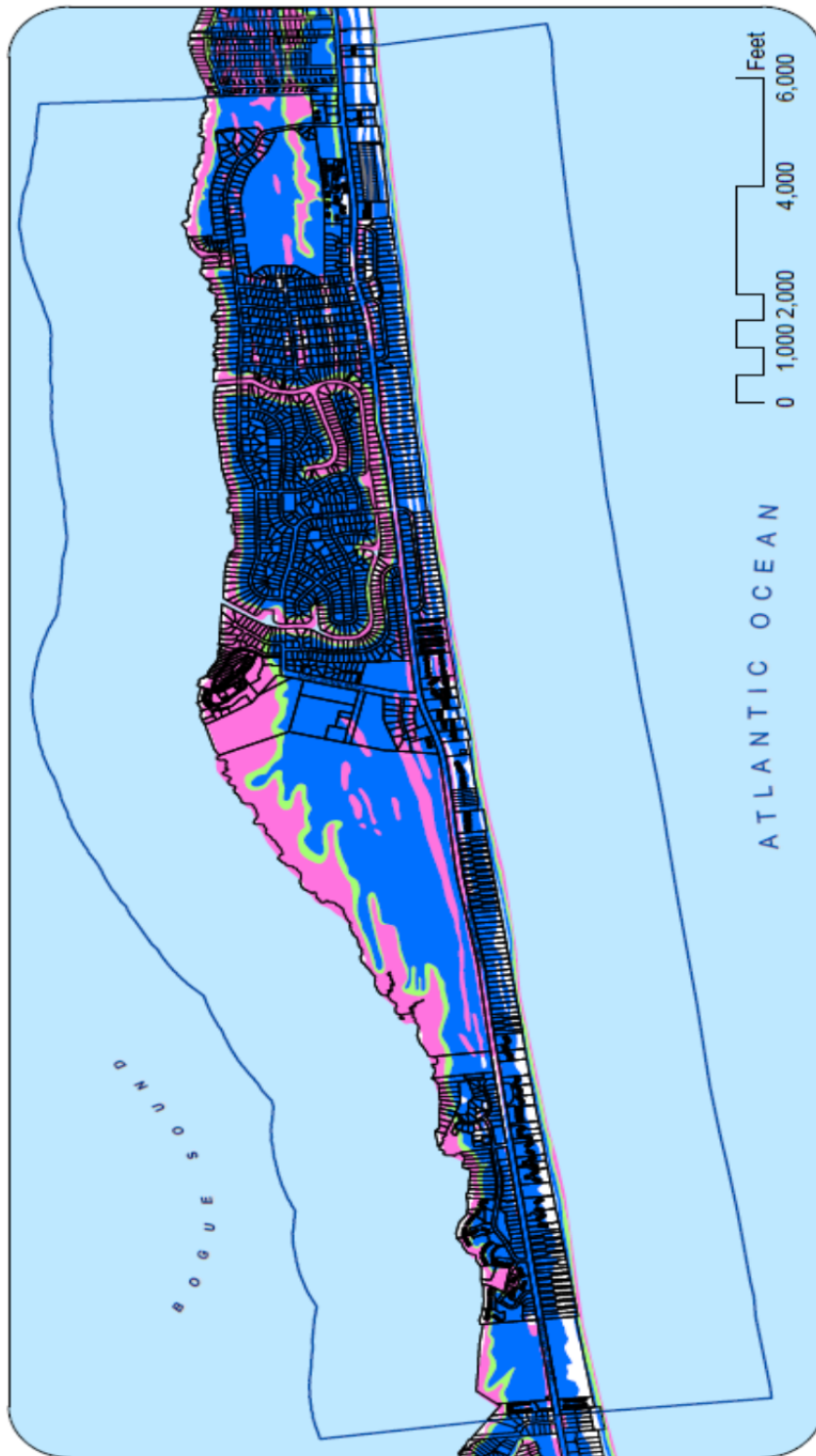
*Source: Based on source layers from Holland Consulting Planners prepared in conjunction with the 2008 Land Use Plan. This map prepared in QGIS by Pine Knoll Shores staff to renumber and add greater clarity to legend. It corresponds with information from the North Carolina Floodplain Mapping system, which can be accessed at <http://fris.nc.gov>.

Map 4A - Storm Surge



Source: Map prepared by Holland Consulting Planners in conjunction with the 2008 Land Use Plan. Generally, SLOSH model information is available from the National Weather Service, National Hurricane Center.

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 Map 4B - Storm Surge



The preparation of this map was financed in part through a grant provided by the North Carolina Coastal Management Program, through funds provided by the Coastal Zone Management Act of 1972, as amended, which is administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.



MAP 4B

**Pine Knoll Shores
 Land Use Plan**

SLOSH MODEL
 Slow Moving Hurricane
 Storm Surge Inundation

Legend

- Corporate Limits
- Hydrology
- SLOSH Model - Slow Moving Hurricane SURGE
 - Category 1 and 2
 - Category 3
 - Category 4 and 5



Source: Map prepared by Holland Consulting Planners in conjunction with the 2008 Land Use Plan. Generally, SLOSH model information is available from the National Weather Service, National Hurricane Center.

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Table 22. Pine Knoll Shores Storm Surge Inundation Acreage (Fast & Slow Moving Hurricanes)

Hurricane Strength	Fast Moving		Slow Moving	
	Acreage*	% of Total Acreage	Acreage*	% of Total Acreage
Category 1 - 2	1,046	71.3%	165	11.2%
Category 3	1,260	85.8%	244	16.6%
Category 4 - 5	1,361	92.7%	1,053	71.7%

*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.

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 74-95 miles per hour. Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.

Category 2: Winds of 96-110 miles per hour. Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.

Category 3: Winds of 111-129 miles per hour. Devastating damage will occur: Well-built frame homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.

Category 4: Winds of 130-156 miles per hour. Catastrophic damage will occur: Well-built frame homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Category 5: Winds greater than 157 miles per hour. Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential

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areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

In addition to flood plains, the Town has identified as a flood-prone area: the property bounded on the south by North Carolina Highway 58; on the west by Maple Court and the Pine Knoll Waterway; on the north by Cypress Drive (from Pine Knoll Waterway to Fairway Court); and on the east by the Bogue Banks Country Club Golf Course and the western boundary of the Bill Christian Subdivision, and Laurel Court to the Knollwood Drive intersection. The Town's efforts to address flooding in this area will be discussed later in this plan.

*Source: National Hurricane Center

d. *Man-Made Hazards*

There are no significant man-made hazards within the corporate limits of Pine Knoll Shores.

e. *Soils*

A detailed soil survey was issued for all of Carteret County in September of 1978. That report, Soil Survey of Carteret County, North Carolina, identifies nine soil series located within Pine Knoll Shores' planning jurisdiction. The soil series are presented on Map 5, and their characteristics are summarized in Table 23.

Of the nine soil series located within Pine Knoll Shores, four are hydric soils. Hydric soils are defined as soils formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions within the upper part. The presence of hydric soils is significant due to the fact that these soils are typically poorly suited for development. Additionally, these soils may be wetland areas if found in combination with certain vegetation and require permitting by the U.S. Army Corps of Engineers' Wilmington office prior to any disturbance.

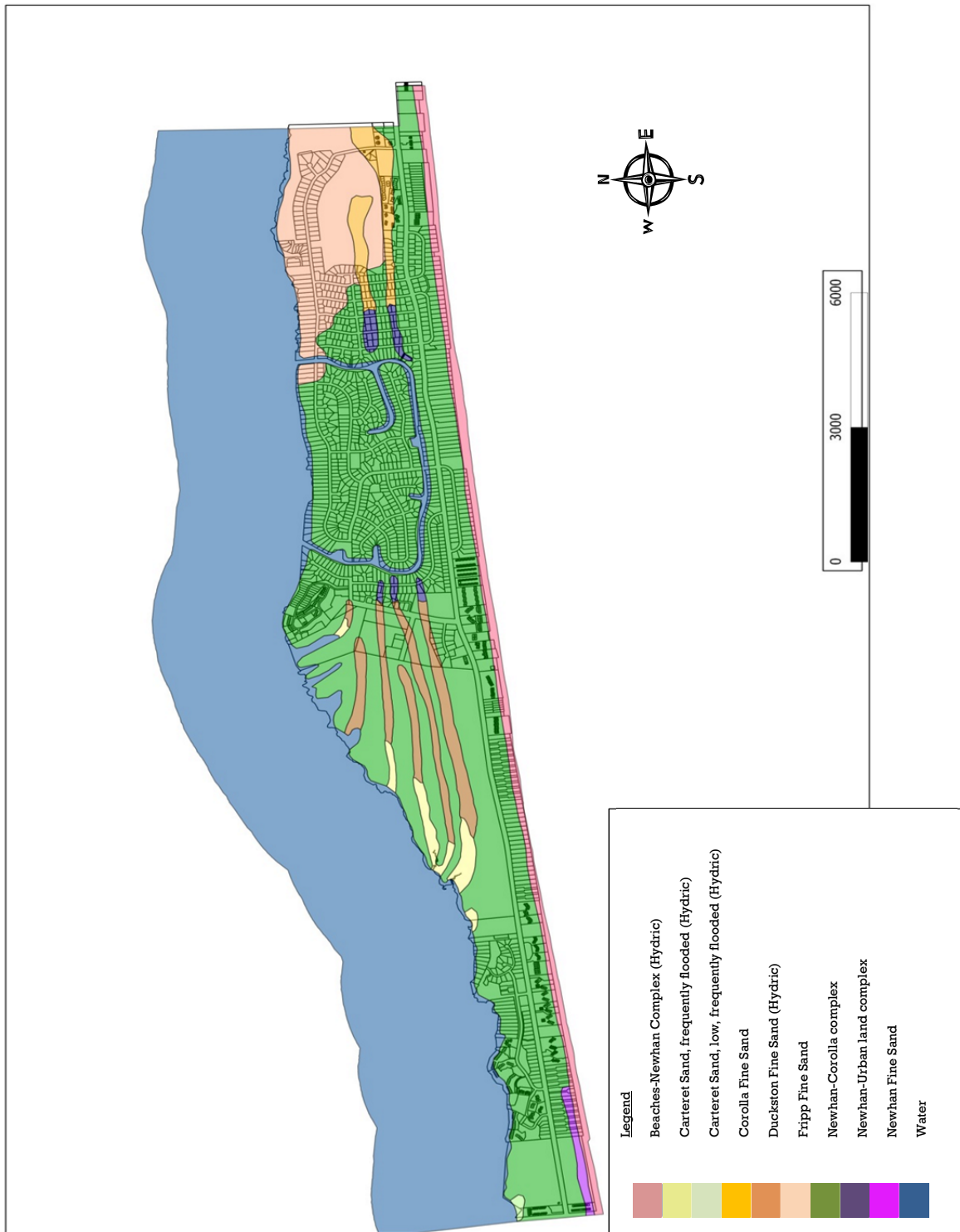
Table 23. Pine Knoll Shores Soil Conditions

Map Symbol	Soil Name	% of Town Acreage	Septic Tank Conditions	Flooding Frequency
Bn*	Beaches-Newhan complex	3.3%	Severe: poor filter, slope	None
CH*	Carteret sand, frequently flooded	1.8%	Severe: flooding, ponding, poor filter	Frequent
CL*	Carteret, sand, low, frequently flooded	0.1%	Severe: flooding, ponding, poor filter	Frequent
Co	Corolla fine sand	2.9%	Severe: wetness, poor filter	Rare
Du*	Duckston fine sand	5.2%	Severe: flooding, wetness, poor filter	Frequent
Fr	Fripp fine sand	10.8%	Severe: poor filter, slope	None
Nc	Newhan-Corolla complex	68.2%	Severe: poor filter, slope	None
Ne	Newhan-Urban land complex	1.0%	Severe: poor filter	None
Nh	Newhan fine sand	0.7%	Severe: poor filter, slope	None
w	water	6.0%	n/a	n/a

*Indicates soil series that are made up of hydric soils.

Source: Soil Survey of Carteret County, North Carolina.

Map 5 - Soil Classifications



*Source: Map prepared from base layer data provided by Holland Consulting Planners in conjunction with the 2008 Land Use Plan. Redone by Pine Knoll Shores Staff in QGIS to add greater detail to the legend and renumber the map.

f. Water Supply

Groundwater is plentiful throughout Carteret County as well as Pine Knoll Shores. It is near the surface in most places, particularly during the winter and early spring. Thousands of feet of sedimentary deposits underlie the area. The upper part of these deposits contains aquifers that supply water for domestic use. The surficial aquifer ranges from near the surface to a maximum depth of about 75 feet. The water is generally hard but is low in iron. It should be noted that the Town of Pine Knoll Shores receives its municipal water supply from a series of four wells located throughout the Town's corporate limits. The Town purchased this well system from Carolina Water Service on September 27, 2005.

Average water consumption is about 9.5 million gallons per month, with peaks in the summer months of about 15 million gallons per month. The system's capacity is 1.2 million gallons per day, for a maximum monthly capacity of 36 million gallons, well exceeding current demand. The Town maintains mutual aid agreements with Atlantic Beach and Bogue Banks Water Company for emergency water supply needs.

The Public Water Supply Section of the NC Department of Environment and Natural Resources maintains a Source Water Assessment for the Town. The Town's wells generally have a Low Inherent Vulnerability Rating, but Wells 2 and 4 carry moderate Contaminant and Susceptibility ratings. These moderate ratings indicate higher susceptibility to potential contaminants based on their proximity to contaminant sources and environmental factors such as the ability of contaminants from a selected land area to reach the water table, the amount of precipitation that infiltrates into the subsurface, and land use factors. The Town's Wellhead Protection Plan, adopted in 2010, describes the Town's response to contamination events and efforts taken to minimize threats.

The Town's Long Range Water Supply Plan does anticipate two additional wells to meet future needs, but locations have not been determined. The 2013 Long Range Water Supply Plan has been incorporated in the appendices of this document.

The Town is concerned with the overall health of the Castle Hayne aquifer, and supports management and regulatory practices that protect the aquifer from saltwater intrusion and other threats. Areas to the west of Pine Knoll Shores have started to see salt water intrusion into their wells; to date this has not been an issue in Pine Knoll Shores, but may be an issue in the future dependent on demand and pumping practices. If intrusion occurs, the Town may have to consider a desalination plant to provide water to its citizens.

g. Fragile Areas

15A NCAC 07H outlines areas of environmental concern for coastal North Carolina: coastal wetlands, ocean beaches and shorelines, estuarine waters and shorelines, public trust waters, natural resource fragile areas, areas sustaining remnant species, unique geological formations, registered natural landmarks, swamps, prime wildlife habitats, areas of excessive slope, areas of excessive erosion, scenic points, archaeological sites, and historical sites. Pine Knoll Shores has generally adopted these areas of environmental concern as its fragile areas. The Town also considers its maritime forest to be a fragile area.

i. Estuarine Waters and Shorelines

The northern portion of Pine Knoll Shores is immediately adjacent to Bogue Sound, an estuarine environment. The estuarine system consists of deepwater subtidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. These sheltered waters support an abundance and diversity of plant and animal life, and a number of marine organisms depend on the estuaries for spawning, nursing, or feeding.

Estuarine systems 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.

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 Outstanding Resource Waters (ORW) by the Division of Water Resources, all lands 75 feet leeward from the normal water level are considered to be estuarine shorelines. The western portion of Bogue Sound (14,256.5 acres) and the Theodore Roosevelt State Natural area totaling 11,236.4 acres are classified as ORWs or High Quality Waters. Development along estuarine shorelines can exacerbate water quality problems within estuarine waters, and expedite the threats of shorefront erosion and flooding.

ii. Primary Nursery Areas and Submerged Aquatic Vegetation

Bogue Sound and adjacent streams are extremely important to fisheries production and support significant commercial and recreational fisheries. These areas also function as nursery areas for species such as spot, croaker, weakfish, flounder,

striped bass, white perch, yellow perch, blue crabs and other commercially and recreationally important species.

There are no anadromous fish spawning areas or primary nursery areas immediately adjacent to the corporate limits of Pine Knoll Shores. There are however, nursery areas located along the northern bank of Bogue Sound and also within tributaries feeding into Bogue Sound. Maps of the nursery and spawning areas are available through the North Carolina Division of Marine Fisheries.

Submerged aquatic vegetation is a common occurrence along the Sound side of Pine Knoll Shores. Its primary impacts are to dock and boat slip construction and dredging. Permitting in areas where submerged aquatic vegetation is present involves the Army Corps of Engineers, the North Carolina Division of Marine Fisheries, North Carolina Division of Water Quality, and National Marine Fisheries Service. A map of historical submerged aquatic vegetation data is available in Appendix XI.

iii. Coastal Wetlands

Wetland is a generic term for all the different kinds of wet habitats where the land is wet for some period of time each year but not necessarily permanently wet. Many wetlands occur in areas where surface water collects or where underground water discharges to the surface, making the area wet for extended periods of time. Other wetlands occur along our coasts, such as salt marshes, and are created by the tide. The federal Clean Water Act defines wetlands as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." Wetlands have both upland and aquatic characteristics, and, thus, they often have a richer flora and fauna than other environments. In practice, wetlands are hard to define, precisely because they are transition zones. It is important to recognize that an area does not have to be wet all year long to be considered a wetland - as few as two or three consecutive weeks of wetness a year is all it takes for this determination to be made.

Within Pine Knoll Shores, there are approximately 213 acres of wetlands. These wetlands vary in their characteristics. The location of the wetland areas within the Town's jurisdiction are shown on Map 6, and a summary of wetland acres are provided in Table 24. The map of wetland location is intended to be used for general location purposes only. On-site analysis must be performed in order to determine the exact location of all wetlands. It should be noted that a majority of the wetland acres within Pine Knoll Shores are located within the Roosevelt Natural Area.

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Activities in waters of the United States that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. The basic premise of the program is that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. A majority of the wetlands within Pine Knoll Shores fall under the jurisdiction of Section 404 of the Clean Water Act.

Table 24. Pine Knoll Shores Coastal Wetlands

Wetland Type	Acres	% of Total Town Wetland Acres
Cleared Depressional Swamp Forest	0.12	0.05%
Cleared Pine Flat	0.57	0.27%
Cutover Depressional Swamp Forest	0.02	0.01%
Cutover Estuarine Shrub/Scrub	0.17	0.08%
Cutover Maritime Forest	0.39	0.18%
Cutover Pine Flat	1.82	0.86%
Depressional Swamp Forest	0.92	0.43%
Estuarine Shrub/Scrub	35.51	16.69%
Freshwater Marsh	5.24	2.46%
Maritime Forest	28.18	13.24%
Pine Flat	72.21	33.93%
Salt/Brackish Marsh	67.64	31.79%
Total	212.79	100.00%

Source: North Carolina GIA and National Wetlands Inventory.

Map 6. Wetlands



*Source: Map prepared by Holland Consulting Planners in conjunction with the 2008 Land Use Plan. It corresponds with wetland maps available through the US Fish and Wildlife Service's National Wetlands Inventory.

iv. Ocean Beaches and Shorelines

Ocean beaches and shorelines are lands consisting of unconsolidated soil materials (sands) 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 Pine Knoll Shores is considered an ocean beach and shoreline. Pine Knoll Shores contains approximately five miles of ocean erodible areas and high hazard flood areas, but no unvegetated beach area. There are no inlet hazard areas within or adjacent to the corporate limits of Pine Knoll Shores.

v. Areas of Excessive Slope

Areas of excessive slope are considered to be areas with slopes in excess of 12%. The general lay of the land within Pine Knoll Shores is fairly flat; however, there are dune lines where slopes may exceed 30%. The grade and slope of these areas is constantly shifting, and this factor has very little impact on land use and/or development within the Town of Pine Knoll Shores. There are several internal dune and trough systems indicated on the Fragile Areas Map.

vi. Areas of Excessive Erosion

The ocean shoreline along Bogue Banks is extremely vulnerable to erosion associated with coastal storm events, primarily because the natural flow of sediment that would replenish this shoreline has been diverted offshore by the dredging and channel maintenance activities at the Morehead City Port. The Town of Pine Knoll Shores has proactively addressed this issue over the past few years through a Town-funded beach renourishment effort. In addition to this, Pine Knoll Shores is constantly working to establish a long-term comprehensive beach renourishment program with the assistance of the US Army Corps of Engineers Section 933 program. In order to comply with the criteria for this program, the Town provides public beach accesses as required. This issue will be addressed in further detail throughout this document.

Using current and historical aerial photography and sophisticated computer software, the Division of Coastal Management evaluates erosion rates. The most recent study conducted in 1998 indicates that the erosion rate along the ocean shoreline within Pine Knoll Shores is approximately two feet per year.

vii. Significant Natural Heritage Areas and Protected Lands

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 Town of Pine Knoll Shores the only recorded natural resource fragile area is the Roosevelt Natural Area. The Roosevelt Natural Area is a 265-acre nature preserve adjacent to the NC Aquarium, and showcases the Barrier Island ecosystem including maritime forest and marsh habitats. The marsh habitat is a rich area for shellfish and abundant birdlife. A discussion regarding marking walking trails within the Roosevelt Natural Area will be included in the policy statement portion of the plan. The NC Department of Environmental and Natural Resources has identified one protected land within the planning jurisdiction of Pine Knoll Shores: the Roosevelt Natural Area and the North Carolina Aquarium. The Roosevelt Natural Area is owned by the State of North Carolina, and is managed by the Fort Macon Ranger as part of the North Carolina Division for Parks and Recreation.

viii. Public Trust Waters

The public trust area is comprised of submerged lands waterward of the mean high water line in tidal, coastal, or navigable waters adjacent to Pine Knoll Shores. On the ground, the public trust area extends from the water up to a prominent debris line or high water mark.

These areas are significant because the public has rights in these areas, including navigation and recreation. The public trust areas support valuable commercial and sports fisheries, have aesthetic value, and are important resources for economic development. All of the land within Pine Knoll Shores that falls immediately adjacent to waters of both the Bogue Sound and Atlantic Ocean are considered public trust areas, and follow this general rule. Additionally, the canal network that traverses through the eastern portion of Town is also considered public trust water.

While these areas are also discussed in the Estuarine Waters and Shorelines and Ocean Beaches and Shoreline categories, it is important to note that water quality guidelines are attached to each use of marine resources. The Division of Marine Fisheries is responsible for water testing. There are three collection sites in Pine Knoll Shores for ocean water quality testing, and two sites relatively near the Town's boundaries with Atlantic Beach and Indian Beach. 10 recreational water quality advisories have been issued for these six sites between 2006 and 2014. The threshold for recreational water quality advisories is a geometric mean of 35 enterococci per

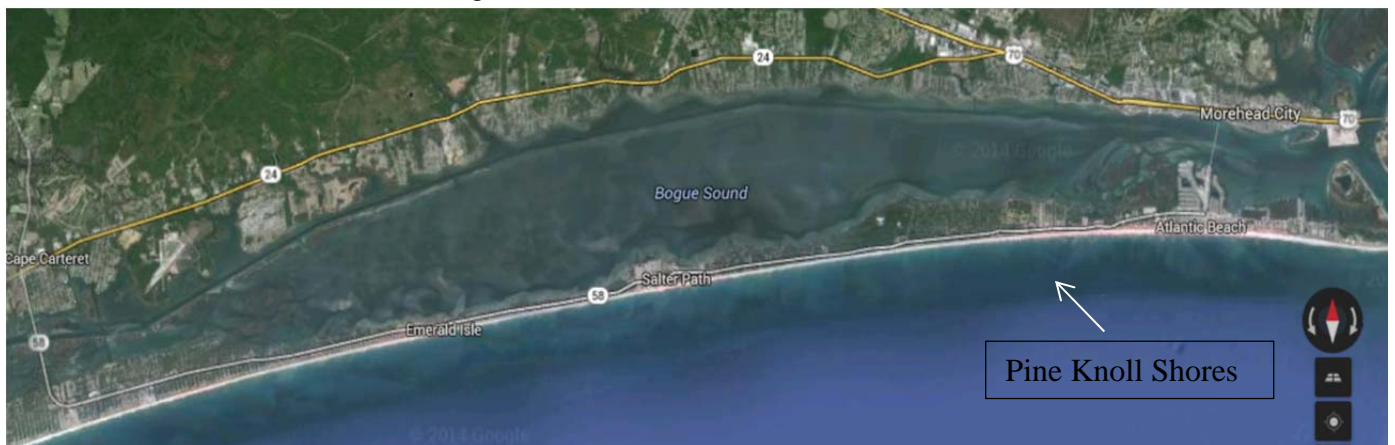
100 milliliter during the swim season, a single sample in excess of 500 enterococci per 100 milliliter, or two of three concurrent water samples exceed 104 enterococci per 100 milliliter.

For shellfish harvesting, the median fecal coliform Most Probable Number (MPN) or the geometric mean MPN of water shall not exceed 14 per 100 milliliters, and not more than 10 percent of the samples shall exceed a fecal coliform MPN of 43 per 100 milliliters (per five tube decimal dilution) in those portions of areas most probably exposed to fecal contamination during most unfavorable hydrographic conditions. The entirety of the Pine Knoll Shores canal system, the portion of the shoreline between the mouths of the canal, and a little beyond, and the Beacon's Reach-Westport Marina are all closed to shellfishing. There is a map reflecting shellfish closures in Appendix VI of this document.

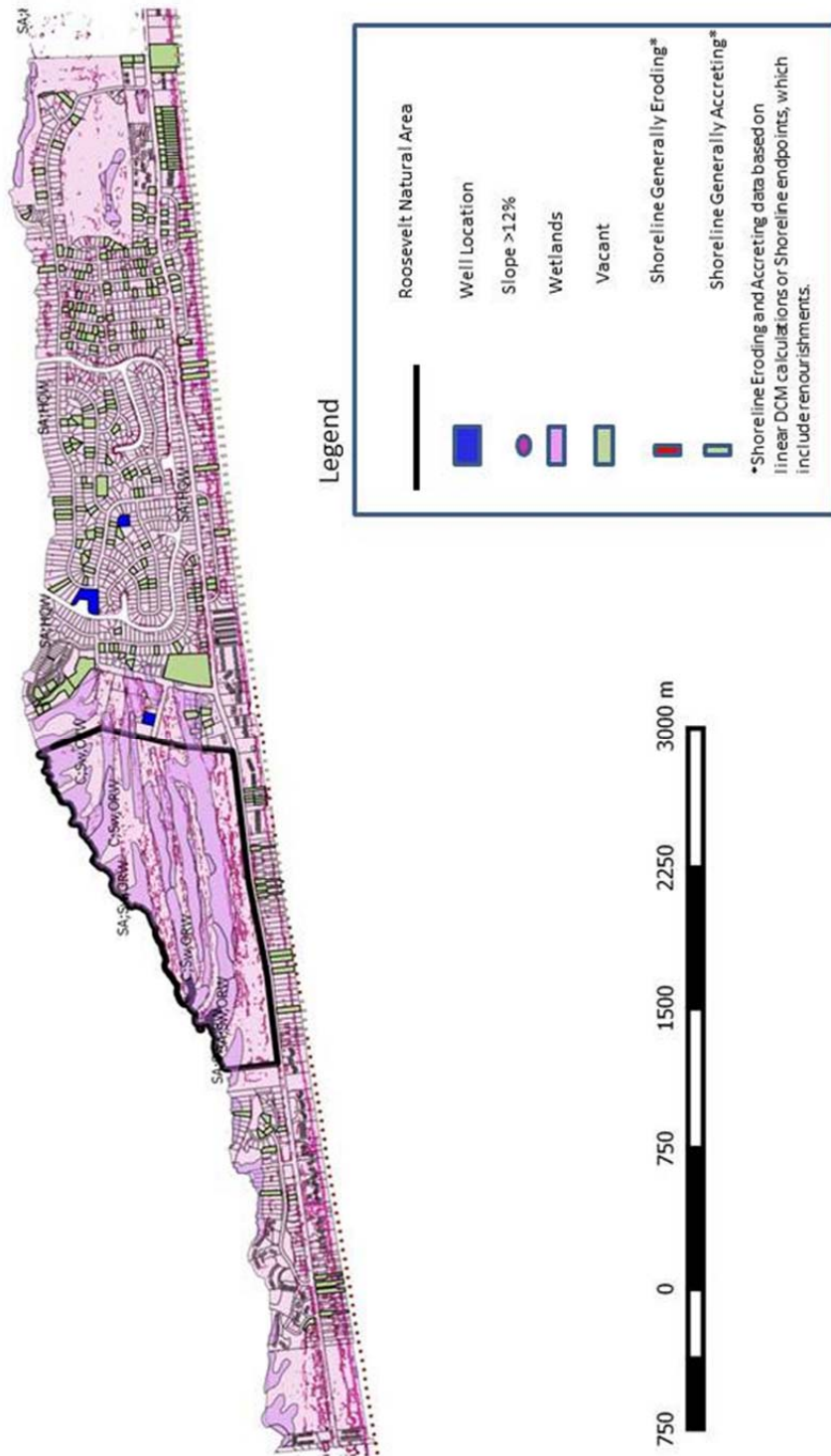
ix. Maritime Forest

Maritime forests are wooded habitats typically found on barrier islands frequently impacted by salt spray, harsh winds, and sand. The Town of Pine Knoll Shores places tremendous value in its maritime forest. While some components of the forest are encompassed by the Natural Heritage Area designation, i.e. the Roosevelt Natural Area, maritime forest permeates the Town. The Town has identified thirty-six species of trees for protection in its ordinances, and requires permits for tree removal. The town recognizes the following benefits from its maritime forest: safeguard and enhance real estate values; reduce noise, glare, and heat; conserve energy; buffer noise and wind; mitigate stormwater runoff; protect properties from erosion; provide habitats for animals; and encourage the most appropriate use of land throughout the town.

The graphic below shows the density of Pine Knoll Shores' tree canopy in the context of other communities on Bogue Banks.



Map 7. Fragile Areas



*Sources: This map is a composite of the wetlands map, vacant parcel data from Carteret County Tax Office Use Descriptions, Division of Coastal Management Erosion Rates, and slopes calculated from US Geological Survey National Map data by Pine Knoll Shores staff. Map prepared in QGIS. Well locations prepared by Pine Knoll Shores Staff.

h. Areas of Resource Potential

i. Regionally Significant Parks

The Town of Pine Knoll Shores is home to a North Carolina Aquarium, located in the Roosevelt Natural Area. Public use of the Roosevelt Natural Area is limited to two natural trails and programs provided by the NC Aquarium. In high summer, the Aquarium can draw up to 5,000 visitors in a day and around 400,000 in a year.

ii. Marinas and Mooring Fields

Within the Town of Pine Knoll Shores, there are no commercially operated marinas. There are, however, a substantial number of docking facilities throughout the Town that are privately-owned. Additionally, there are several private marinas that are maintained by Homeowners' Associations. Pine Knoll Shores is unique in that there is a network of canals running throughout the central portion of the Town's corporate limits. There are private docking facilities located throughout these canals that are maintained by individual property owners.

iii. Channel Maintenance and Interstate Waterways

There are navigable channels throughout Bogue Sound adjacent to Pine Knoll Shores. These channels are marked and periodically dredged. At lower tides, navigation into and out of shoreline within Pine Knoll Shores must go through these marked channels. The waters of Bogue Sound are generally very shallow even at high tides; therefore, these marked navigation channels are essential for recreational boaters and commercial fisherman. The Town's Homeowners Associations maintain the network of channels that run throughout the central portion of the Pine Knoll Shores corporate limits. These channels are public trust waters used for access to private docking facilities. In order to ensure ingress and egress from these channels, periodic maintenance of the navigation channel is required. Water quality within these channels has also been identified as a concern by Pine Knoll Shores residents. This issue will be discussed further later in the plan and will be addressed within the context of policy statements.

iv. Marine Resources

The North Carolina Division of Water Resources assigns water quality classifications to all named waters of the State of North Carolina. The classifications are based upon the existing or contemplated best usage of the various streams and segments of streams within a basin, as determined through studies, evaluations, and comments

received at public hearings. The state water classification system is broken down as follows:

Table 25. 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.
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 Department of Environment and Natural Resources.

There are only two segments or water bodies that have been rated and lie adjacent to the jurisdiction of Pine Knoll Shores. Table 26 provides a listing of all water bodies within the Town that have been classified by the NC Division of Water Quality. Also included are their stream index numbers and assigned classification.

Table 26. Pine Knoll Shores Listing of Water Bodies

Name of Stream	Description	Stream Index Number	Class
Bogue Sound (including Intracoastal Waterway to Beaufort Inlet)	From a line across Bogue Sound from the southwest side of the mouth of Gales Creek to Rock Point to Beaufort	20-36-(8.5)	SA; HQW
Atlantic Ocean	The waters of the Atlantic Ocean contiguous to that portion of the White Oak River Basin that extend from the northern boundary of White Oak River Basin (southwest side of Drum Inlet) to the southern boundary of White Oak River Basin (northern boundary of Cape Fear River Basin) at the southwest side of the mouth of Goose Bay in the Intracoastal Waterway.	99-(4)	SB
Roosevelt Natural Area Swamp	All of the fresh waters within the property boundaries of the natural area including swamp forest, shrub swamp and ponds	20-36-9.5-(1)	C; Sw; ORW
Roosevelt Natural Area Swamp	All of the saline waters within the boundaries of the natural area including brackish marsh and salt marsh	20-36-9.5-(2)	SA; Sw; ORW

Source: NC Division of Water Quality.

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:

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. Overall land that falls within this category should be considered developable with regards to environmental factors.

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. Land in this class either falls within the boundary of a natural hazard area, or is within or immediately adjacent to environmentally sensitive areas.

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. Land falling within this class should be considered conservation areas, due to the presence of either public trust areas or extremely environmentally 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 and how each layer was classified.

Table 27. Pine Knoll Shores 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	✓		
Public Trust Areas/Estuarine Shorelines			✓
Flood Zones		✓	
Storm Surge Areas		✓	
HQW/ORW Watersheds		✓	
Water Supply Watersheds		✓	
Significant Natural Heritage Areas		✓	
Protected Lands			✓

Map 8 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. The following table provides a summary of the land area within Pine Knoll Shores that falls within each of the defined classes.

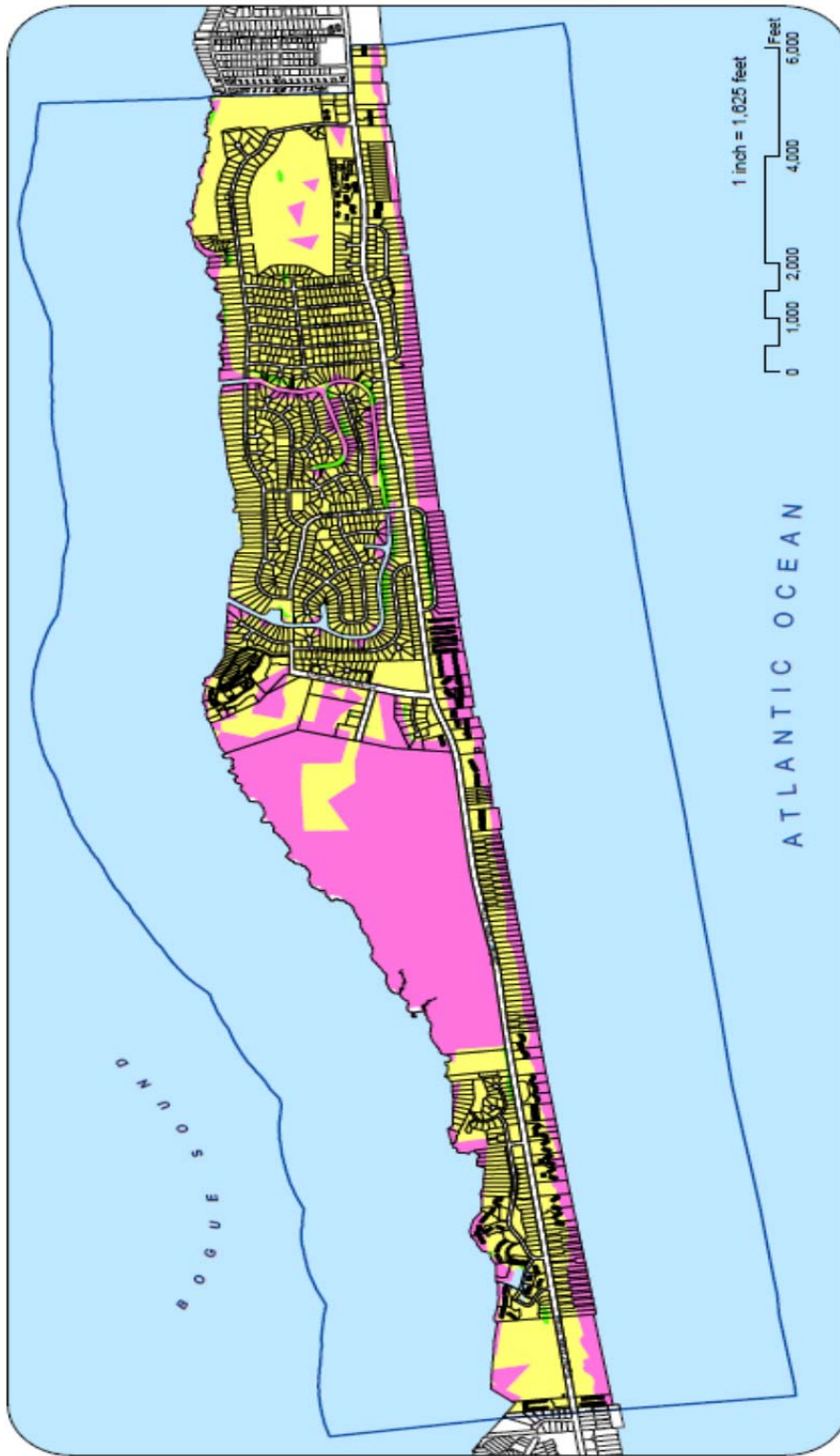
Table 28. Pine Knoll Shores Land Use Acreage by Class (as determined through Environmental Composite Analysis)

	Acres	%of Total
Class I	16.3	1.3%
Class II	804.5	63.7%
Class III	442.0	35.0%
TOTAL*	1,262.8	100.0%

*This figure does not include water or right-of-ways.

Sources: Holland Consulting Planners, Inc., and NC Center for Geographic Analysis.

Map 8 - Environmental Composite



The preparation of this map was financed in part through a grant provided by the North Carolina Coastal Management Program, through funds provided by the Coastal Zone Management Act of 1972, as amended, which is administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.



Map 8
Pine Knoll Shores
Land Use Plan
Environmental Composite

Legend

- Corporate Limits
- Environmental Composite
- Class 1
- Class 2
- Class 3
- Hydrology



*Source: Map prepared by Holland Consulting Planners in conjunction with the 2008 Land Use Plan.

3. Environmental Conditions

a. *Subbasin 03-05-03 (Hydrologic Unit 03020106)*

Pine Knoll Shores is located within subbasin 03-05-03, part of the White Oak River Basin. The basin-plan was most recently amended in 2001. Water quality within subbasin 03-05-03 is generally good. The Division of Marine Fisheries has classified waters in this subbasin to have Fair to Good commercial fisheries value. Oyster production is considered fair and clam production is good. Some problems do exist within the subbasin, which can mainly be attributed to increased development along Bogue Banks, as well as the northern shore of the Bogue Sound. Subbasin 03-05-03 lies in the center of Carteret County, extending from the U.S. Forest Service's Croatan National Forest to the Town of Beaufort and the Beaufort Inlet. Most of this subbasin is comprised of the estuarine waters of Bogue and Core sounds. The only source of surface freshwater throughout the subbasin is the Newport River.

Most of the development within the subbasin is occurring within Morehead City, Atlantic Beach, Beaufort, Newport, and Bogue Banks. There are eight individual National Pollutant Discharge Elimination System (NPDES) wastewater discharge permits in this subbasin with a total permitted flow of 4.75 MGD. The Town of Morehead City WWTP has the largest of these permits with a total permitted flow of 2.5 MGD and discharges into Calico Creek. The following table summarizes the characteristics of subbasin 03-05-03.

Table 29. Characteristics of Subbasin 03-05-03

Land and Water Area (sq. miles):

Total Area	228
Land Area	168
Water Area	60

Land Cover (%):

Forest/Wetland	59%
Surface Water	26%
Urban	4%
Cultivated Crop	6.5%
Pasture/Managed Herbaceous	4%

Monitored Stream Statistics:

Aquatic Life

Total Streams	15.1 mi/5,788.1 ac
Total Supported	5,847.9 mi
Total Impaired	140.2 ac
Total Not Rated	15.1 mi

Recreation:

Total Streams	11.2 mi/17,912.9 ac
Total Supported	11.2 mi/17,764.7 ac
Total Impaired	8.0 ac
Total Not Rated	148.2 mi

Shellfish Harvesting:

Total Streams	5.2 mi/23,867.4 ac
Total Supported	19,357.1 mi
Total Impaired	5.2 mi/14,510.3 ac

Source: NC Division of Water Quality White Oak River Basinwide Water Quality Plan.

Pine Knoll Shores lies within the Division of Marine Fisheries' Growing Area E-2. Of the six rated areas within the E-2 growing area, only one is approved for Shellfish Harvesting. Four of the areas are prohibited for Shellfish Harvesting and one area is Conditionally Approved - Closed. The stressors in those areas not opened for shellfish harvesting are fecal coliform bacteria. The following table provides information regarding three of these areas in Pine Knoll Shores' jurisdiction.

Table 30. Impaired Waters in the Town of Pine Knoll Shores Planning Jurisdiction

AU Number	Classification	Aquatic Life Rating	Recreation Rating	Shellfish Harvesting Rating	Stressors
20-36-(8.5)a9	SA HQW	No data	No data	Impaired	Fecal coliform bacteria
From a line across Bogue Sound from the southwest side of mouth of Gales Creek to Rock Point to Beaufort Inlet excluding the DEH Conditionally Approved Closed area near Jumping Ru. Bogue Pines Boat Basin					
20-36-(8.5)e	SA HQW	No data	No data	Impaired	Fecal coliform bacteria
DEH closed area in unnamed bay approximately 3500 meters east of line across Bogue Sound from the southwest side of mouth of Gales Creek to Rock Point					
20-36-(8.5)f	SA HQW	No data	No data	Impaired	Fecal coliform bacteria
DEH closed area in unnamed bay area near Hoophole Woods approximately 7400 meters east of line across Bogue Sound from the southwest side of mouth of Gales Creek to Rock Point					

Source: NC Division of Water Quality 303(d) list

b. Water Treatment Facilities

Communities along Bogue Banks have been concerned with wastewater treatment and a long term strategy for dealing with wastewater for many years. According to the Carteret County Health Department-Environmental Health Division, it is anticipated that Pine Knoll Shores will continue to rely on private septic tank systems and package treatment plants. Reliance on these systems has slowed growth and redevelopment of large multi-family and hotel complexes due to the significant expense associated with package treatment facilities. At this time, the Town of Pine Knoll Shores has made a decision to not support the installation of a central sewer system. This decision was made based on the premise that not providing central sewer will ultimately help control growth. There are currently 12 package plants located within the jurisdiction of Pine Knoll Shores. These systems vary in age and require weekly maintenance. All facilities have operators who are responsible for weekly maintenance and upkeep of the systems. Additionally, the Carteret County Health Department inspects their systems twice a year and NC DENR-Division of Water Resources inspects their systems annually to ensure that there are no problems or deficiencies that need to be addressed. As these facilities age, the regulatory agencies require that upgrades and/or replacement systems be put in place.

Carteret County is currently initiating a program to GPS new and existing septic systems, package treatment systems, and wells that will be available as a layer on the Carteret County GIS webpage. At this time, however, there do not seem to be any problems of note with respect to wastewater treatment facilities or septic facilities in Pine Knoll Shores. Carteret County Health Department reports that surface runoff, and the contaminants associated with it, has had a much greater impact on water quality in Bogue Sound than septic tank systems or package treatment plants. One of the biggest problems affecting water quality is the runoff of waste associated with pets and wildlife along Bogue Banks and

the northern shore of Bogue Sound. Additionally, there are no public health hazards currently within the jurisdiction of Pine Knoll Shores.

c. Natural Hazards

Pine Knoll Shores 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 Town 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. 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 Town of Pine Knoll Shores, the following table provides the acreage within the AE and VE flood zones by land use type. A detailed discussion regarding flood hazard areas within Pine Knoll Shores, including definitions of flood zone designations, is provided earlier in the plan. 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 by banks and lending institutions. Additionally, development within these areas must comply with the Town'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 31 provides the Town's acreage that falls within the AE and VE flood zones by land use. According to this table, 136.42 acres or 27.5% of Pine Knoll Shores' 495.81 single-family residential land use acres fall within a flood hazard area.

Table 31. Pine Knoll Shores Land Use Acreage within Flood Hazard Areas

Land Use	Acreage by Land Use	% of Total Town Acreage
Churches (Trinity Center)	33.96	2.5%
Commercial/Hotels	7.2	0.5%
Common Area*	86.17	6.4%
Condo**	14.33	1.1%
Exempt***	9.92	0.7%
Golf Course	13.46	1.0%
Municipal Exempt****	33.53	2.5%
Residential	136.42	10.2%
State Exempt*****	227.614	17.0%
Vacant	30.49	2.3%
Vacant w/XFOB*****	4.78	0.4%
Total	597.8	44.6%

Sources: Carteret County GIS, Town of Pine Knoll Shores

These land characterizations can be found in Map 9.

*Common Area generally encompasses the area around multi-family dwelling units under common ownership. It also includes the Beacon’s Reach parcel on Roosevelt Blvd.

**Condo generally encompasses the floor space of actual condominium units, but it also includes a portion of Beacon’s Reach Common Area and the Whaler Inn Common Area.

***Exempt generally encompasses Homeowners Association Parks, but also includes utility properties and some McGinnis Point Common Area.

****Municipal Exempt includes the majority of Town-owned property, including Beach Accesses

*****State Exempt includes the Roosevelt Natural Area, and erroneously includes the Town parcel known as “Hester Woods”

*****Vacant w/XFOB includes vacant parcels with limited improvements, for example docks.

C. ANALYSIS OF LAND USE AND DEVELOPMENT

1. Existing Land Use

Map 9 provides the locations of varying land uses within Pine Knoll Shores, and Table 31 summarizes the land use acreage resulting from the existing land use survey. According to the land use survey, approximately 35% of the acreage within Pine Knoll Shores is residential. Single-family housing takes up the most acreage followed by recreational. A majority of this acreage is located within the Roosevelt Natural Area. The Land Uses described in Table 32 come from the “Use Description” field of Carteret County GIS data prepared by the Carteret County Tax Office. Known issues with the data are described in the notes to Table 31, which is based on the same data.

Table 32. Pine Knoll Shores Existing Land Use Survey**

Land Use	Acreage by Land Use	% of Total Town Acreage
Churches	51.32	3.8%
Commercial/Hotel	19.22	1.4%
Common Area	159.79	12.0%
Condo and Multi-Family	25.27	1.9%
Exempt	18.87	1.4%
Golf Course	102.97	7.7%
Municipal Exempt	48.56	3.6%
Single-Family Residential	495.81	37.1%
State Exempt	291.22	21.8%
Vacant	103.16	7.7%
Vacant w/XFOB	19.84	1.5%
Total*	1336	100.0%

*This figure does not include streets or canal.

**Please refer to notes on Table 31 and Map 9

Source: Carteret County GIS

2. Land Use Conflicts/Development in Fragile Areas

Based on its coastal environment, development in Pine Knoll Shores requires special considerations to protect both the local ecology and the built environment. This section describes the interactions between land uses and fragile or sensitive environmental factors and some of the Town’s existing policies for addressing those interactions.

a. *Estuarine Waters and Shorelines*

Approximately 57% of Pine Knoll Shores parcels border estuarine waters and shorelines, including the Atlantic Ocean. The parcels with the longest shorelines are largely protected from significant future development: Town Hall, the Roosevelt Natural Area, the Country Club of the Crystal Coast, and the Trinity Center. These areas largely maintain natural shorelines. The majority of Pine Knoll Shores residential development along the canal and sound estuarine waters and shorelines employs bulkheads to stabilize shorelines. This practice is required along the canal, but not along the sound. Some sound-front property owners have opted to use living shoreline systems for stabilization.

To address the interaction between development and estuarine waters and shorelines, the Town requires setbacks of 100 feet from the mean high water mark of Bogue Sound and thirty feet from the mean high water mark of the canal. The soundfront requirements exceed the CAMA setback of 30 feet. The larger setbacks help to protect structures from storm damage and flooding. Oceanfront estuarine shorelines will be addressed under “Ocean Beaches and Shorelines.”

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. Buffers also create natural areas provide breeding, nesting, and habitat, and protect wildlife from predication. Vegetated buffers help increase the diversity of wildlife while providing site for foraging and corridors for dispersal.

b. *Coastal Wetlands*

Coastal wetlands make up approximately 1/6th of the Town's jurisdiction, around 212 acres. However, wetlands only impact around 7% of the parcels in town. As reflected in the fragile areas map, wetlands are mostly concentrated in the Roosevelt Natural Area and towards the central part of town around Pine Knoll Boulevard. The Town owns several of the other parcels predominantly affected by wetlands. Significant wetlands are also located in Beacon's Reach and on the Country Club of the Crystal Coast property. Development in coastal wetlands is subject to permitting by the US Army Corps of Engineers and the North Carolina Division of Coastal Management.

c. *Ocean Beaches and Shorelines*

63% of Pine Knoll Shores parcels, largely multi-family and condominium units, are located along oceanfront beaches and shorelines. Because the Town maintains a static line exception, the setback for structures of less than 2,500 sq. ft. in this area is 60 feet from the first line of stable vegetation; structures between 2,500 and 5,000 sq. ft. have a setback of 60 feet from the static line; and structures more than 5,000 sq. ft. have a setback of 120 feet from the static line. The exception allows structures to be constructed, reconstructed, and allowed to remain closer to the shoreline than if the Town did not maintain a static line exception. The Town's renourishment projects help to enable the exception and provide a layer of protection for these structures. The Town also periodically undertakes sand fencing and vegetation projects and has adopted a dune protection ordinance to further protect these structures from storm surge, erosion, flooding, and other damage. There are a number of non-conforming structures that would require a CRC variance to be reconstructed in the event of catastrophic damage. Losing the static line exception would create a larger number of non-conforming structures and be catastrophic to the Town's tax base, 45.8% of which is oceanfront.

d. *Areas of Excessive Slope*

Areas of excessive slope predominantly follow interior dunelines of the Town as well as portions that border the canal, the ocean, and wetlands. Protections that have been listed for each of those areas also help to avoid conflicts with the areas of excessive slope. The Town

does not have many particular ordinances addressing areas of excessive slope, but does require a registered surveyor or professional engineer to certify that any significant grading changes will not alter normal drainage patterns nor will stormwater runoff on adjacent properties be increased. Generally, areas of excessive slope have not been much of an issue in the Town in terms of construction. The Planning Board considers the presence of dunes in its site reviews, and the Building Inspector reviews new construction for structural integrity. Oceanfront setbacks help to protect oceanfront home sites from the effects of excessive slope, and grading as part of construction helps inland sites with slope issues. Slope is also considered in the Town's Source Water Assessment Program Report and is a factor in the unsaturated zone rating of wells.

e. *Areas of Excessive Erosion*

Erosion data is only available on the ocean shoreline, and not on the sound side. The sound side is largely stabilized by bulkheads. The Town does not have extreme erosion, but periodic hurricanes can cause significant erosion and bulkhead damage. For the period between 2002 and 2013, Pine Knoll Shores experienced an average nourishment of 8.6 cubic yards per foot per year and an average erosion of 3 cubic yards per foot per year for a net accretion rate of 5.6 cubic yards per foot per year on the ocean side. The Town has undertaken five renourishment projects between 2001 and 2013, with a total volume placed of 2,408,741 cubic yards and a total volume loss of 844,800 cubic yards. In some storm events, significant erosion has occurred on both the sound side and the ocean shoreline to the point of threatening structures. Generally, there is more oceanfront erosion on the western side of town than the eastern, as reflected on the fragile areas map. The minimum setback factor set by the Division of Coastal Management is based on 2 feet per year of erosion.

Vegetated buffers also help to stabilize the soil and reduce sedimentation.

f. *Significant Natural Heritage and Protected Lands*

The Roosevelt Natural Area is protected from future development by three primary factors: state ownership, deed restrictions, and Town zoning. The deed restrictions prohibit the property from being used for general recreation purposes or as a public park. The adjacent properties have been generally undeveloped to date except for the single-family development of Pine Knoll Village and the Town's commercial district containing the Bogue Banks Public Library. Human impact on the Roosevelt Natural Area is also limited by accessibility: other than the North Carolina Aquarium, there is only a single natural trail that winds its way to the Sound that makes the area accessible to humans. The Aquarium itself has 250 parking spaces and can draw up to 5,000 people in a day. Deed restrictions also

limit ingress and egress to a single access road, which enters the property from Roosevelt Blvd. Walkways for pedestrian visitors are allowed on any portion of the property.

g. *Public Trust Waters and Watershed*

The Natural Systems Analysis discusses the required water quality standards and levels for a variety of use classifications in the waters surrounding Pine Knoll Shores. Several academic studies have examined water quality in the canal system, and found that the water quality is generally good, except for in the cul de sac. The canal system is able to enjoy good water quality due to the relatively rapid flushing of the canal system. The Town also maintains a stormwater ordinance, sets impervious limits, and encourages pet waste clean up to protect water quality. These efforts have not been enough to prevent the closure of the canal systems in Town to shellfishing, nor to prevent the recommendation to avoid swimming in the canal in a recent UNC study. The most common impairment is fecal coliform bacteria.

h. *Maritime Forest*

As mentioned in the Fragile Areas Section, maritime forest permeates the entire Town. The Town uses its ordinances to protect the maritime forest by requiring permits for tree removal and imposing fines for removal without a permit. The Town also requires revegetation for improperly removed vegetation. The Town also requires inventorying of trees on site and trees for removal in its landscape permit review process.

i. *Flood Zones and Storm Surge*

The vulnerability of Pine Knoll Shores to coastal flooding and cyclonic tropical storms has been discussed several times within the context of this plan. The Town recognizes that development within flood hazard areas is going to occur due to the Town's location almost entirely within the floodplain. The Town's strategy to address this issue will be to continue enforcement of land use controls that increase the safety of residential and non-residential structures that are built within defined flood zones. The Town has decided to fall under the Carteret County Hazard Mitigation Plan which outlines specific goals, objectives, and implementing actions that will be carried out to increase the safety of Town citizens and property in the event of a natural disaster. The Town's flood hazard mitigation actions have resulted in an improved insurance rating, and the Town actively monitors the requirements of the Community Rating System.

j. *Water Supply*

The Town maintains a wellhead protection plan to protect its water supply. The plan establishes standards for development around well sites and responses to potential

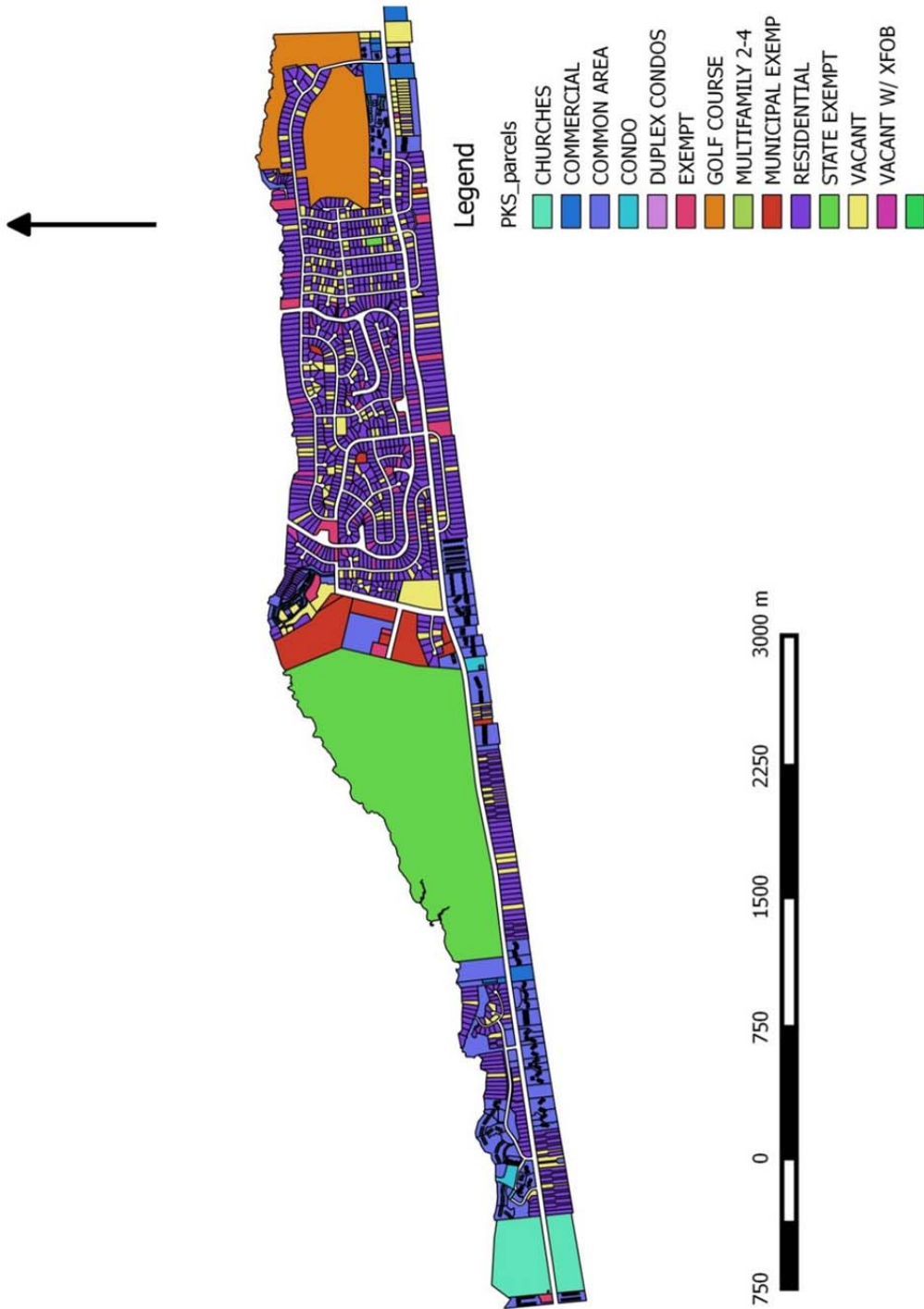
contaminants. The Town withdraws water from the Castle Hayne Aquifer. The Town's Source Water Assessment Program Report and Wellhead Protection Plan are available for inspection at Town Hall.

The Town's established buffers are also beneficial for recharging the ground water supply and promoting groundwater flow.

k. High Density Development in Areas with Soils Having Severe Septic Tank Limitations

There is currently no central sewer system serving the municipalities along Bogue Banks. Sewage treatment within Pine Knoll Shores is primarily handled either through individual septic tank systems or package treatment plants. Use of these facilities is a concern for the Town, and has been identified as a key issue within this planning process. This issue has been an impediment to new construction and redevelopment within the Town's jurisdiction. This issue will be discussed further in the Community Facilities/Services portion of the plan.

Map 9 - Existing Land Use



*Source: Carteret County Tax Office data; map prepared by Pine Knoll Shores staff in QGIS.

3. Development Trends

Because of redevelopment, it is challenging to chart an exact course of the Town's development; however, based on county tax records, we can produce a reasonable chart, based on current structures. The 1980s show a significant jump in average parcel size and rate of development due to the rapid development of multi-family units during the time period. Since the 1980s, new development has been slowly tapering off as the community approaches build out under existing development ordinances. Some of the causes of the significantly smaller development area in the 2010-2013 time frame have been a lack of new multi-family developments and the economy, although there are properties where new multi-family developments may occur prior to 2020.

Table 33: Development Trends in Pine Knoll Shores

	Acres Developed	Average Rate of Development	Average Development Size
Pre-1970	33.647	1.25 acres/year	.443 acres
1970-1979*	171.443	17.1443 acres/year	.608 acres
1980-1989**	260.312	26.031 acres/year	.734 acres
1990-1999	121.612	12.612 acres/year	.455 acres
2000-2009***	60.048	6.048 acres/year	.973 acres
2010-2013	4.324	1.081 acres/year	.432 acres

Source: Carteret County Tax Office

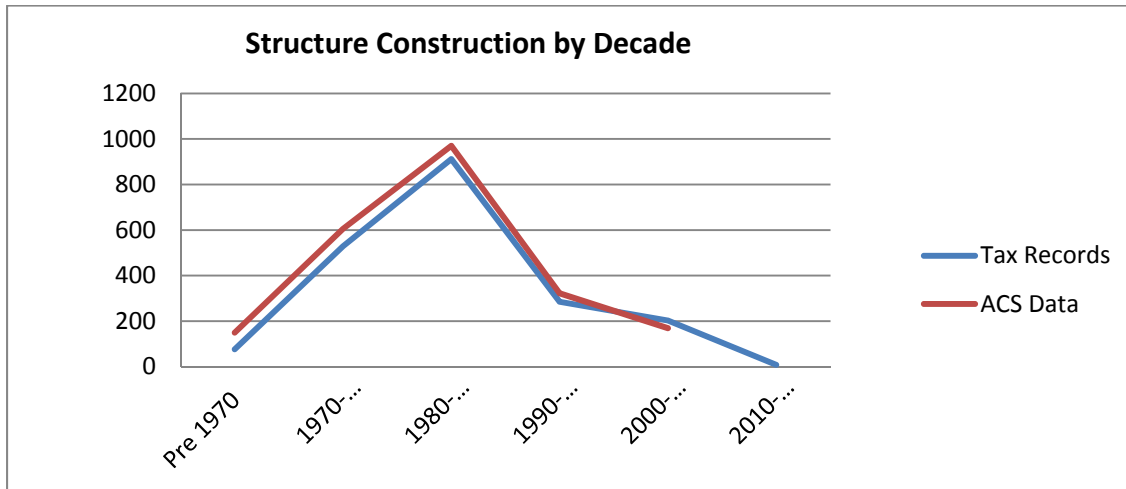
* Includes Town Hall

** Includes Trinity Center

*** Excludes new Club House at Country Club

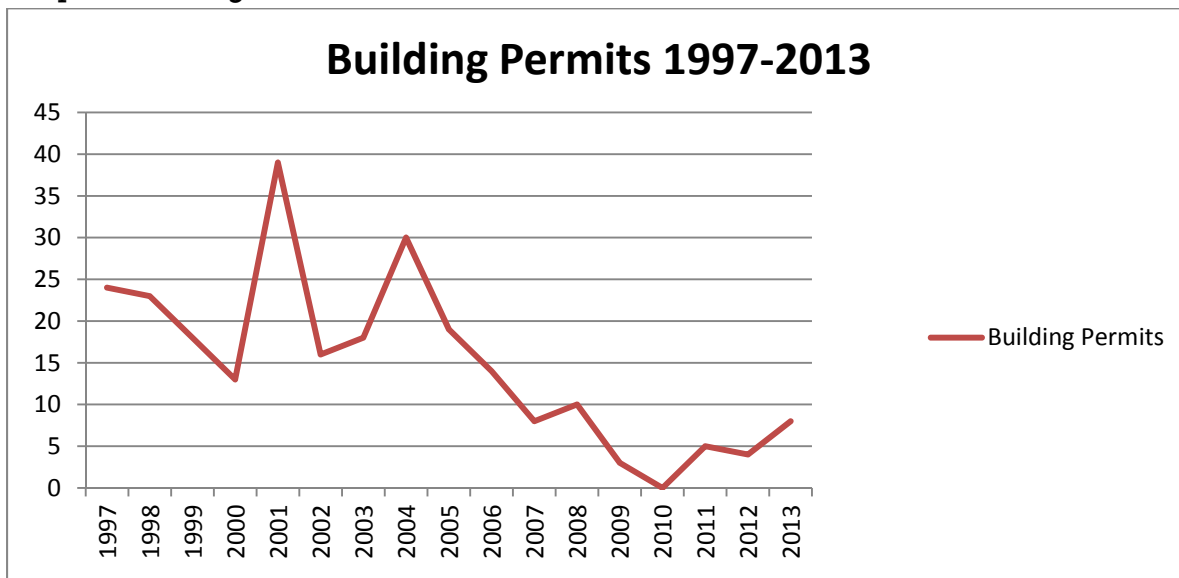
As indicated in the Housing section of this plan, development occurred very quickly between 1970 and 1990, and has largely stabilized between 1990 and 2010. Both the federal Census' American Community Survey and county tax records reflect this trend as reflected in Graph 2.

Graph 2: Structure Construction by Decade



Over the more near term, we see evidence of a continuing decline in building permits between 1997 and 2013 as depicted in Graph 3: generally this decline has been driven by the downturn in the economy, but also by the Town’s development patterns and the decrease in undeveloped lots.

Graph 3: Building Permits 1997-2013



Approximately 263 parcels remain vacant. These vacant parcels encompass 120.46 acres and average .458 acres in size. The largest parcels that are zoned for development are the Office/Professional parcel at the intersection of Pine Knoll Boulevard and NC 58 (9.330 acres); a 4.660 acre oceanfront parcel near the Atlantic Beach Border; and approximately five acres in the McGinnis Point development. Based on community building trends, we would anticipate all of these parcels will experience new multi-family developments as the

economy continues to improve. An additional 334.213 acres are made up of HOA parks, municipal property, utility property, and state property, but generally have minimal development and significant protections.

The Town’s primary redevelopment trend has been the conversion of income-producing properties, including hotels and shops, to residential development. To date, this has resulted in the conversion of 18.74 acres, leaving 143.186 acres of income-producing property, including the Country Club of the Crystal Coast and the NC Aquarium at Pine Knoll Shores, but excluding the Trinity Center and vacation rental homes.

To date, there has been minimal redevelopment of single family residential lots, and recent demand does not suggest that there will be.

Table 35. Pine Knoll Shores Zoning Classification of Undeveloped Properties

Zoning District	Parcels	% of Total Vacant Parcels	Acreage by Land Use	% of Total Vacant Acreage
MF1, MF2	62	23.0%	29.4	24.1%
OP, C	3	1.1%	10.5	8.6%
R1, R2, R3, R4	203	75.4%	81.7	66.9%
REC2, REC3	1	0.4%	0.26	0.2%
Total	269	99.9%	122.3	99.8%

Source: Holland Consulting Planners, Inc. and Carteret County Tax Office

Each of the zoning classifications listed in the table above include several different zoning districts. The following summarizes which zoning districts have been included in the table, as well as the intended use of each zoning district as defined in the Town’s zoning ordinance:

- Multi-Family District (MF1, MF2) - the principal use of land is for multi-family dwellings; however, single family dwellings are permitted in the Multi-family 2 zoning districts.
- Office & Professional (OP) - the principal use of land is for office and professional service facilities to serve the needs of the community.
- Residential Districts (R1, R2, R3, R4) - the principal use of land is for dwellings.
- Recreation Districts (REC2, REC3) - the principal use of land is for recreation, both public and private.

4. Historical, Cultural, and Scenic Areas

There are several Protected Lands and state-defined Natural Heritage areas that fall within the planning jurisdiction of Pine Knoll Shores. These areas have been thoroughly discussed in the Natural Systems Analysis portion of this plan. 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 8) was discussed beginning on page 55 of the plan. This map is intended to delineate the Town’s jurisdiction 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). There is very limited Class I land in Pine Knoll Shores. Of developed lands, the vast majority is in Class II Class III areas. Of the areas identified for future development, development in the vicinity of McGinnis Point and oceanfront development are the most likely to infringe upon Class III areas. The development proposals for McGinnis Point and Roosevelt Beach have already been approved and take into account the hazards associated with each area.

Table 36. Pine Knoll Shores Undeveloped Land in Relation to Environmental Composite Analysis (Class I-III)

Environmental Composite Map (Class I - III)	Acreage by Land Use	% of Total Vacant Acreage
Class I	1.7	1.9%
Class II	88.86	83.6%
Class III	10.53	14.5%
Total	101.09	100.0%

Source: Holland Consulting Planners, Inc., and NC Center for Geographic Analysis.

6. Land Use Demand Forecast

To date, there has been minimal redevelopment of single-family residential parcels; however, there are two primary factors that could shape future redevelopment: density and land coverage. There have been no signs of shifting away from the current development trends of primarily single family residential with some multi-family residential new construction. Long-term future redevelopment, over the next 20-30 years, could take one of two routes: either there could be greater subdivision of large lots or recombination of smaller lots into larger lots.

Research conducted in the process of the Town’s impervious surface ordinance indicated that many parcels in Town are not fully built to allowable impervious coverage, which could drive additional impervious coverage in redevelopment.

In the scenario of subdivision of large lots, approximately 446 new housing units could be constructed through the subdivision of existing developed single family residential lots.

With maximum subdivision, an additional 276 new single family residential housing units could be built on vacant lots. Based on the maximum density allowance for multi-family 2 zoning districts, 154 multi-family units could be added. Thus, based on the Town's density guidelines of 4 single family residential housing units per acre and 8 multi-family housing units per acre, maximized subdivisions, and assuming no changes to municipal property allocations, an additional 876 housing units could be constructed in Pine Knoll Shores. Current demand patterns and development philosophies do not indicate that this level of development would occur in the near future, but it sets an upward bound.

In order to gauge the rate of growth within the Town of Pine Knoll Shores, it is necessary to establish an estimate of how rapidly development is expected to occur within the Town's planning jurisdiction. Many times land use demand is established based on the growth rate of a Town's population. Within Pine Knoll Shores, based on the recovering economy and vacant parcels, it is reasonable to expect additional single family residential units to appear in the Roosevelt Shores development and on the interior of the Town. Based on trends to date, we would expect 1-3 acres annually of single family residential development. The Town could also see between 5 and 15 acres of development of multi-family units between 2014 and 2030. This would essentially represent multi-family build out for the Town under likely development conditions in a recovered economy. Using the same sort of modeling, we would anticipate that total build out of single-family residential lots is not imminent and would occur in at least 20-30 years, not accounting for additional redevelopment. Under this most likely development scenario, the Town should see 4-12 single-family residential units per year, and a total of 40-160 multi-family units over the next 20 years.

The Town 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 Pine Knoll Shores, residential development estimates have been established based on building permit activity over the last five years. The following table provides a summary of these estimates.

Table 37. Pine Knoll Shores Residential Land Use Demand Estimates

	2010	2015	2020	2025
Built-Up Residential Acreage (Single- and Multi-Family)*	550	560	575	590
Residential Unit Increase	N/A	40	80	80

*Residential acreage increase is based on the average lot size of all remaining undeveloped land within the Pine Knoll Shores jurisdiction. The average lot size is one-half (0.5) acre.

D. ANALYSIS OF EXISTING COMMUNITY FACILITIES/SERVICES

1. Transportation

a. Highways and Streets

A majority of the roads within the planning jurisdiction of Pine Knoll Shores are local access streets, with the exception of NC Highway 58 which runs the entire length of the Town's corporate limits. NC Highway 58 is the primary road running along Bogue Banks, and connects the island to Cape Carteret to the west and Morehead City to the east. All of the roads within Pine Knoll Shores are maintained by the Town, with the exception of private drives which are located within several of the single-family and multi-family developments and NC Highway 58.

According to the North Carolina Department of Transportation (NCDOT), there are approximately 20.9 miles of public right-of-way within Pine Knoll Shores' jurisdiction. As stated, a majority of these streets are local access streets serving the residential portions of Town. NCDOT collects traffic count data on an annual basis at key intersections throughout the state. Average daily traffic counts have generally declined between 2002 and 2012, with a decline from 11,000 to 6,600 at the intersection of Pine Knoll Boulevard and NC 58. The Town does experience congestion on weekends during the summer.

The primary street infrastructure needs in Pine Knoll Shores relate to the maintenance of two bridges over the canal: one on Oakleaf Drive and one on Mimosa Blvd. These bridges are routinely inspected by the State of North Carolina. Maintenance and replacement is done on an as-needed basis in accordance with the Town's street and road maintenance plan. Beyond the bridges, the Town maintains 11.4 miles of streets. NCDOT maintains approximately 5 miles of NC 58 within the Town's jurisdiction, and homeowners associations maintain approximately 4.4 miles of private streets in the McGinnis Point, Bogue Pines Circle, Roosevelt Shores, Ocean Shores, and Beacon's Reach areas.

The Town relies on bridges at Emerald Isle and Atlantic Beach for access to the mainland, and does not support the construction of a third bridge to the island. The Town may be open to considering this option if a catastrophic geologic shift were to occur that prevented access to the existing bridges.

The Level of Service (LOS) for NC Highway 58 is an A or B in the off-season. During the height of the summer, around the fourth of July, the LOS for this road can be as low as a D. The road cannot be significantly widened due to the availability of land and environmental concerns that exist in the area. Overall, the LOS is acceptable for that area. LOS D is considered the "practical capacity" of a facility, or that at which the public begins to express dissatisfaction.

The Carteret County Comprehensive Transportation Plan suggests that the Town's annual average daily traffic (AADT) was 8,000 vehicles per day in 2010 between Hoffman Beach Road in Indian Beach and Bermuda Greens Road in Pine Knoll Shores, and projects an AADT of 10,500 in 2040. The capacity of the road to maintain a Level of Service D is 12,000 suggesting that no significant highway improvements should be necessary in the near term. Between Bermuda Greens and Pepper Lane in Atlantic Beach, the traffic was 14,000 vehicles, and the capacity was 16,000 vehicles per day. The Comprehensive Transportation Plan recommends improvements to increase the capacity to 18,900 vehicles per day. The projection for the stretch of road is 18,900 vehicles per day in 2040.

Trends over the last decade show a general decrease in AADT in the area, but more details will be known after the Highway 58 Corridor Study is completed.

b. Pedestrian Infrastructure

The Town has adopted a Pedestrian Master Plan for the construction of sidewalks. There are also a number of trails in Town. Currently, sidewalks link Atlantic Beach to Oakleaf Drive, the Public Safety Building and Library to Pine Knoll Boulevard, the Hampton Inn to Public Beach Access A, and a short segment connects the bridge over Mimosa Boulevard to a crosswalk at Dogwood. A potential study topic for the planning period may be the linkage of public pedestrian infrastructure. Primary safety concerns are along NC 58 due to its high speed limit and large population density. Pedestrians enjoy a reasonable expectation of safety along Town-maintained streets due to lower traffic volumes and speed limits.

Beacon's Reach and the Trinity Center have private pedestrian infrastructure.

c. Bicycle Infrastructure

There is currently no bicycle-specific infrastructure in Pine Knoll Shores; however, bicycle and pedestrian use of the two-foot shoulders along NC 58 is currently commonplace. With the development of sidewalks, the shoulders along NC 58 would serve as de facto bicycle lanes, although not built to bicycle lane specifications. The Town may consider widening these in conjunction with any future significant highway projects.

d. Public Transportation

Public Transportation for Pine Knoll Shores is provided by Carteret County Area Transit System (CCATS). CCATS provides:

- limited out of county service for non-emergency medical appointments
- non-emergency medical transportation
- service to and from all areas of Carteret County

- shopping trips for seniors, residents, and guests
- transportation to and from Carteret Community College
- transportation to beaches, museums, parks, aquarium, and other places of interest
- transportation for employees to and from work

The Town of Pine Knoll Shores supports CCATS' provision of services for those without personal means of transportation at an affordable cost. It is especially important for an aging community like Pine Knoll Shores.

Private transportation is available through taxis and rideshares.

2. Health Care

The citizens of Pine Knoll Shores rely on access to health care outside of the Town's borders. There are many local primary care providers and specialists in the area, but the largest comprehensive health care provider is Carteret County General Hospital, approximately 8 miles (15 min.) away.

For services not provided at Carteret County General Hospital, residents of Pine Knoll Shores also have regional access to both Craven County Regional Medical Center, located in New Bern, and University Health Systems of Eastern North Carolina located in Pitt County. The Pitt County facility is located approximately 110 miles from Pine Knoll Shores, and provides service to 29 counties throughout eastern North Carolina. University Health Systems includes Pitt County Memorial Hospital in Greenville, NC, community hospitals, physician practices, home health, and other independently operated health services. University Health Systems is affiliated with the Brody School of Medicine at East Carolina University.

3. Law Enforcement

The Town of Pine Knoll Shores Police Department provides law enforcement services for all of the Town's corporate limits. The staff consists of seven full time officers, including the Police Chief. One officer is on duty at all times with a second officer on duty during peak call times. The full-time staff is supplemented by four part-time officers. Police staff are also supported by seven V.I.P.S. (Volunteers in Police Service). V.I.P.S. perform clerical tasks, deliver materials to the Clerk of Courts Office, perform "I'm OK" Checks, Residence Checks, and Business Checks. Eight patrol cars are maintained along with one V.I.P.S. car. Based on National Standards, a community would normally provide two staff police personnel per 1,000 persons in population. The Town has a 2010 population of 1,339, and therefore exceeds the two per 1,000 population ratio.

Peak seasonal population was established for the Town earlier in the plan. The estimated peak population based on these estimates is 15,372. If the Town's four part-time officers are factored into the overall police staffing count, Pine Knoll Shores still exceeds the recommended ratio for police personnel even during summer months when the Town's population substantially increases. Future needs regarding police and fire/EMS protection will be discussed later in the plan.

4. Fire/Rescue Services

The Town of Pine Knoll Shores operates a full-time fire/rescue department. The department has a staff of three paid firefighter/EMTs, and a paid Fire Chief. This staff is supported by a number of volunteers. Department fleet includes one 75-foot aerial truck with a 1500 gallons per minute (gpm) pump, one 1,500 GPM pumper, and one 1,000 GPM pumper, two EMS Advanced Life Support Transport Units, one service vehicle, and one command unit. The Town of Pine Knoll Shores currently maintains a county wide mutual aid agreement with all other municipal and volunteer fire departments within Carteret County as well as a State wide mutual aid agreement through the Office of State Fire Marshal. The Pine Knoll Shores Fire Department maintains automatic aid agreements with Indian Beach/Salter Path Fire Department, and the Atlantic Beach Fire Department. This means that when a fire alarm/call is dispatched in either jurisdiction, the Pine Knoll Shores Fire Department is dispatched concurrently regarding the incident. According to the Town's Fire Chief, response time for the Pine Knoll Shores Fire Department averaged 3.5 minutes in 2013 with a maximum of 4 minutes for calls at the parts of town farthest from the station.

In addition to the Town's Fire/EMS staff, there is paramedic service within the Town 24 hours/day, seven days a week. The paramedic operates out of the Fire/EMS facility, but all equipment and compensation for the paramedic is paid by Carteret County. It should be noted that this paramedic does not just serve Pine Knoll Shores, but may be dispatched to incidents throughout the county.

The Insurance Services Office (ISO) makes an independent evaluation of many departments every five years or when major changes have occurred. Many insurance companies use the ISO rating as one factor in setting the amount of premium that is paid on a particular property. Departments are rated from a Class 1 (the best) to Class 10 (unprotected). The Insurance Services Office (ISO) rating for the Town of Pine Knoll Shores is 6. The Town was last inspected in 2005 and should be due for an inspection in the relatively near future.

The Fire Department is assisted by the Community Emergency Response Team (CERT). The CERT supplements the manpower of the fire department, and can provide the following services:

- Hurricane good neighbor program
- Answer/log calls
- Issue hurricane reentry passes
- Act as liaison to the County EOC for PKS
- Go out with Fire Crews and help clear roadways from downed trees
- Direct traffic
- Can assist with search operations in some storm scenarios

5. Administration

The Town of Pine Knoll Shores is governed by a Council-Manager form of government. The Town's personnel are broken down into five defined departments including: Administration, Police, Fire/EMS and Emergency Management, Planning/Inspections, and Public Service. The Town currently employs 27 full-time employees. Pine Knoll Shores has five acting Town Commissioners, a Mayor, and maintains an active Planning Board, Board of Adjustment, Community Appearance Commission, Historical Committee, Strategic Planning Committee, Parks and Recreation Committee, *Shoreline* newspaper, and a variety of ad hoc committees.

6. Water System

The Town of Pine Knoll Shores owns and operates 94,288 linear feet of water line, two elevated storage tanks, and four wells within the Town. The Town purchased the system from Carolina Water Service on September 27, 2005 for \$3,750,000. The locations of all water lines, storage tanks, and wells within Pine Knoll Shores are shown on Map 10. The Town's water system is permitted for a maximum capacity of 1.2 million gallons per day (mgd). Through operation of the Town's existing four well sites, the Town's system is capable of producing approximately 982,000 gallons of treated potable water per day. Consumption of the Town's water resources varies substantially from winter months to peak summer months. During peak summer months, the Town utilizes approximately 680,000 gallons per day (.68 mgd) comprising approximately 58% of the Town's total permitted water system capacity. This demand drops to as low as 244,000 gallons per day (.24 mgd) during winter months.

Average water consumption is about 9.5 million gallons per month, with peaks in the summer months of about 15 million gallons per month. The system's capacity is 1.2 million gallons per day, for a maximum monthly capacity of 36 million gallons, well exceeding current demand. The Town maintains mutual aid agreements with Atlantic Beach and Bogue Banks Water Company for emergency water supply needs.

The water supplied to Pine Knoll Shores is gathered from wells, which are tapped into the Castle Hayne Aquifer running beneath portions of Carteret County. The Castle Hayne aquifer, underlying the eastern half of the North Carolina coastal plain, is the most productive aquifer in the state and the primary water source for the Town. It is primarily limestone and sand. The Castle Hayne aquifer is noted for its thickness (more than 300 feet in places) and the ease of water movement within it, both of which contribute to high well yields. It lies fairly close to the surface toward the south and west, deepening rapidly toward the east.

7. Sewer System

The Town of Pine Knoll Shores relies on a combination of private septic tank systems and package treatment plants for wastewater treatment. A majority of single-family homes utilize private septic tank systems. While these systems are suitable for moderate density residential development, these systems are not suitable for high density developments. Within Pine Knoll Shores, privately-owned central collection, treatment, and disposal systems are being utilized by high density and multi-family developments. These systems consist of mechanical, biological and/or chemical wastewater pretreatment package plants with subsurface or surface disposal of the effluent accomplished through conventional, drip, low pressure pipe, nitrification lines, spray or rotary distributors. These privately-operated package treatment plants are permitted and regulated by Carteret County Health Department Environmental Health Division and NC Department of Environment and Natural Resources – Division of Water Resources (NCDENR-DWR). Table 38 provides a listing of all package treatment plants within Pine Knoll Shores, including their capacity and condition. The information regarding the condition of the plants was provided by Carteret County Health Department.

With such a large variety of systems and site characteristics it's difficult to give a life expectancy. It used to be 15-20 years but better designs and installations have far surpassed that figure. In more complex or poorer site conditions a shorter life span (maybe 20 yrs) may be expected, but that can increase significantly with proper maintenance. Many systems that have been in use for 40+ years are still going strong.

Table 38. Pine Knoll Shores Package Treatment and Disposal Systems

Complex	Capacity (GPD)	Operator	Type	System Age
Hampton Inn and Suites (was Ameri Suites)	13,800	Don O'Mara	Subsurface-LPP	1998
Coral Bay West	10,000	Kevin Mullineux	Subsurface-Siphon-Conversion Lines	Early '80's
Pine Knoll Townes II	11,040	Don O'Mara	Subsurface-LPP	1991
Ocean Terrace	12,000	Don O'Mara	Extended Aeration Plant with Subsurface-Conventional Dispersal Lines	Early '80's
Genesis	30,500	Don O'Mara	Sequencing Batch Reactor (new)with Rotor Fields (existing)	Plant (2011)
Oceans	6,000	Don O'Mara	Sequencing Batch Reactor (New) with Subsurface-Conventional Lines (Existing)	Plant (2011)
SunBay Villas	4,680	Fortin Contract Services	Bioclere with Low pressure Pipe nitrification lines	2006
Whaler Inn	20,000	Lee Buck	Extended Aeration Plant Subsurface-LPP	1992
Beach Walk Villas	17,340	Don O'Mara	Advantex with Drip Nitrification Dispersal (all new)	2010
Bogue Shore Club	12,000	Don O'Mara	Advantex with Drip Nitrification Lines (all new)	2011
McGinnis Point	30,600	Don O'Mara	Extended Aeration with Anoxic Treatment Plant (new) and Drip Nitrification Dispersal (existing)	2012 (plant) 2003 (drainfield)
Beacons Reach	135,000	Don O'Mara	Re-Use/Spray Irrigation	2011
Ocean Bay Villas	32,500	Kevin Mullineaux	Extended aeration, dual train, concrete plant with Spray Irrigation	Late 1970s Spray Irrigation (2007)
NC Aquarium at Pine Knoll Shores	25,000		HR Infiltration/Reclaimed	Compliance Verification 9/2013

Source: Carteret County Health Department and Division of Water Resources.

As noted, the systems above are responsible for treating high density multi-family developments. Private septic tanks are relied upon for the treatment of waste from individual housing units. According to the Carteret County Health Department, there are no recurring septic tanks problems other than normal failure of systems due to aging, tree roots or sand infiltration. One concern of the County Health Department is that as redevelopment occurs higher density development will take place and will potentially create problems with respect to water treatment due to the lack of land available for utilization as a drain field. This concern is addressed and improved by the use of new wastewater treatment and dispersal system technologies. The new systems have the potential to extend the life of a drain field, can be used in poorer soil conditions, take less space than standard septic systems, and treat the effluent to a higher quality reducing the impact to groundwater. The establishment of a central sewer system within Pine Knoll Shores is not viewed as a feasible option at this point. Sewage treatment will be discussed further in the future demands and policy statement sections of the plan.

Map 10 - Water Lines



*Source: Map prepared by Pine Knoll Shores Staff in QGIS from base layers compiled by Holland Consulting Planners for the 2008 Land Use Plan.

8. Solid Waste

The Town of Pine Knoll Shores contracts out solid waste and recycling services for its residents. All trash and debris collected is taken to the Tri-County Landfill, a government-controlled facility operated by three counties, located near Tuscarora in Craven County. This facility serves Carteret, Pamlico, and Craven Counties, and was opened in 1994. The Tri-County Landfill currently has one cell that is at capacity, one that is being utilized, and a third is being constructed. According to 2003 estimates, the landfill has the capacity to operate for approximately 30 more years. The Town also provides yard waste collection and recycling services for its residents.

9. Schools

The school age population of Pine Knoll Shores is served by the Carteret County School System. All schools serving the area are located on the mainland of Carteret County. Bus service provides transportation to and from these schools on a daily basis. Several private schools and one charter school are also available in the surrounding area.

Generally, student performance at local schools exceeds state averages.

Higher education is offered for Pine Knoll Shores citizens through Carteret Community College, located in Morehead City. The school offers more than 100 courses, and students can pursue programs leading to a certificate, diploma, or associate degree. East Carolina University is a major four-year university, and is part of the University of North Carolina system. The university is located in Greenville, North Carolina, roughly 100 miles from Pine Knoll Shores. UNC-Wilmington is closer than ECU at 91 miles.

10. Recreation

a. Public Recreation

The largest public recreation area in Pine Knoll Shores is the beach, to which the people of North Carolina have public trust rights via the State Constitution. The Town maintains eleven public beach accesses and associated parking throughout the Town as required by the Army Corps of Engineers as a condition of renourishment. Each parking lot has at least 10 spaces, with a total of approximately 173 spaces.

In addition to the beach, the Town maintains a short trail system and picnic area on the Town Hall grounds, and has recently extended the trail system along Pine Knoll Boulevard. The trail provides limited sound access. There is a similar trail, longer and with more interpretive signage, maintained within the Roosevelt Natural Area.

The Town maintains a Parks and Recreation Committee which hosts a variety of events throughout the year. The majority of these are outlined in the Town's recreation plan. The group also surveys the Town residents every five years to determine future recreation needs.

The Town participates in county recreational programs as they are offered.

b. Private Recreation

There is a significant amount of private recreation in Pine Knoll Shores. The most common homeowners association amenity is beach access, available to approximately 93%* of housing units in Pine Knoll Shores; the second most common is sound access, available to approximately 74% of housing units in Pine Knoll Shores; marinas are available to 52% of housing units; homeowners association pools are available to 48% of housing units; and tennis courts are available to 27% of units.

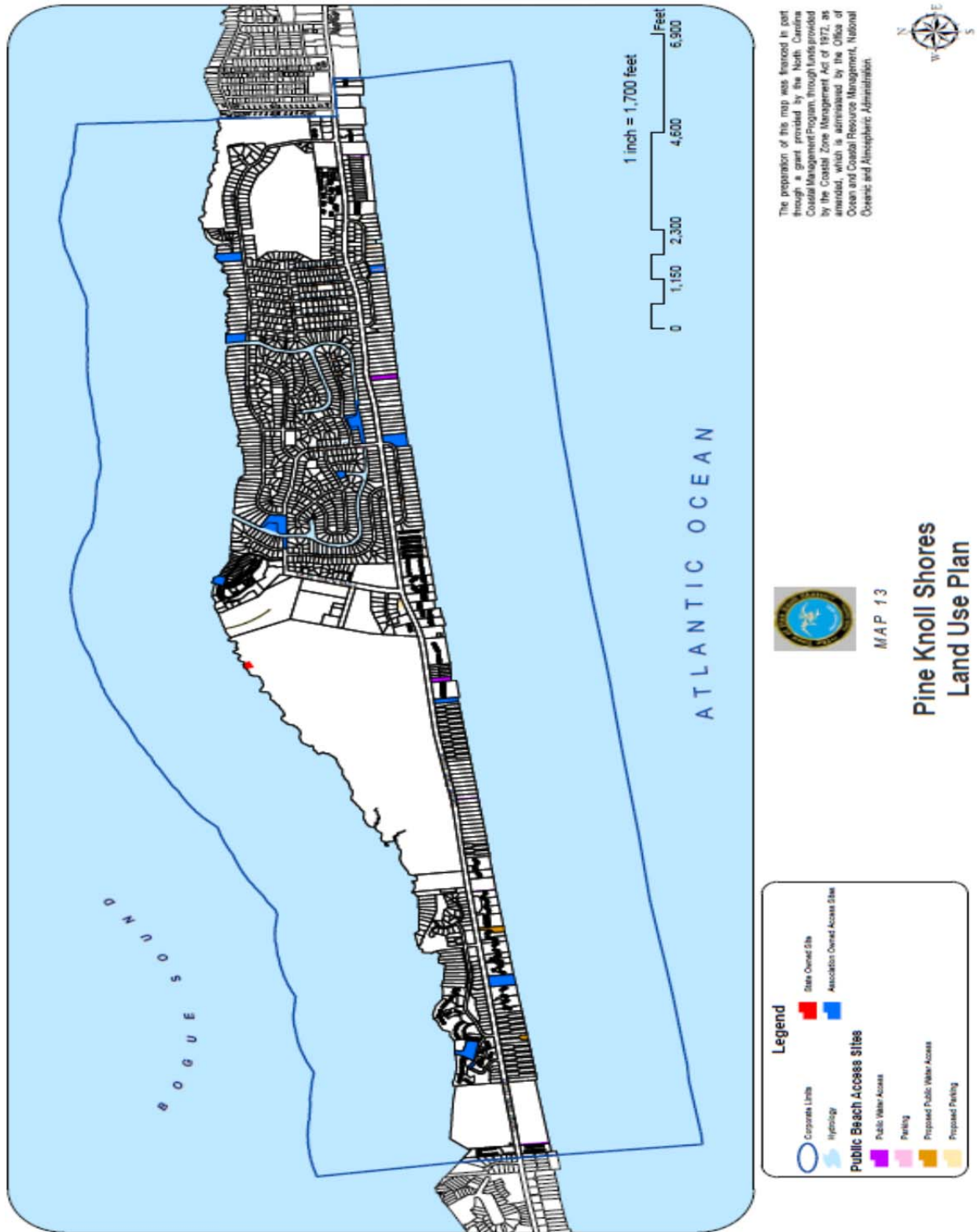
Golf, tennis, and a pool are also available through the Country Club of the Crystal Coast located on Oakleaf Drive. Golf and tennis are open to the public, but pool use and dining are for members and their guests.

*Figures based on 2,274 residential parcels

11. Other Services

Electric Service, Telephone/Cable Service, Wireless, and High Speed Internet are all available to Pine Knoll Shores residents from a variety of private providers.

Map 11 - Public and Private Recreational Accesses



*Source: Map prepared by Holland Consulting Planners in conjunction with the 2008 Land Use Plan.

12. 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's filtered through traps, usually located at the end of the pipe system, but it still flows directly from streets and gutters into the canal, Bogue Sound, and ocean. 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. According to the Carteret County Health Department, the most significant problem with respect to pollutants in stormwater runoff is pet and animal waste.

The Town of Pine Knoll Shores has undertaken several methods to control stormwater and related pollution. As part of Chapter 22 of the Code of Ordinances, the Town requires stormwater infiltration and control of the first two inches of runoff in a 24-hour period from all impervious surfaces on a site. It also sets impervious surface limits for all zoning districts.

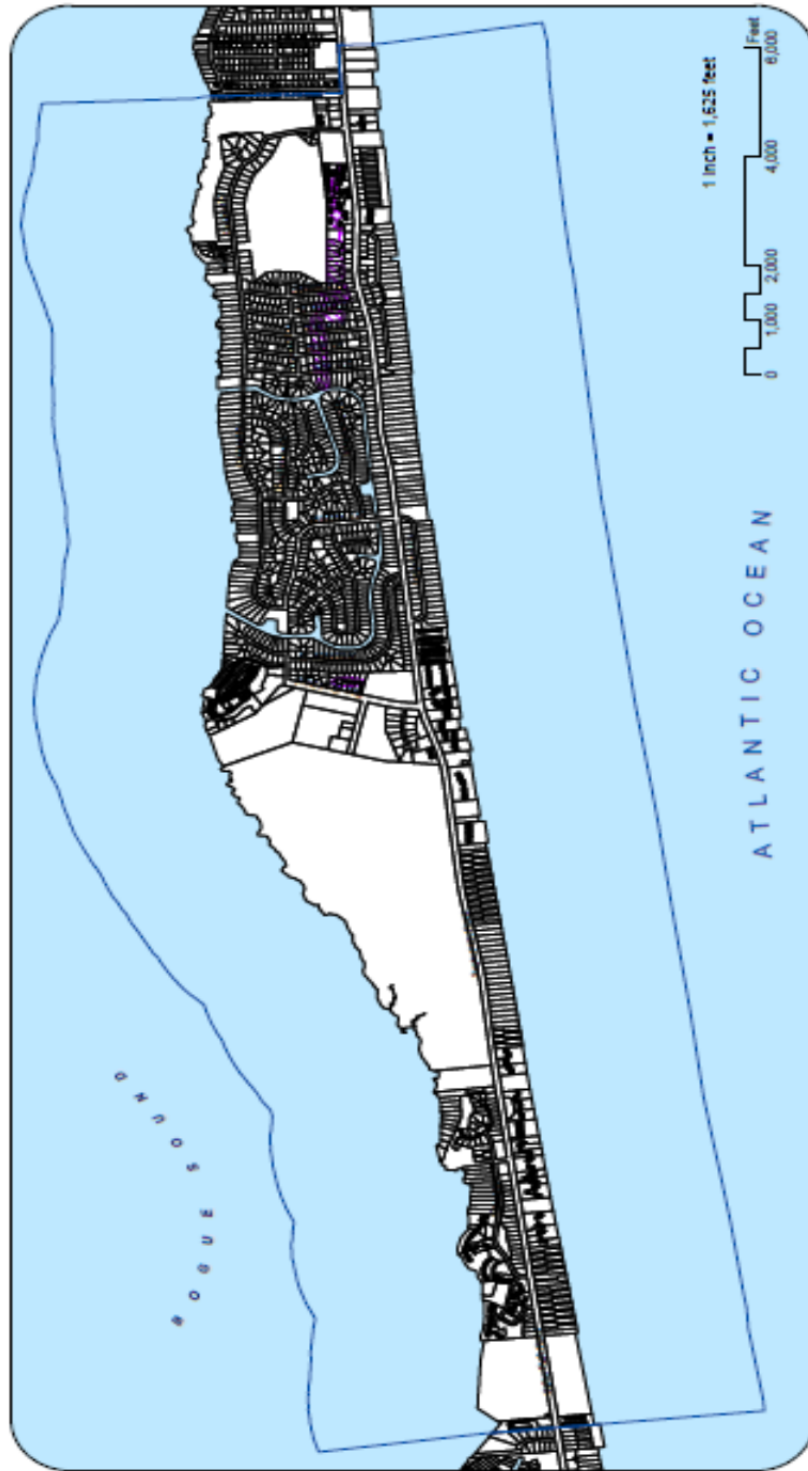
b. *Existing Drainage Problems*

Overall stormwater drainage is not a significant problem within Pine Knoll Shores. There is, however, a low-lying area situated between portions of Cedar Road and the eastern extent of the Town's corporate limits. This area is centrally located between Cypress Drive to the north and Salter Path Road to the south. This area experiences heavy ponding of water, and in some cases floods during heavy rain events. The boundaries of this stormwater drainage problem area are shown on Map 12. The Town has installed a stormwater infrastructure project on the east end of Town that is designed to control the stormwater from the majority of this area. The Town also refers to this area as the "flood-prone area" in its ordinances, and maintains tighter impervious surface limits and other requirements to reduce flooding and runoff volumes. The Town has also begun monitoring ground water levels to detect when flooding is more likely.

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 Pine Knoll Shores has been discussed in detail in the Natural Systems Analysis and Environmental Conditions sections of the plan.

Map 12 - Stormwater Concerns



The preparation of this map was financed in part through a grant awarded by the North Carolina Coastal Management Program through funds provided by the Coastal Zone Management Act of 1972, as amended, which is administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.



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**Pine Knoll Shores
Land Use Plan**

Areas of Stormwater Concern

Legend

-  Corporate Limits
-  Hydrology
-  Areas of Stormwater Concern



*Source: Map prepared by Holland Consulting Planners in conjunction with the 2008 Land Use Plan.

d. *Environmental Protection Agency (EPA) Regulations*

At this time, the Town of Pine Knoll Shores is not required to meet the new EPA Phase II Stormwater Management Program regulations, but has independently adopted and implemented some stormwater control mechanisms.

e. *Construction Activities*

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

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 Pine Knoll Shores, an overlay analysis was performed during the 2008 planning process. 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 13). This map can be used as a foundation for the discussion and formation of Town-wide land use policy and should be compared to the future land use map.

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

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

All of these steps have been completed, and as noted above, the end product is displayed on Map 13. There were no additions or adjustments to the default layer sets and weighting factors provided by the Division of Coastal Management to the Town for the existing land suitability analysis map. Prior to producing the map, data was compiled and each data layer in conjunction with criteria was assigned a weight. The Town was then divided into one-acre squares. Each of these one-acre squares of land was given a score based on how that respective piece of property related to each data layer. The score for each data layer was multiplied against that given layer's weight. The scores for each layer were added together to determine a suitability rating for that one-acre square of property. The suitability rating falls into four primary categories: least suitable, low suitability, medium suitability, and high suitability.

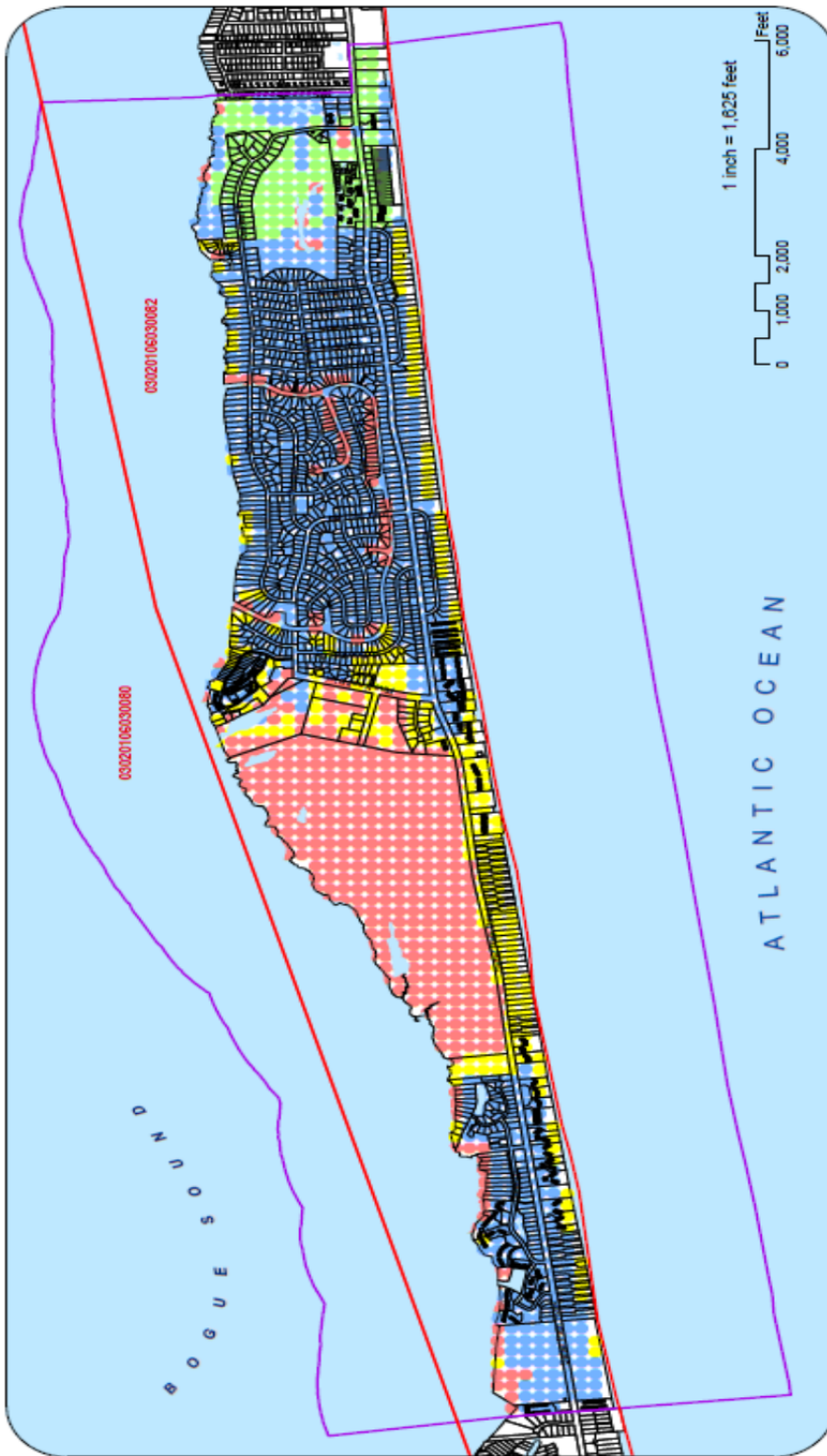
The following table summarizes all data layers used, including the criteria and weight assigned to each layer.

Table 39. Pine Knoll Shores Land Suitability Analysis Criteria Table

Layer Name		<u>Criteria and Rating</u>				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.

Map 13 - LSA



The preparation of this map was financed in part through a grant provided by the North Carolina Coastal Management Program, through funds provided by the Coastal Zone Management Act of 1972, as amended, which is administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.



MAP 15
**Pine Knoll Shores
 Land Use Plan**
Land Suitability Analysis

Legend

- Corporate Limits
- 14-Digit Hydrologic Code
- ~ Hydrology

Land Suitability

- Least Suitable
- Low Suitability
- Moderate Suitability
- High Suitability



*Source: Map prepared by Holland Consulting Planners in conjunction with the 2008 Land Use Plan.

Overall, land in Pine Knoll Shores is moderately suitable for development. Table 40 provides a summary of land suitability acreage based on the results of the overlay analysis.

Table 40. Pine Knoll Shores Acreage

Suitability	Acreage	% of Total
Least Suitable	413	28.1%
Low Suitability	215	14.6%
Medium Suitability	720	49.0%
High Suitability	120	8.2%
Total	1,468	100.0%

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

F. CURRENT PLANS, POLICIES, AND REGULATIONS

1. Town of Pine Knoll Shores Code of Ordinances

Land development within Pine Knoll Shores is regulated by a Code of Ordinances. The Code of Ordinances was recodified by the Board of Commissioners on May 13, 2008. The ordinance is a comprehensive approach to controlling land development within the corporate limits of Pine Knoll Shores. The following provides a summary of the Town's ordinances that pertain to development or environmentally sensitive areas.

a. Zoning

On the Town's official zoning map, 13 zoning districts are established for the corporate limits. Pine Knoll Shores does not have any extraterritorial jurisdiction. Specific requirements are set forth regarding permitted uses in each district as well as the minimum lot sizes, yard setbacks, and building heights. Map 14 and Table 41 provide the location and acreage figures of all zoning districts within Pine Knoll Shores' planning jurisdiction. The two largest zoning districts within the Town's planning jurisdiction are R-2 and REC3. These two districts account for 45% of Pine Knoll Shores' total jurisdiction. Fifty-eight percent (57.7%) of Pine Knoll Shores is zoned residential use, 8.8% is zoned for non-residential uses, and 33.5% is zoned for recreational uses. For a detailed description of each of the zoning districts provided in this table, refer to the Town's current Code of Ordinances.

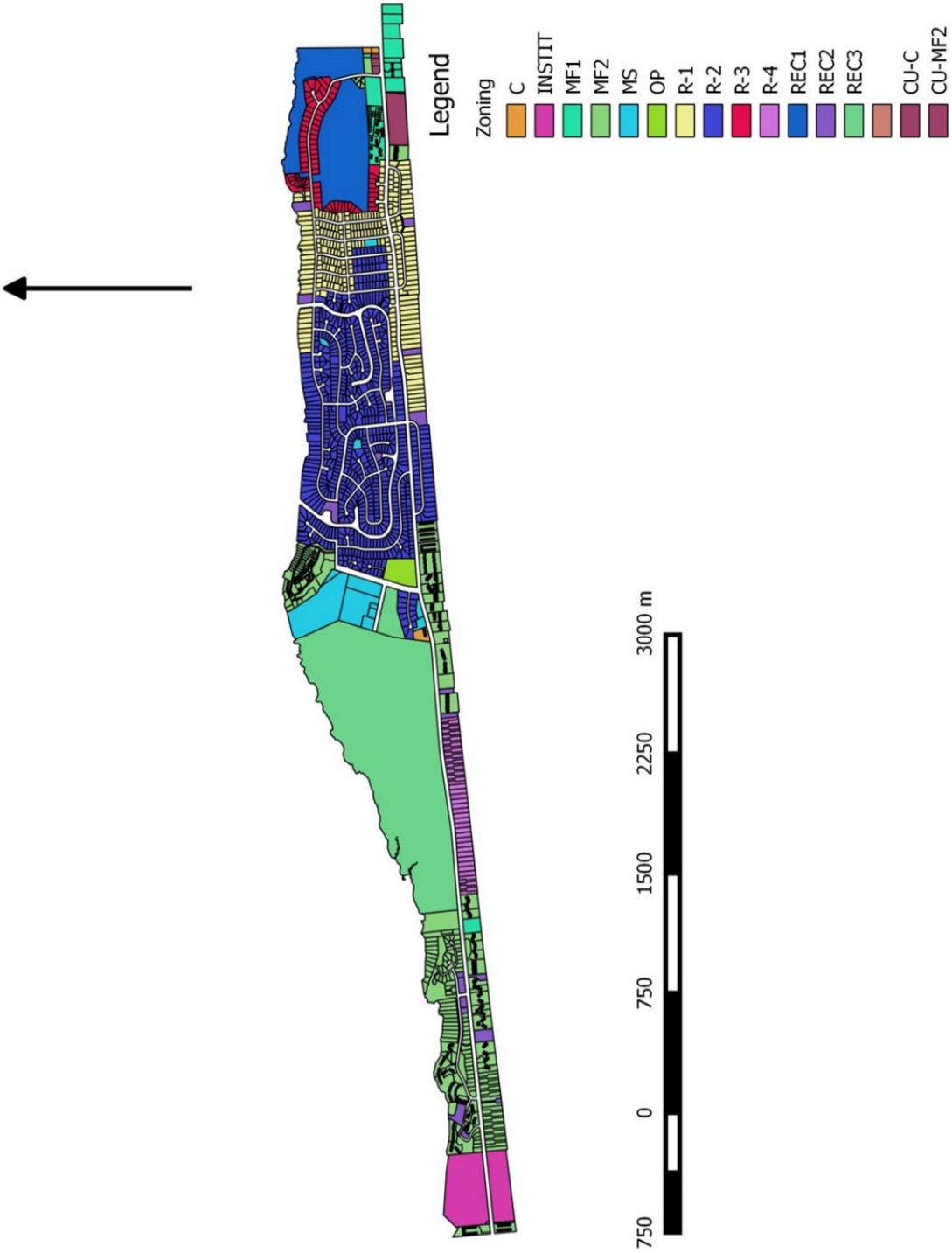
Table 41. Pine Knoll Shores - Zoning

Districts	Acres	% of Total
Residential	742.9	57.7%
R-1	126.1	9.8%
R-2	280.8	21.8%
R-3	38.1	3.0%
R-4	35.7	2.8%
MF1	53.6	4.2%
MF2	208.6	16.2%
Conditional	13.85	
Non-Residential	113.6	8.8%
C	7.8	0.6%
Conditional	.466	
INSTIT	51.3	4.0%
MS	45.2	3.5%
OP	9.3	0.7%
Recreation	431.5	33.5%
REC1	24.9	8.0%
REC2	103.2	1.9%
REC3	303.4	23.6%
TOTAL	1,288.0*	100.0%

*This figure does not include water or right-of-ways.

Source: Holland Consulting Planners, Inc., and Town of Pine Knoll Shores.

Map 14 - Zoning



*Source: Town of Pine Knoll Shores

b. Subdivision Regulations

The subdivision regulations for the Town of Pine Knoll Shores are intended to contain all criteria pertaining to the subdivision of individual tracts of land into smaller lots. This ordinance is intended to establish sound and orderly development principles in an effort to prevent overcrowding and integrate future developments into the Town's existing road and utility infrastructure network. The subdivision regulations also contain provisions requiring the establishment of right-of-way easements required for public utilities installation.

c. Stormwater Management Ordinance

The Town currently has a stormwater management ordinance in place that requires a stormwater management plan to be submitted with new development or redevelopment that demonstrates that the first two inches of rain fall in a 24-hour period will be infiltrated on the owner's property, ensures that natural water flow patterns are maintained, protects surface waters, minimizes erosion, protects groundwater levels, protects wetlands, prevents increased flooding, prevents saltwater intrusion, protects natural salinity fluctuation, protects interdunal troughs, minimizes injury to flora, fauna, and habitat, and maintains the integrity of rights of way. The Stormwater Management Ordinance was comprehensively rewritten in 2009: administration of the ordinance since that time has revealed some potential revisions that may be necessary.

d. Flood Damage Prevention Ordinance

The Town of Pine Knoll Shores is a standard member of the National Flood Insurance Program (NFIP). Revised floodplain maps are anticipated shortly after the development of this plan: the most recent maps were put in place in 2003. The floodplain maps have been discussed in the Natural Systems Analysis section of the plan.

In accordance with regulations under the NFIP, Pine Knoll Shores adopted a Flood Damage Prevention Ordinance. The purpose of this 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 increase 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.

e. Public Waters and Boats Ordinance

This Town ordinance governs the construction of piers and docking facilities within the Town's planning jurisdiction. The ordinance specifies the allowable location and volume of private docking facilities for both single-family developments, as well as multi-family developments. This ordinance also sets forth rules and regulations pertaining to use of the Town's canal network. This portion of the ordinance addresses issues such as anchoring, speed, discharging and dumping, etc.

f. Beaches and Dunes Ordinance

This Town ordinance addresses the issue of vehicular access to the ocean beach running along Pine Knoll Shores. The ordinance specifies who is eligible for these permits, and outlines the process required to obtain a permit. This ordinance also provides provisions relating to general beach use regulations, parking restrictions, and restrictions against bulldozing on the beach. The Town enacted a dune preservation ordinance in 2011 that limits activity on the frontal dune system.

g. Tree Preservation Ordinances and Heritage Tree Program

Revised in 2010, the Town's tree preservation ordinance establishes a permit program for tree removal. It requires Community Appearance Commission inspection and approval of trees prior to their removal and imposes a per tree penalty for violations dependent on the diameter of the tree. The ordinance specifies 36 species of vegetation subject to regulation. The Town also requires an inventory of existing trees and trees to be removed on applications for landscape permits.

The Town also established a Heritage Tree Program in 2014 to identify trees of particular importance to the community.

h. Buffer and Setback Requirements

The Town has a number of different buffer and setback requirements for environmental and use separation purposes. The Town generally requires a 30' setback from a public street line, with an exception for Fairways Court, ten feet from lot lines, 100' setback from the mean high water mark of Bogue Sound, and 30' from the high water mark of any other interior waterway or canal. The Town's oceanfront setback is established by drawing a line

between adjacent or similarly situated, in the case of keyed lots, structures, unless the CAMA setback is more restrictive. For multi-family one and two structures, like hotels and condominiums, the setback is 50' from Salter Path Rd. and 30' from any other street line, and 10' from adjacent property lines. For commercial, office/professional, and municipal services zoning districts, the setback is 50' from the right of way, and 20' from the property line. The institutional zoning district has a setback requirement of 50' from Salter Path Rd., 10' from the lot line, and 30' from adjoining commercial or residential property.

2. NC State Building Code

The Town of Pine Knoll Shores utilizes the North Carolina State Building Code to oversee the erection of all structures within its planning jurisdiction. The Town employs a full-time building inspector and an administrative assistant to oversee the inspections process.

The minimum use standards, provisions, and requirements for safe and stable design, methods of construction, and usage of materials in buildings and structures erected, enlarged, altered, repaired, moved, converted to other uses, or demolished, and the equipment, maintenance, use, and occupancy of all buildings and structures in the Town, are regulated in accordance with the terms of the North Carolina State Building Code.

3. Hazard Mitigation Plan

In 2010, the Town of Pine Knoll Shores voted to be included as part of the Carteret County multi-jurisdictional Hazard Mitigation Plan.

4. Beach Renourishment

The Town has participated through the Carteret County Shore Protection Office in the creation of a Bogue Banks Master Plan. The Plan sets forth targets for renourishment and maintains the Town's eligibility for federal funding for future renourishment when funds are available. The Town created special tax districts for beach nourishment in the year 2000 in conjunction with a bond issuance for that purpose; these tax districts were modified and became municipal service districts effective in 2008 as a long-term funding mechanism for beach renourishment.

5. Recreation Plan

In accordance with the 2008 Pine Knoll Shores CAMA Land Use Plan, the Town developed and approved its recreation plan in 2010-2011. The plan outlines existing recreational facilities in the town and county and its recommendations were based on a 2008-2009 recreation survey. The Parks and Recreation Committee will conduct a survey every five years, with its most recent survey in 2011-2012. The primary recreational interest of citizens

coming out of both the recreational surveys was pedestrian infrastructure along NC 58. The other priorities in the Recreation Plan stemmed directly from the 2008 CAMA Land Use Plan.

6. Pedestrian Master Plan

The Pedestrian Master Plan was approved in 2010 and set out priorities for sidewalks in Pine Knoll Shores. To date, four sidewalk segments have been constructed within the town using NCDOT discretionary funds. With the Strategic Transportation Investment bill in 2013, the State of North Carolina did away with the NCDOT discretionary funding the Town had relied upon for its first segments. Over the planning period, the Town will need to adapt its plan to the new reality if it wishes to continue to apply for NCDOT funding for sidewalks.

7. Emergency Operations Plan

The Town maintains an Emergency Operations Plan to respond to emergencies of all types. The plan was last updated in 2013. The Town also has a Emergency Management Ordinance that enables it to restrict movement throughout the town to best protect its residents and property.

8. Strategic Plan

The Town adopted a strategic plan in 2014. The plan outlines goals, objectives, and action items for the Town with a five-year view. There is some subject matter overlap between this plan and the Town's strategic plan.

9. Road Maintenance Plan

The Town maintains a road maintenance plan, which guides the expenditure of Powell Bill and local funds for street maintenance. The road maintenance plan was developed in 2008, and is subject to annual review.

10. Review of the Pine Knoll Shores 2008 CAMA Land Use Plan

The review of the Pine Knoll Shores 2008 CAMA Land Use Plan can be found in Appendices VII. and VIII. .

SECTION VI: PLAN FOR THE FUTURE

A. FUTURE DEMANDS

1. Introduction

This portion of the plan will focus on the future needs and demands facing the Town of Pine Knoll Shores over the course of the planning period. Pine Knoll Shores faces a unique set of challenges to balance development with the protection of the Town's fragile natural environment. The Town has been established and maintained over time with this problem at the forefront of discussions regarding future growth. Through the development of goals, policies, and implementing actions, the Town will establish a specific course of action that will assist the citizens and administration to overcome these challenges.

In addition to environmental protection, the Town must address the provision of public services to a permanent and growing seasonal population base. Every year the number of housing units in the Town increases, which has a long-term effect on the number of individuals that will visit Pine Knoll Shores during peak summer months. Although the permanent population has decreased over the time period between 2000 and 2010, the popularity of the Town as a seasonal and vacation destination has increased. This presents the Pine Knoll Shores' administration with the issue of addressing this growth with adequate police protection, infrastructure carrying capacity, fire/EMS protection, recreational opportunities, beach nourishment, and transportation options.

The goals, policies, and implementing actions section of this plan will balance these demands with the protection of sensitive areas of environmental concern.

2. Housing Trends

As evidenced by the existing land use survey much of the land (47.9%) within the corporate limits of Pine Knoll Shores is comprised of either single-family residential (34.7%) or multi-family housing (2%) and common area (11.3%). Residential development far exceeds any other use in terms of percentage of total land use. This trend is expected to continue into the future.

There is still a great deal of vacant land throughout Pine Knoll Shores; however, a majority of this land has already been subdivided for residential development. Of the remaining 123 acres of developable vacant land, approximately 92.4% is currently zoned for single-family and multi-family residential development. It is difficult to predict how rapidly this land will be developed, although, in recent years residential construction has been steady at a rate of 1-3 acres of new single family development per year. Multi-family development is

significantly more sporadic and largely dampened by the economic recession of 2008 and following. It is expected that residential growth and redevelopment will remain consistent throughout the planning period, and that seasonal population will continue to grow, but build out of vacant properties is not expected over the planning period.

Some of the Town's housing stock is beginning to age, and it is possible that redevelopment within the Town will accelerate over the planning period. Given the Town's movement towards a more seasonal population, it is possible that this new development will increase home size and impervious area, which the Town will need to monitor in conjunction with stormwater and other local concerns. At the same time, redevelopment represents the opportunity to convert structures from non-conforming to conforming, both to the most recent building codes and setback requirements. These types of updates ultimately help to keep community-wide insurance rates lower than they would be if the non-conforming structures continued to exist and make for safer housing stock.

Simultaneously, the Town has interest in maintaining oceanfront lots as developable to protect its tax base and home values, and should be mindful of regulations that would impact this interest.

3. Commercial Land Use

The Town of Pine Knoll Shores has tried over the years to minimize the development of retail commercial establishment within its corporate limits, and succeeded. There are currently no retail commercial establishments within the Town limits. Such uses would be permissible on 3.725 acres within the town: 1.674 acres on three parcels at the eastern border of the Town and 2.051 acres adjacent to the Town's public safety building. Although the zoning would permit Commercial uses, the 2.051 acre parcel is currently used for Office/Professional activity, 1.203 acres are currently vacant, and .471 acres are used for commercial activity.

4. Transportation

There are several transportation related improvements that Pine Knoll Shores will face during the planning period. The Carteret County Transportation Committee via the Down East Rural Planning Organization (DERPO) is currently conducting a corridor study of the Towns on and around Bogue Banks to develop some mutually agreeable transportation solutions to peak traffic volumes that take into account that those peak volumes are seasonal in nature. Generally, the Town opposes the widening of Hwy 58 and the installation of a median until traffic counts are closer to a Level of Service D (LOS D). NCDOT does not project that traffic will reach this level in their 30 year planning period through 2040. The Town also opposes the construction of a third bridge to the island.

Between 2005 and 2012, the Town experienced 321 accidents (average 40.125 per year), and an annual average daily traffic (AADT) of 9062.5, which peaked in 2006 at 12,000. Of the

321 accidents, 45 involved injuries, and none were fatal. The annual average for injury accidents in Pine Knoll Shores for the same period was 15.5% per year. There are no clear trends in the data, except for a general decline in the AADT.

Given that the majority of the interior of the eastern end of Town is developed, significant new transportation infrastructure is unlikely. There is the possibility that private streets may be granted to the Town, but the primary transportation investments on Town streets will be routine maintenance.

The Town is considering sidewalk infrastructure, but the issue is highly divisive within the Town. Any sidewalk infrastructure should minimize vegetative clearing and significant topographic impacts. The Town's top priorities with regard to sidewalk infrastructure are clear: pedestrian safety and connectivity within the Town. The Town conducted a survey in 2014 to determine citizen interest and willingness to fund sidewalks.

5. Public Land Use

Public land use within the Town currently has three primary manifestations: municipal buildings, public utilities, and public recreation. Over the planning period, the Town does not anticipate additional municipal buildings, but does anticipate maintenance on the existing public buildings in accordance with the Town's five-year Capital Improvement Plan. Regarding public utilities, the Town may consider identifying new well locations that are compliant with the Town's Wellhead Protection Plan during the planning period. Regarding public recreation, the Town has constructed all public beach accesses as required by the US Army Corps of Engineers Section 933 beach renourishment program. The Town has also developed a scenic walking trail on its Town Hall property and its five acre parcel along Pine Knoll Boulevard. The Town may consider future uses for its 10-acre parcel at the corner of Roosevelt Boulevard and Pine Knoll Boulevard and the parcel Beacon's Reach owns adjacent to the Aquarium. Both of these parcels are environmentally challenging, as evidenced by the presence of wetlands and their general topography, and may best be served by a zoning designation that preserves their natural condition or an extension of the walking trail system and pedestrian infrastructure.

a. Recreation

As indicated in the Existing Land Use Analysis, the majority of recreation in Town is provided by homeowners associations. The needs of infill subdivisions should be considered as they will not by default have some of the access enjoyed by existing development particularly with regards to the sound and ocean. The Town may consider these needs in future recreational infrastructure development.

The Town's primary contributions to public recreation are the hosting and facilitation of events by the Town's Parks and Recreation Committee and the provision of public beach

access parking. The Town has made improvements to the Town Hall Property and an adjacent 5-acre parcel as described under “Public Land Use.” Walking trails are the next most likely expansion of recreational infrastructure within the Town limits.

The Town also has a members-only dog park on its Town Hall property.

b. Water System

The Town is currently operating under its maximum permitted water system capacity of 1.2 million gallons per day. The local water supply plan, last adopted in 2013, calls for two new wells to come online by 2020. Although the dates for these new wells continue to get pushed further out into the future, the Town may begin identifying potential well-site locations and acquiring easements or land for the purpose over the planning period. The Town is also implementing an intelligent water metering system to better identify leaks and pressure issues.

c. Sewer System

The Town is not considering a sewer system at this time. Any such effort would require significant coordination with neighboring towns in order to be financially viable. The Town will continue to rely on septic systems for single family residential structures and individual package plants for multi-family developments.

d. Municipal Building and Land

The Town maintains two primary buildings: its Town Hall and Public Safety Building, in addition to eleven public beach accesses and associated parking and the water system infrastructure. In 2014, as an outcome of the Town’s Strategic Plan, the Town developed a plan to update Town facilities through the 5-year Capital Improvement Plan.

6. Administration

The Town does not anticipate any substantial changes to its current administrative structure, the Council-Manager system of government.

7. Police Department and Fire/EMS

The Town has found it necessary to expand its fire department to four firemen per shift in order to maintain its ISO rating of 6.

8. Stormwater Management

The Town has implemented a significant stormwater infrastructure project on the eastern end of town that utilizes the Country Club of the Crystal Coast’s pond system to move

stormwater to the Sound. The Town's ordinances require new construction to infiltrate the first two inches of rainfall in a 24-hour period. Additional study on localized flooding throughout the Town to determine future management needs is underway. The Town has also received a grant to map its existing stormwater infrastructure. This is a continuing issue for the Town.

9. Sea Level Rise

The Town does not expect that sea level rise will be a significant issue over the near-term planning horizon, but understands that over the long term it could be. The Town does require freeboard above the base flood elevation requirements, which should help the Town prepare for sea level rise in the short term. Data are available from NOAA that shows what inundation could be like with one foot of sea level rise. These data are reflected in Appendix X. The Coastal Resources Commission currently has a committee estimating sea level rise over a thirty year time span, and the topic is of significant interest to the Town's Strategic Planning Committee. The concerns around sea level rise are two-fold: long-term inundation of land and short-term flooding and storm surge associated with significant storm events. The Town should examine both of these factors as it plans for future development. Maps reflecting one foot and two feet of sea level rise are reflected in Appendix X. of this plan.

B. LAND USE/DEVELOPMENT POLICIES AND IMPLEMENTING ACTIONS

The following policies and implementing actions section is a tool to guide the development and use of land in Pine Knoll Shores. The policies are meant to support the goals of the Town. It is also intended that they are consistent with the goals of CAMA, address the CRC management topics for land use plans, and comply with all state and federal rules and regulations. These policies and implementing actions will apply to the Town's entire planning jurisdiction. All policies and implementing actions shall be used for consistency review by appropriate state and federal agencies.

The Pine Knoll Shores Planning Board and Board of Commissioners shall consult this plan during the deliberation of all rezoning requests, and should consult the plan when considering ordinance development, property acquisition, transportation infrastructure development, and capital improvement. The policies and implementing actions of this plan and all applicable CAMA regulations regarding land use and development will be taken into consideration during all zoning petitions. Zoning decisions will reflect the policies outlined in this plan. The following will also be considered during zoning petition deliberations:

- All permissible uses within a zoning district. Rezoning cannot be based on consideration of only one permissible use or a partial list of the uses allowed within a zoning district.
- The potential for spot zoning. Rezoning requests will not be approved if the requested change will result in spot zoning. Spot zoning is a form of discriminatory zoning whose sole purpose is to serve the private interests of one or more landowners instead of furthering the welfare of the entire community as part of an overall zoning plan.
- The likelihood of a zoning decision resulting in a strip development. Strip developments should be discouraged. These types of developments are typically commercial, extending along both sides of a major street. Strip development may severely reduce traffic-carrying capacity of abutting streets by allowing for excessive and conflicting curb cuts.
- The concept of uniformity. Uniformity should be supported in all zoning deliberations. Uniformity is a basic premise of zoning, which holds that all land in similar circumstances should be zoned alike. Any different circumstances should be carefully balanced with a demonstrated need for such different treatment.
- Zoning regulations should be made in accordance with the Pine Knoll Shores Land Use Plan and designed:
 - to lessen congestion in the streets;
 - to secure safety from fire, panic, and other dangers;
 - to promote health and the general welfare;
 - to provide adequate light and air;
 - to prevent the overcrowding of land;
 - to avoid undue concentration of population;– to facilitate the adequate provision of transportation, water, sewerage, schools, parks, and other public requirements; and
 - to reduce stormwater runoff

The regulations shall be made with reasonable consideration, among other things, as to the character of the district and its peculiar suitability for particular uses, and with a view to conserving the value of buildings and encouraging the most appropriate use of land throughout Pine Knoll Shores' planning jurisdiction.

- The Planning Board and Board of Commissioners should ask the following questions:

- Does Pine Knoll Shores need more land in the zone class requested?
- Is there other property in the Town that might be more appropriate for this use?
- Is the request in accordance with the Pine Knoll Shores Land Use Plan?
- Will the request have a serious impact on traffic circulation, parking space, sewer and water services, stormwater, and/or other utilities?
- Will the request have an impact on other Town services such as police or fire and EMS protection?
- Is there a good possibility that the request, as proposed, will result in lessening the enjoyment or use of adjacent properties?
- Will the request, as proposed, cause serious noise, odors, light, activity, or unusual disturbances?
- Does the request raise serious legal questions such as spot zoning, hardship, violation of precedents, or need for this type of use?
- Does the request adversely impact any CAMA AEC's or other environmentally sensitive areas including water quality?

The Pine Knoll Shores Land Development Ordinances should be revised from time to time to be consistent, as reasonably possible, with the recommendations of this plan and the evolving nature of the Town's growth and development policy. Pine Knoll Shores will coordinate all development proposals with appropriate State and/or Federal agencies.

C. POLICIES REGARDING LAND USE AND DEVELOPMENT IN AEC'S

Pine Knoll Shores accepts state and federal law regarding land uses and development in AEC's. By reference, all applicable state and federal regulations are incorporated into this document. All policies and implementing actions are to be utilized by the State of North Carolina for consistency review. Note the following:

- No policy is subordinate to another.
- All management topics have equal status.
- The future land use map may show some areas in a developed category which may also include sensitive habitats or natural areas. The intent is that development should be designed/permitted to protect these areas through utilization of concepts such as cluster development. Development/project

approval will be based on project design which avoids substantial loss of important habitat areas and dunes.

D. LAND USE PLAN MANAGEMENT TOPICS

1. Introduction

The Coastal Resource Commission (CRC) developed six management topics to be addressed in CAMA Land Use Plans: Public Access, Land Use Compatibility, Infrastructure Carrying Capacity (including transportation), Natural Hazard Areas, Water Quality, and Local Areas of Concern. These six management topics were created to ensure that CAMA Land Use Plans support the goals of CAMA, define the CRC's expectations for the land use planning process, and give the CRC a substantive basis for review and certification of CAMA Land Use Plans. Each management topic includes three components: a management goal, a statement of the CRC's planning objective, and requirements for the CAMA Land Use Plan. These policies apply to the entire planning jurisdiction. The Town recognizes that policies generally fit into a few categories: *passive policies*, which indicate the Town's position on a particular issue, but do not dictate a particular course of action; *advocacy policies*, which indicate a course of action external to the Town, but which recommend that the Town actively engage with the relevant external entities; *actionable policies*, which generally suggest either investment or ordinance development by the Town. Estimated time frames will be supplied for actionable policies; it should be recognized that while this Land Use Plan suggests a course of action, the actual implementation will be driven by decisions of the Town's Board of Commissioners. The policies and implementing actions frequently utilize the following words: should, continue, encourage, enhance, identify, implement, maintain, prevent, promote, protect, provide, strengthen, support, and/or work. The intent of these words is defined in Appendix XII.

2. Impact of CAMA Land Use Plan Policies on Management Topics

This document is intended to be supportive of the CAMA regulations for protection of AEC's (15A NCAC 7H) and of the Town of Pine Knoll Shores Vision Statement on page 10. The Vision Statement was developed based on the key issues identified on page 9. No negative impacts are anticipated by the implementation of the goals, objectives, and policies that are included in this plan. All policies are consistent with applicable State and Federal requirements when State and Federal requirements apply. Where policies exceed state and federal requirements it will be noted in the policy.

E. POLICIES AND IMPLEMENTING ACTIONS

Management Goal: Public Access

Pine Knoll Shores will provide, as required, public access to town beaches.

PA. 1. The Town supports public and private shoreline accesses that protect and preserve the natural environment while promoting the Town as a vacation destination, consistent with the residential nature of the Town. (Passive)

PA. 1.1 If required, the Town will create new public accesses and associated parking to maintain eligibility for state and federal funding.

PA. 1.2 In designing any new accesses, the Town will ensure that they are compatible with any adjacent development and minimally obtrusive.

PA. 1.3 The Town will encourage developers of new subdivisions to secure shoreline access for their homeowners.

PA. 2. The Town supports the private and public development of waterfront access through private funds, federal and state grant money, and local taxes. (Passive/Advocacy)

PA. 2.1 The Town will seek grant money or private donations for any required new accesses, and will supplement with local tax dollars.

PA. 2.2. The Town will advocate for continued funding of public access development grants.

PA. 3. The Town supports providing shoreline access for persons with disabilities where reasonably possible. (Maintaining)

PA. 3.1 The Town maintains at least two public accesses accessible to persons with disabilities.

PA. 3.2 The Town will maintain adequate parking facilities for persons with disabilities.

PA. 4. The Town supports the development of estuarine access areas which comply to the maximum extent possible with all state and federal regulatory requirements to ensure adequate shoreline access. Areas that have traditionally been used by the public should be given special attention. (Maintain)

PA. 4.1. The Town will ensure that its accesses comply with state and federal regulatory requirements.

Management Goal: Land Use Compatibility

Pine Knoll Shores will ensure that development and use of resources or preservation of land will minimize direct and secondary environmental impacts and avoid risks to public health, safety, and welfare.

LUC. 1. The Town supports re-zoning and amendments in classifications to the future land use map that are carefully balanced with a demonstrated need for such proposed development that will be in the best interest of the Town. This policy should be focused on carrying out the policies established in this plan, as well as the Town's Vision statement outlined on page 10. (Advocacy)

LUC. 1.1. The Town will consider the Town's vision and mission statement, community needs, vision, and compatibility prior to rezoning property.

LUC. 1.2. All re-zoning and subdivision approvals will consider the future land use and land suitability maps and analyses which are included in this plan.

LUC. 1.3. The Town may conduct studies on the areas designated as "Study Areas" on the Future Land Use Map.

LUC. 2. The Town supports quality development reflecting the spectrum of housing needs ranging from single-family homes to multi-family (where indicated on the future land use map) and planned unit developments. (Passive/Actionable)

LUC. 2.1. The Town will consider housing compatibility as a component of the permit and subdivision review processes.

LUC. 3. The Town supports regulating growth to coincide with the provision of public facilities and services. (Actionable)

LUC. 4. The Town supports the continued establishment and maintenance of buffers along major thoroughfares, especially Hwy 58, when and where possible. (Maintaining).

LUC. 4.1. The Town will maintain its current buffer requirements along major thoroughfares. These buffer requirements are described in the Current Plans, Policies, and Regulations section of this plan.

LUC. 4.2. The Town will maintain safe visibility at intersections and along major thoroughfares.

LUC. 5. The Town supports providing adequate conservation/open space buffers between areas designated for residential development as indicated on the future land use map and any adjacent non-residential land use, including commercial, office and/or institutional, and utility areas. (Maintaining)

LUC. 5.1. The Town will maintain its existing buffer requirements between residential development and other land uses. These buffer requirements are described in the Current Plans, Policies, and Regulations section of this plan.

LUC. 6. The Town supports allowing home occupations in residential districts. (Maintaining)

LUC. 6.1. The Town will maintain its ordinance allowing for home occupations in residential districts.

LUC. 7. The Town will rely on its existing land use and development ordinances to regulate development. (Maintaining)

LUC. 7.1. The Town will review its existing ordinances periodically to ensure consistency with this and other adopted plans.

LUC. 8. The Town will preserve and protect its valuable natural resources. Special attention will be given to the Roosevelt Natural Area and adjacent Outstanding Resource Waters. (Actionable/Maintaining)

LUC. 8.1. The Town will maintain its existing zoning district requirements for the Roosevelt Natural Area.

LUC. 8.2. The Town will study environmentally low-impact uses for parcels along Pine Knoll Boulevard and the gateway to the Roosevelt Natural Area.

LUC. 8.3. The Town will maintain its existing tree preservation ordinance. This ordinance is described in the Current Plans, Policies, and Regulations section of this plan.

LUC. 8.4. The Town will consider the donation/acquisition of land to serve as public green space within the community.

LUC. 9. The Town of Pine Knoll Shores will maintain medium density residential development (4 dwelling units/acre in single family residential areas, and 8 dwelling units or less per acre in multi-family residential areas) in order to maintain the character of the Town. (Maintaining)

LUC. 9.1. The Town will maintain its ordinances that permit for higher densities as part of a development plan that includes preservation areas resulting in an overall project density that does not exceed the maximum density outlined in LUC. 9.

LUC. 10. The Town does not oppose non-residential development, which is consistent with Town policies and ordinances. The Town does, however, want to focus this development in

areas designated for commercial/office space development on the Town's future land use map. (Actionable/Passive)

LUC. 10.1. The Town will study its non-residential development needs and aspirations prior to rezoning designated parcels to a purely residential usage.

LUC. 10.2. The Town will consider incorporating mixed-use development into its Zoning Ordinance.

LUC. 10.3. Generally, the Town will continue to review rezoning requests on a case by case basis.

LUC. 10.4. The Town will consider the Future Land Use Map contained in this plan prior to any decisions on non-residential development requests.

LUC. 11. The Town will support larger lots in conservation classified areas as designated on the future land use map through enforcement of the Town of Pine Knoll Shores subdivision and zoning ordinances in zoned areas. (Maintaining)

LUC. 11.1. The Town will maintain its Recreational District 3 zoning requirements and district boundaries.

LUC. 12. The Town supports the enforcement of controls and regulations, i.e. design standards, flood-proofing, CAMA regulations, and FEMA regulations, deemed necessary by the Town Board of Commissioners to mitigate the risks to lives and property caused by severe storms and hurricanes. (Maintaining).

LUC. 12.1. The Town will maintain its existing buffer requirements and flood ordinance.

LUC. 12.2. The Town will review and study risk levels for oceanfront structures as it considers setback requirements, if flexibility is allowed by the Coastal Resources Commission. The Town supports redevelopment of previously developed areas, provided that it is compliant with all applicable policies, regulations, and ordinances.

LUC. 12.3. The Town supports, but does not fund, relocation of structures endangered by erosion if the relocated structure will be in compliance with all applicable policies and regulations.

LUC. 12.4. The Town will continue to enforce its Floodplain Ordinance and participate in the National Flood Insurance Program. It will rely on the Division of Coastal Management to monitor and regulate development in areas of environmental concern. The

intent of the Town's floodplain ordinance is described in the Current Plans, Policies, and Regulations section of this plan.

LUC. 13. The Town, in conjunction with the Carteret County Health Department and NCDENR, requires the use of package treatment wastewater systems for effective development of multi-family units, condotels, and motel/hotels. (Maintaining).

LUC. 14. The Town supports hazard mitigation and emergency operations planning. (Actionable)

LUC. 14.1. The Town supports and relies on the Town's Emergency Operations Plan and the Carteret County Emergency Operations Plan for evacuation procedures and policies necessary as a result of natural disasters.

LUC. 14.2. The Town will participate in updates to the Carteret County Multi-Jurisdictional Hazard Mitigation Plan and any other regional Hazard Mitigation Plans.

LUC. 14.3. The Town will maintain an up-to-date Emergency Operations Plan, and review it on an annual basis.

LUC. 14.4. The Town will maintain mutual aid agreements with neighboring communities, the county, and the state.

LUC. 14.5. The Town will rely on the Carteret County Hazard Mitigation Plan to prepare for a variety of natural disasters.

LUC. 15. The Town supports the preservation of its maritime forest and tree canopy. (Actionable/Maintaining)

LUC. 15.1. The Town will maintain a permit review process for tree removal and oceanfront pruning. The Town will also monitor tree removal through its landscape permit processes.

LUC. 15.2. The Town will investigate and implement programs, such as its Heritage Tree Program and Tree City USA, which encourage awareness about and conservation of the maritime forest and tree canopy.

LUC. 15.3. The Town will maintain and enforce its regulations regarding tree removal.

LUC. 15.4. The Town will engage with local utility trimmers, including Carteret Craven Electric Co-Op and NCDOT, to support this policy.

LUC. 16. The Town supports policies, ordinances, infrastructure, and practices that are designed to protect structures and structure values from the impacts of sea level rise.

LUC. 16.1. The Town will establish a working group to consider impacts from varying amounts of sea level rise to determine the thresholds that the Town's current development can withstand, to identify adaptation/remediation strategies for when sea level rise exceeds those thresholds, and to develop strategies to protect future development from the impacts of sea level rise.

Management Goal: Infrastructure Carrying Capacity

Pine Knoll Shores will ensure that infrastructure systems are appropriately sized, located and managed so the quality and productivity of areas of environmental concern are protected.

ICC. 1. The Town of Pine Knoll Shores supports providing adequate infrastructure, community services, and facilities which meet the needs of the Town's citizens and businesses to include, but not limited to, water service, stormwater management, emergency response, administration, and solid waste collection. (Actionable).

ICC.1.1. The Town will continue to annually prioritize and allocate funding for infrastructure and service improvements to meet the needs of the Town.

ICC. 2. The Town will ensure that water service supports growth, alleviates public health problems, provides effective service, and supplies fire protection for the town. (Actionable/Maintain)

ICC. 2.1. The Town will maintain its water system in such a fashion that the water is potable, free of harmful bacteria, chemicals, pollutants, and other contaminants. It will regularly monitor its water supply in accordance with state regulations.

ICC. 2.2. The Town will ensure the safety and integrity of its water infrastructure.

ICC. 2.3. The Town will maintain a Long Range Water Supply Plan and Wellhead Protection Plan.

ICC. 2.4. The Town will consult with the North Carolina Rural Water Association regarding needed water system improvements and planning.

ICC. 2.5. The Town will continue to incorporate fire protection into its water infrastructure to provide adequate coverage for the town.

ICC. 2.6. The Town will install and maintain its water infrastructure in a way that supports its population.

ICC. 2.7. The Town supports regulation of underground storage tanks in order to protect its groundwater resources and implementation of the Town's wellhead protection plan. The Town will coordinate local development activities involving chemical storage or underground storage tank installation/abandonment with the Town Emergency Management personnel and the Groundwater Section of the North Carolina Division of Environmental Management.

ICC. 2.8. Any underground storage tank (UST) systems installed within 500 feet of a public water supply well must be secondarily contained.

ICC. 2.9. The Town will seek to minimize unaccounted for water loss as described in the Town's Strategic Plan.

ICC. 3. The Town supports the extension of water services from existing systems and encourages the use of central systems for new developments whether residential, commercial, or office/institutional in nature. (Actionable)

ICC. 3.1. The Town may encourage the extension of water service from existing systems, and the use of central systems for new development.

ICC. 4. The Town may amend or modify regulations to encourage or require the provision of central water service to lots or parcels proposed in new developments. (Actionable)

ICC. 5. The Town supports the installation and use of properly permitted septic tank systems and package treatment plants, with oversight and enforcement from the Carteret County Health Department, North Carolina Department of Environment and Natural Resources (NCDENR), and local development regulations regarding lot sizes, waste disposal system placement, system type, and maintenance. The Town recognizes how important the proper installation and maintenance of these systems is to the continued protection of environmentally sensitive areas. (Advocacy)

ICC. 5.1. The Town may encourage routine maintenance of septic systems and package treatment plans.

ICC. 6. The Town supports continued efforts to improve the provision of utilities to all Town residents, e.g. water, waste water, cellular coverage, cable, and electric. (Advocacy/Actionable)

ICC. 6.1. The Town will advocate for improved utility provision by service providers in the Town.

ICC. 6.2. The Town will implement improvements to its water system as called for in local plans and as needed to maintain a high level of service.

ICC. 7. The Town supports maintaining an effective signage and addressing system for all right-of-ways including private drives and access streets. (Maintaining)

ICC. 8. The Town supports state and federal funding for maintenance/dredging of the inlets on either side of Bogue Banks. Additionally, Pine Knoll Shores supports the requirements to place all beach quality sand from dredging projects on the beaches along Bogue Banks. (Advocacy).

ICC. 8.1. The Town will advocate for state and federal funding of maintenance/dredging of inlets and canals in the vicinity of Bogue Banks.

ICC. 8.2. The Town will advocate for the placement of all beach quality sand from dredging projects on the beaches along Bogue Banks.

ICC. 9. The Town supports keeping its Pedestrian Master Plan updated. (Actionable).

ICC. 9.1. The Town's Pedestrian Plan should promote pedestrian safety and connectivity.

ICC. 9.2. The Town's Pedestrian Plan should include guidelines and timelines for implementation.

ICC. 9.3. The Town's Pedestrian Plan should place particular emphasis on connections to the beach and safe transit along and across NC 58.

ICC. 9.4. The Town will seek to implement its Pedestrian Master Plan, in accordance with the Town's Strategic Plan.

ICC. 9.5. The Town will seek state and federal funding to implement its Pedestrian Master Plan.

ICC. 9.6. The Town supports pedestrian projects with minimal environmental impacts to include tree removal, stormwater runoff, and land disturbance. The Town will, when feasible, undertake efforts to mitigate any of these impacts on the natural environment.

ICC. 10. The Town supports appropriate transportation projects for the community. (Actionable/Passive/Advocacy)

ICC. 10.1. Transportation projects will be considered appropriate if:

They do not increase capacity beyond 30-year AADT traffic projections.

They do not have a significant environmental impact, for example, minimizing stormwater runoff, tree-clearing, or shoreline impacts.

They provide for more efficient transport off the island in an emergency.

They increase safety and decrease the number of crashes along Hwy 58.

They maintain at least a Level of Service D within the limits of the Town.

They provide safe and well-maintained public streets, as called for in the Town's Strategic Plan.

ICC. 10.2. The Town will encourage a regional approach to transportation that reduces congestion and improves safety.

ICC. 10.3. The Town is generally opposed to medians and the widening of Hwy 58 to three lanes, but may be receptive to targeted turning lanes in the long term.

ICC. 11. The Town supports conserving its drinking water supply. (Actionable)

ICC. 11.1 The Town specifically supports the enforcement of the Capacity Use Rules tied to the Castle Hayne Aquifer in an effort to ensure groundwater quantity and quality throughout the planning period and beyond.

ICC. 12. The Town supports maintaining professional, safe, functional, and attractive public facilities as called for in the Town's Strategic Plan. (Actionable)

ICC. 12.1. The Town will annually assess public facilities as part of the budget process.

Management Goal: Natural Hazard Areas (5)

Pine Knoll Shores will conserve and manage shorelines, flood plains, and other coastal features for their natural storm protective functions and natural beauty.

NHA. 1. The Town supports the US Army Corps of Engineers' regulations and the applicable guidelines of the Coastal Area Management Act and the use of local land use ordinances to

regulate development within or immediately adjacent to freshwater swamps, marshes, and 404 wetlands. (Passive)

NHA. 1.1. The Town will enforce its zoning regulations and rely on state permitting agencies to ensure that all development within or adjacent to Areas of Environmental Concern, freshwater swamps, marshes, and 404 wetlands is carried out in accordance with all local, state, and federal regulations.

NHA. 2. The Town will protect its waterfront/shoreline areas, estuarine shorelines and waterbodies, town-wide canal system, and valuable scenic areas. (Maintaining/Advocacy)

NHA. 2.1. The Town will maintain appropriate setbacks along the Pine Knoll Shores canal, Bogue Sound, and the Atlantic Ocean.

NHA. 2.2. The Town will continue, by ordinance, to require property owners to install and maintain bulkheads around the town-wide canal system.

NHA. 2.3. The Town supports the research of shoreline stabilization methods and the impacts of mixed systems (bulkhead and natural) along Bogue Sound.

NHA. 2.4. The Town will maintain its existing dune preservation ordinance.

NHA. 2.5. The Town will maintain its beach renourishment program, including maintaining and advocating for adequate funding for future renourishment projects.

NHA. 2.6. The Town supports the installation of properly engineered and permitted bulkheads, assuming this development is in compliance with all 15A NCAC 7H Guidelines.

NHA. 3. The Town recognizes the significance of protecting the dune line along oceanfront portions of Pine Knoll Shores' planning jurisdiction. The Town of Pine Knoll Shores supports continued efforts to protect these dunes through the establishment of a proactive dune stabilization and protection program. (Actionable)

NHA. 3.1. The Town will continue a sand fence/vegetation program along the Pine Knoll Shores dunes as necessary, and coordinate with oceanfront property owners.

NHA. 3.2. The Town will enforce and strengthen its ordinances regarding the protection of oceanfront vegetation and dune system.

NHA. 4. The Town supports the efforts of the Carteret County Shore Protection Office to establish a long term comprehensive approach to addressing beach renourishment throughout oceanfront portions of the Town's jurisdiction. (Actionable)

NHA. 4.1. The Town will continue its participation with the Carteret County Beach Commission.

NHA. 4.2. The Town will work with the Carteret County Shore Protection Office to maintain sand levels in accordance with triggers outlined in the Bogue Banks Master Plan.

NHA. 4.3. The Town will maintain adequate funding for beach renourishment.

NHA. 4.4. The Town will lobby for state and federal funding of beach renourishment.

Management Goal: Water Quality

The Town of Pine Knoll Shores will manage, protect, and where possible enhance water quality in all surface waters and wetlands within the town's jurisdiction giving consideration to public health, safety and welfare issues.

WQ. 1. The Town supports the guidelines of the Coastal Area Management Act and the efforts and programs of the North Carolina Department of Environment and Natural Resources, Division of Coastal Management and the Coastal Resources Commission to protect the coastal wetlands, estuarine waters, estuarine shorelines, and public trust waters of the Town. (Advocacy)

WQ. 2. The Town supports commercial and recreational fishing in its waters and will cooperate with other local governments and state and federal agencies to control pollution of these waters to improve conditions so that commercial and recreational fisheries will not be depleted. It also supports the preservation of nursery and habitat areas. (Actionable)

WQ. 2.1. The Town supports monitoring efforts and studies of local waters that include recommendations for water quality improvement.

WQ. 2.2. The Town will monitor the state's 303(d) list and supports efforts to get local waters to unimpaired status.

WQ. 2.3. The Town supports the goals of the NC Coastal Habitat Protection Program.

WQ. 3. The Town opposes the disposal of any toxic wastes, as defined by the US Environmental Protection Agency's Listing of Hazardous Substances and Priority Pollutants (developed pursuant to the Clean Water Act of 1977), within its planning jurisdiction, or in waters adjacent to Town including the waters of the Atlantic Ocean. (Passive)

WQ. 4. The Town supports the policy that all State of North Carolina projects should be designed to limit to the extent possible stormwater runoff into coastal waters. (Passive)

WQ. 5. The Town supports protection of those waters known to be of the highest quality or supporting biological communities of special importance, this especially applies to the Outstanding Resource Waters adjacent to the Roosevelt Natural Area and those within the Town's canal system. (Actionable/Advocacy)

WQ. 5.1. The Town supports federal, state, and local regulations, funding, and/or public education to achieve this policy.

WQ. 5.2. The Town supports the implementation of the White Oak River Basinwide Water Quality Management Plan.

WQ. 5.3. The Town supports the goals of the NC Coastal Habitat Protection Program.

WQ. 6. The Town of Pine Knoll Shores supports management of problem pollutants particularly biological oxygen demand and nutrients, in order to correct existing water quality problems and to ensure protection of those waters currently supporting their uses. This effort should focus on residential development adjacent to the Town's canal system. (Actionable/Advocacy)

WQ. 6.1. The Town supports federal, state, and local regulations, funding, and/or public education to achieve this policy.

WQ. 6.2. The Town supports additional study and identification of specific approaches to achieve this policy.

WQ. 6.3. The Town supports the implementation of the White Oak River Basinwide Water Quality Management Plan.

WQ. 6.4. Any underground storage tank (UST) systems installed within 500 feet of any surface water classified as HQW, ORW, WS-I, WS-II, or SA must be secondarily contained.

WQ. 6.5. The Town of Pine Knoll Shores supports the removal of any abandoned or out-of-use USTs within the planning area.

WQ. 7. The Town of Pine Knoll Shores opposes the installation of package treatment plants and septic tanks or discharge of waste in any areas classified as coastal wetlands, freshwater wetlands (404), or natural heritage areas. This policy does not apply to constructed wetlands. All decisions regarding the construction of these facilities should have the oversight of the Carteret County Health Department and the NCDENR. (Passive)

WQ. 7.1. The Town supports enforcement of this policy by the Carteret County Health Department and NCDENR.

WQ. 7.2. The Town may monitor and provide input on the implementation of this policy through its permit review process.

WQ. 8. The Town encourages the use of advanced wastewater treatment technologies which will reduce the amount of land required for drain and repair fields. These systems should help reduce pollutants in stormwater runoff, which have historically contributed to water quality issues in waters adjacent to town. (Advocacy/Passive)

WQ. 8.1. The Town will provide, as requested, public information regarding advanced wastewater treatment technologies.

WQ. 8.2. The Town may encourage advanced wastewater treatment technologies through the review process, but may not require them.

WQ. 8.3. The Town supports the efforts of the Carteret County Health Department to map new and existing septic systems, package treatment plants, and wells and provide that information to the public.

WQ. 9. The Town of Pine Knoll Shores supports reducing soil erosion, runoff, and sedimentation to minimize the adverse effects on surface and subsurface water quality. This policy is especially important in areas adjacent to the Outstanding Resource Waters located along the Roosevelt Natural Area as well as the waters within the Town's canal system. (Advocacy)

WQ. 9.1. The Town supports state and local guidelines that achieve this policy.

WQ. 10. The Town of Pine Knoll Shores recognizes the value of water quality maintenance to the protection of fragile areas and to the provision of clean water for recreational purposes and supports the control of stormwater runoff to aid in the preservation of water quality. (Actionable/Advocacy)

WQ. 10.1. The Town of Pine Knoll Shores will support existing state regulations relating to stormwater runoff to aid in the preservation of water quality.

WQ. 10.2. The Town of Pine Knoll Shores will support existing state regulations relating to stormwater runoff resulting from development (Stormwater Disposal Policy 15 NCAC 2H.0001-.1003).

WQ. 10.3. The Town will consider elements of Phase II implementation that will help it to achieve this policy.

WQ. 10.4. The Town supports federal, state, and local regulations, funding, infrastructure investment, and/or public education to achieve this policy. The Town will comply with CAMA and NC Division of Environmental Management stormwater regulations.

WQ. 11. The Town does not support the location of floating homes within its jurisdiction. (Maintaining)

WQ. 11.1. The Town will continue to prohibit floating homes and living onboard.

WQ. 12. The Town supports efforts to improve water quality.

WQ. 12.1. The Town will modify ordinances if required by the Division of Water Resources, and may consider modifying them independently to achieve the policies contained in this plan.

Management Area: Local Areas of Concern

Tourism

LAC. T. 1. The Town of Pine Knoll Shores supports the local North Carolina Aquarium in their efforts to provide a regional education and cultural destination. (Advocacy)

LAC. T. 2. The Town of Pine Knoll Shores supports the tourism development efforts of Carteret County. (Advocacy)

LAC. T. 3. The Town of Pine Knoll Shores supports the continued presence of tourism-related businesses within the town limits. (Passive/Advocacy/Maintaining)

Recreation

LAC. Rec. 1. The Town supports recreational activities for its citizens and visitors. (Actionable)

LAC. Rec. 1.1. The Town's recreational program will take into account public and private recreational resources.

LAC. Rec. 1.2. The Town's recreational program will consider both programming and infrastructure needs.

LAC. Rec. 1.3. The Town will survey Town residents every five years to determine recreational needs.

LAC. Rec. 2. The Town supports the provision of public and private recreational facilities and areas in keeping with the desires of citizens. (Actionable)

LAC. Rec. 2.1. The Town will survey Town residents every five years to determine recreational needs.

LAC. Rec. 3. The Town supports the maintenance of an up to date recreation plan. (Actionable)

LAC. Rec. 3.1. The Town will review its Parks and Recreation Plan after each quinquennial survey and make necessary updates based on public input and resource changes.

Services

LAC. S. 1. The Town supports the provision of solid waste collection and recycling services for residents. (Maintaining)

LAC. S. 1.1. The Town will take into account seasonal waste collection needs.

LAC. S. 1.2. The Town will promote recycling in its waste collection efforts.

LAC. S. 2. The Town supports providing adequate public services to its population. (Actionable)

LAC. S. 2.1. The Town will examine service demand trends considering both full time and part-time residents, as called for in the Town's Strategic Plan.

Age-Friendly Community

LAC. AFC. 1. The Town supports efforts to make Pine Knoll Shores an age-friendly community. (Actionable)

LAC. AFC. 1.1. The Town will research age-friendly policies and infrastructure investments.

LAC. AFC. 1.2. The Town supports the continued presence of and access to high-quality medical care in Carteret County.

Economic Development

LAC. ED. 1. The Town supports the economic development efforts of the Carteret County Economic Development Council. (Advocacy/Passive)

LAC. ED. 2. The Town generally opposes the presence of industrial or manufacturing land uses within the town limits. (Maintaining)

LAC. ED. 3. The Town supports tourism as a component of economic development, as outlined in policy LAC. T. 3. (Passive)

LAC. ED. 4. The Town supports limited office/professional and commercial development within the Town. This development should be consistent with the policies outlined in the Land Use Compatibility section. (Maintaining)

Quality of Life

LAC. QoL. 1. The town supports a property owner's right to earn income from their properties through long-term and short-term home rentals.

The town requires that all such rentals comply with federal, state, county, and town regulations and expects them to meet the covenants of local Home Owner Associations.

LAC. QoL. 1.1. The Town will develop and provide informational materials to rental agents and homeowners for dissemination to prospective renters. Such materials will provide tenants with needed town information such as parking regulations, trash and recycle pick up schedules, location of town services, noise ordinances, fire, police and EMS contact numbers, perhaps a general map of local area attractions and a description of PKS as an environmentally friendly town, and its designation as a Tree City USA, Bird and Turtle sanctuaries.

LAC. QoL. 1.2. The Town will continue to study the impacts of income-producing land uses in Pine Knoll shores

F. FUTURE LAND USE

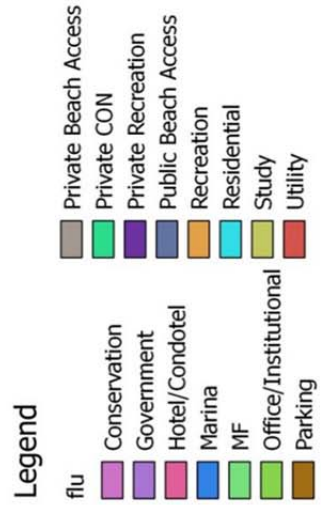
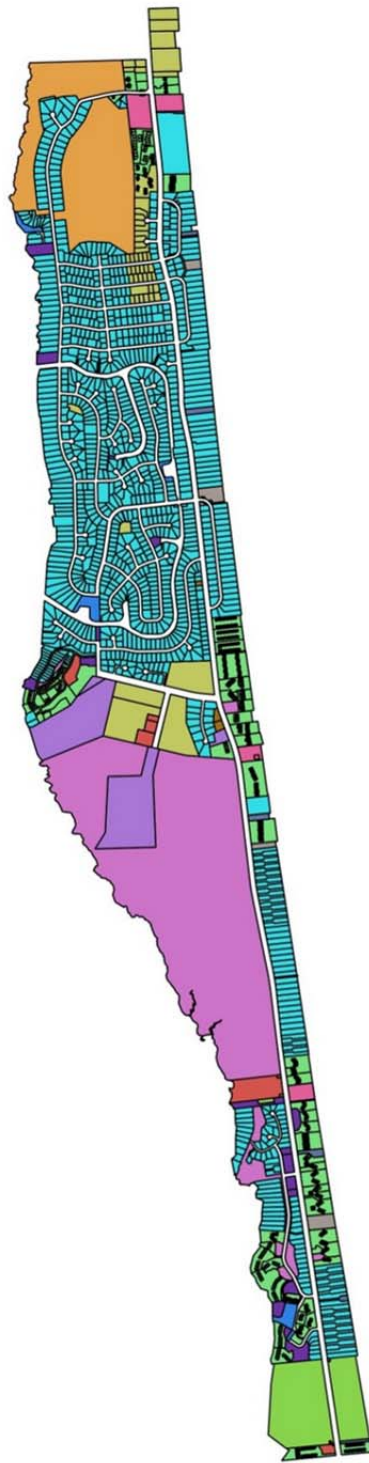
1. Introduction

The future land use map (Map 15) depicts application of the policies for growth and development and the desired future patterns of land use and land development. **The areas indicated as least suitable on the Future Land Use Map are not intended to prohibit development but are intended to indicate areas where careful review of proposed development should be undertaken, if approved for development.** All development activities that fall within the least suitable overlay district should be carefully monitored during the permitting process to ensure that impacts on the environment are minimized.

Specifically, the Town of Pine Knoll Shores Future Land Use Plan was drafted with consideration given to the following:

- Preservation of existing residential neighborhoods.
- Preservation of existing suburban form.
- Existing zoning patterns.
- Development constraints.
- Desire to concentrate non-residential development.
- Existing plans for the development of public facilities.
- Limiting of potential land use conflicts.
- Key land use issues.

Map 15 - Future Land Use



*Source: Town of Pine Knoll Shores

Map 14 outlines the boundaries of all future land use districts, falling within the planning jurisdiction of Pine Knoll Shores. These districts are defined in the following section.

2. Land Use Acreage

Table 42 provides a summary of future land use acreage as depicted on the Town’s Future Land Use Plan. These acreages assume total buildout of Pine Knoll Shores for each respective zoning district. Currently, there are approximately 123 acres (269 parcels) of vacant land within the Town’s planning jurisdiction. A summary of how these properties are zoned has been provided on page 68 of this plan. According to this table, 66.9% of the vacant acreage, or 75.4% of all vacant parcels are zoned for single-family residential development. Of the remaining vacant land, a substantial portion (23.0% of vacant acreage) is zoned for multi-family development. These existing conditions, with respect to local land development regulations, indicate that almost 90% of the future development to take place within Pine Knoll Shores will be residential in nature.

Table 42. Pine Knoll Shores Future Land Use Map Acreages

	Acres	% of Total
Conservation	278.95	21.9%
Government	53.05	4.2%
Multi-Family Residential	126.88	10.0%
Marina	7.54	0.5%
Office and Institutional	51.46	4.1%
Parking	0.82	.06%
Public Access	6.1	.48%
Private Recreation	18.4	1.4%
Single-Family Residential	544.74	42.9%
Private Beach Access	7.32	0.6%
Utility	13.83	1.1%
Recreation	103.48	8.1%
Study	57.51	4.5%
Total*	1270.08	100.0%

*This figure does not include right-of-ways.

Source: Town of Pine Knoll Shores, using base layers done by Holland Consulting Planners

The land use districts in Table 42 are defined below. These definitions provide what the Town has outlined as desirable density and height restrictions for each of the defined Future Land Use Districts. These development criteria have been based on a variety of factors including: existing land uses, existing zoning code and zoning districts, and preferred development trends as discussed throughout this land use plan.

3. Future Land Use Designations (Development Criteria)

The following provides a definition and criteria for development with respect to each future land use category established on the Future Land Use Map. These are intrinsically tied to the policy section of the plan.

a. *Conservation*

This district was originally established in an effort to preserve the Roosevelt Natural Area which is located within central Pine Knoll Shores. As discussed earlier, this 265-acre undeveloped property is considered both a Protected Land and a Significant Natural Heritage Area, and will be maintained as open space throughout the planning period and beyond. This property should remain undeveloped, but efforts to link the free, public trail through the Roosevelt Natural Area to Study Area A could be explored.

Other parcels are also owned by Homeowners Associations, specifically Beacon’s Reach, but have unique natural features like ponds and wetlands that make them generally unsuitable for development.

There are several other areas within Town that are also anticipated to stay in their natural and undeveloped state over the planning period. Several of these are manifested as common areas owned by Homeowners Associations, notably Genesis, Westport IV, and Ocean Grove West. No conservation protections currently exist for these parcels, and multi-family development is possible, though relatively unlikely. Rezoning to the corresponding Recreational District would be possible if requested by the homeowners associations. The Town could conceivably designate these parcels for study.

Additional areas within the Town may be identified through proposed studies.

Desired Density:	None
Desired maximum building height:	None
Preferred uses:	Public water/forest access, municipal storage facilities, outdoor recreational facilities, conservation
Uses to be discouraged:	Public/private permanent structures
Preferred Zoning District:	Recreation 3

b. Government

This land use district involves all parcels of land that are owned, operated, and/or maintained by the Town of Pine Knoll Shores and the North Carolina Aquarium at Pine Knoll Shores. The uses on this property are tied to Town management, public safety, and the Aquarium.

Desired density:	N/A (There are no density requirements for this district. Development will require a 35' buffer between adjacent properties.)
Desired maximum building height:	N/A
Preferred uses:	Government facilities (administration, public safety, Aquarium)
Uses to be discouraged:	All uses not directly related to providing public services
Preferred Zoning District:	Municipal

c. Hotel/Condotel

There are currently six hotel/condotel parcels in Pine Knoll Shores. Four of them are reflected in Study Area D. These facilities provide lodging for tourists who come to Pine Knoll Shores, and the purpose of this district is denote that the Town foresees the continued presence of hotels and condotels within the Town limits.

Desired Density:	22 units/acre
Desired maximum building height:	50' + 10' Mechanical
Preferred uses:	Hotels, Motels, Condotels, restaurants permissible as accessory uses
Uses to be discouraged:	Single family residential, other commercial
Preferred Zoning District:	Multi-family 1

d. Marina

This land use category is comprised of the four privately-owned and operated marina facilities within Pine Knoll Shores. These facilities are currently in place, and serve the residential areas adjacent to their respective locations, as per their homeowners' association rules. The intent of establishing these areas as a future land use district is to ensure their redevelopment in the case of a major storm event. Pine Knoll Shores wants to ensure that these facilities remain in place.

Desired density:	N/A
Desired maximum building height:	N/A
Preferred uses:	Private non-transient docking facilities

Uses to be discouraged: All uses not intended to facilitate the use of these properties as a marina facility
Preferred Zoning District: Recreation 2

e. *Multi-Family*

This land use district is intended to accommodate high-density residential development in the form of townhomes and condominiums. It is anticipated, as depicted on the future land use map, that this development will be focused on the oceanfront and some portions of the Town’s estuarine shoreline. Most of the properties on the future land use map listed as multi-family have already been built out. Due to this fact, the guidelines outlined in this section will only apply to the redevelopment of these properties.

Desired density: Maximum 8 units per acre
Desired maximum building height: 50 feet
Preferred uses: Private multi-family residential development (townhomes and condominiums) privately-owned condotel/condominium complexes will be permitted
Uses to be discouraged: All non-residential uses including commercial operations not intended to serve multi-family residential developments; commercially owned and operated hotel/motel establishments will be discouraged
Preferred Zoning District: Multi-Family 1-2

f. *Office and Institutional*

This district involves all low impact non-residential uses. Currently, there are two existing facilities located in these areas: Trinity Center Episcopal Retreat and an office building. Neither of these uses poses a threat to adjacent residential uses. The primary goal of this district is to allow non-residential uses that will not conflict with the residential nature of the community.

Desired density: N/A (Density for this district is not defined; however, a 50' buffer is required between adjacent properties.)
Desired maximum building height: 35 feet
Preferred uses: Office and institutional uses (churches, office buildings, parks, public access sites, public/private recreational facilities)

Uses to be discouraged:	Commercial operations, multi-family developments, other high impact non-residential uses
Preferred Zoning Districts:	Office/Professional, Institutional, Commercial

g. Parking

This district denotes parking appurtenant to public beach accesses. This use is permitted in all zoning districts, but is distinct from other municipal structures and the beach accesses themselves. Parking is likely to be a significant issue for the Town in the future as the population of North Carolina and demand for public beach access increase.

Desired density:	N/A
Desired maximum building height:	N/A
Preferred uses:	Parking
Uses to be discouraged:	All other uses.
Preferred Zoning District:	Public Beach Accesses and associated parking may be located in any zoning district

h. Private Beach Access

This district denotes the beach accesses that are utilized most by the residents of Pine Knoll Shores. It is distinct from the public beach access district due to a variety of deed restrictions placed on these properties and the supporting zoning. Some private beach accesses, in the past, have been leased to the Town to provide for public beach access. It should be noted that a requirement for additional public parking could lead to similar transitions in the future, although not prior to the next update of this plan.

Desired density:	N/A
Desired maximum building height:	N/A
Preferred uses:	Beach Access, including sittings and other recreational amenities
Uses to be discouraged:	All other uses.
Preferred Zoning District:	Recreational 2, Multi-family 1 and 2 as accessory uses, and Residential 1 as accessory use

i. Private Recreation

This district denotes non-private beach access private recreation. It includes parcels occupied by Homeowner Association swimming pools, tennis courts, and sound accesses, many of which are protected by deed restrictions as well as zoning. These sites are intended to provide recreational opportunities and sound access to members of these Associations.

These properties are protected by the Associations, and will remain under their jurisdiction throughout the planning period.

Desired density:	N/A
Desired maximum building height:	N/A
Preferred uses:	Private recreation (including swimming pools, tennis courts, and sound access)
Uses to be discouraged:	All uses not related to the provision of recreation and public access for a respective Homeowners' Association
Preferred Zoning District:	Recreational 2, Multi-family 1, Multi-family 2

j. Public Access

These properties are currently maintained as CAMA-approved public beach access points for the Town of Pine Knoll Shores. Some of these properties fall under the ownership of the Town, while several exist as easements established through agreements with Homeowners' Associations. These public access sites are expected to be in place throughout the planning period (5-10 years), assuming an alternative to beach access is not identified. The Town is required to establish a public access site every one-half mile in order to qualify for federal beach renourishment funding under the US Army Corps of Engineers Section 933 project. Maintaining these existing sites is imperative if the Town is to meet this requirement.

Desired density:	N/A
Desired maximum building height:	N/A
Preferred uses:	Public ocean and estuarine access
Uses to be discouraged:	All uses not intended to provide public/estuarine and oceanfront access
Preferred Zoning District:	Public Beach Access is permissible in any zoning district.

k. Recreation

This land use district includes the Country Club of the Crystal Coast, a private country club that is open to the public for golf and tennis. The Town desires that this land use be maintained in the future as indicated in the Town's zoning code and in deed restrictions on the property.

Other properties may be classified as recreation as a result of the studies called for in this plan. Generally properties grouped in this category should have at least passive recreation infrastructure and be opened to the public as their principal uses. For land use purposes, these are indicated distinctly from private recreation.

Desired density:	N/A
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Desired maximum building height:	N/A
Preferred uses:	Public and semi-private recreational facilities
Uses to be discouraged:	All uses not related to the provision of recreation
Preferred Zoning District:	Recreational 1

l. Single-Family Residential

This district which comprises a majority of the Town’s developed and undeveloped property, is intended to accommodate the construction of single-family detached dwellings. Pine Knoll Shores exists, for the most part, as a single-family residential community. The Town would like to ensure that the nature of the community is preserved, and generally not compromised to accommodate higher density development. The Town has established rules and regulations regarding redevelopment and reconstruction. The parcel in Study Area A at the intersection of Pine Knoll is a candidate for higher density development, but is in need of additional study. The development criteria for single-family residential development are as follows:

Desired density:	R-1 Zoning (6 units per acre) R-2, R-3, R-4 Zoning (4 units per acre)
Desired maximum building height:	35 feet
Preferred uses:	Single-family residential homes
Uses to be discouraged:	All other uses
Preferred Zoning District:	Residential 1-4; Multi-family 2

m. Utility

The properties located within this district are primarily utilized as wastewater treatment plant sites serving the multi-family complexes located along NC Highway 58. Due to the fact that there is no central sewer system within Pine Knoll Shores, these developments must reserve large tracts of land for the operation of on-site wastewater facilities. Also included in this category are parcels used for municipal water operations and one site used for telecommunications.

Desired density:	N/A
Desired maximum building height:	N/A
Preferred uses:	Facilities needed for the provision of infrastructure services
Uses to be discouraged:	All uses unrelated to the provision of Town infrastructure services
Preferred Zoning District:	Municipal Services

n. *Study*

There are four areas indicated on the future land use map for additional study. These areas each have unique characteristics and considerations regarding their use.

Study Area A: This study area consists of four parcels: two town-owned parcels, one parcel owned by Beacon's Reach, and one parcel zoned Office/Professional. A study may consider unique environmental considerations surrounding these lots, identifying any unique permitting requirements outside of the Town's, any deed restrictions on the properties, and a community vision for this area. A study may seek to make a recommendation for long-term future land use of these parcels and solidify a recommendation on conservation, recreation, or other use that is consistent with community vision.

Study Area B: This study area consists of a single town-owned parcel that the Town acquired with its purchase of the water system. The lot is land-locked and does not meet wellhead protection plan or other requirements for additional siting of a water tower, its originally intended purpose. A study may seek to identify a more suitable classification of this parcel.

Study Area C: This study area consists predominantly of single-family residential lots in a flood-prone area. The area attracts significant town regulatory attention through the Flood Ordinance and investment through stormwater infrastructure. Study may examine additional infrastructure needs and also the identification of any lots suitable for a conservation designation.

Study Area D: This study area consists of a number of parcels and is significant for its transitional nature and mixture of uses including commercial, multi-family, hotels, and vacant parcels. A study may recommend a community vision for this corridor and its connection to the next corridor. As a result of this study, a mixed use description may gather more definition and a clearer set of desired standards.

4. Land Demand Forecast and Carrying Capacity Discussion

a. *Land Demand Forecast*

The Town of Pine Knoll Shores' single and multi-family residential development is the most likely to expand over the future of the Town. The macro-economy has always influenced what gets built and what does not, which has led some properties that would be acceptable for multi-family development, planned for development in the 1980s, to sit as green space for more than 30 years and to be considered as potential areas to identify as conservation in this plan. At the same time, as the most desirable parcels have been developed, and some vacant parcels that remain have a variety of environmental issues, the Town has rezoned away from hotels and condotels and towards single-family and multi-family residential. This trend could continue over the planning period.

Table 43. Pine Knoll Shores Land Demand Acreage Forecast

	Existing Land Use*	Future Land Demand Forecast				% Growth 2015-2035	Additional Housing Units (2035)	Average Units Per Acre*
		2020	2025	2030	2035			
Vacant Land	122.3	110	95	85	72	-41%	N/A	N/A
Non-Residential Land Uses	532.16	532	532	532	532	0	N/A	N/A
Single-Family Residential**	495.81	505	515	525	530	9%	~180	4
Multi-Family Residential**	185.06	192	197	197	205	11%	~160	8
Total	1336	1336	1336	1336	1336		~340	N/A

*The existing land use acreage for common area has been included under the multi-family category due to the fact that if redeveloped this acreage will be included.

**The growth rates for single family residential and multi-family residential reflect the discussion from the Land Use Demand Forecast section of the plan: on average 2 acres/year of single family development, slowing between 2030 and 2035 to one acre per year. Multi-family reflects irregular development in spurts. There is discrepancy between Table 43 and Table 37 with regard to developed acreage. This chart also does not assume redevelopment or reclassification of existing parcels, which is also a possibility over the planning period.

Source: GIS Data from Carteret County

b. Carrying Capacity Discussion

Water supply for the permanent and seasonal population within Pine Knoll Shores is not a problem, at the current time. This determination is based on the Town’s existing water plant capacity of .982 million gallons per day (mgd) and its exceedance of demand; however, there are some factors that may be an issue in the future.

In order to provide some guidance to Town staff and administrators, the following table forecasts water usage for residential customers through the year 2025. The average daily water usage for this forecast is based on the Town’s Local Water Supply Plan.

Table 44. Pine Knoll Shores Water Capacity Use Forecast

	Existing Housing Units and Water Usage	Water Capacity Use Forecast		
		2020	2030	2040
Residential Unit Water Usage (MGD)*	0.241	0.500	0.515	0.565
Non-residential Unit Water Usage (MGD)*	0.059	0.059	.140	.160
Total Daily Water Usage (MGD)*	0.326**	0.716	0.741	0.813

*MGD - Million Gallons per Day.

**Existing housing units based on information taken from Town of Pine Knoll Shores Water Supply Plan.

Source: Pine Knoll Shores Water Supply Plan.

The Town is concerned particularly with salt water intrusion due to the Town’s water supply’s proximity to salt water. The Town is concerned with actions that neighboring systems may take that threaten the Town’s supply through the increased presence of chlorides or through salt water intrusion. The Town will monitor permits filed through the Central Coastal Plains Capacity Use Area Rules to keep appraised of any significant modifications to neighboring systems that may have bearing on the Town’s water supply. The Town supports a regional approach to water supply planning to ensure that local needs can continue to be met.

It has been discussed throughout this plan that there is no central sewer service within Pine Knoll Shores. Due to this fact, it is not possible to compile any form of sewer system demand or future capacity needs. The issue of a sewer system is something that the Town has struggled with for many years. At this point, the Town has decided that single-family structures will rely on private septic systems for wastewater treatment. There is simply no other viable alternative at this time. These systems are permitted by the Carteret County Health Department. The Health Department is working on a system to closely monitor these systems, and generate a methodology to document and identify problems as they occur.

The multi-family complexes throughout Town rely on package treatment plants for wastewater treatment. These properties will continue to rely on these systems throughout the planning period. Table 38 summarizes the condition of each of these systems. As these systems become antiquated or substandard, a respective complex will be required to either replace or retrofit the existing system. NCDENR and the Carteret County Health Department oversee the annual and daily maintenance of the systems, and make determinations on when upgrades will be required.

For the purposes of this land use plan update, it is anticipated that each private development will be responsible for maintaining their own wastewater treatment systems. There is simply no sound methodology for forecasting capacity needs based on the absence of historical average daily usage. Additionally, a majority of the future growth within Town will be in the form of single-family residential development. It is clear that these properties will be required to utilize private septic systems. Through years of discussion and debate, it has been determined that establishing Town-wide central sewer service is not economically feasible or justifiable.

If the Town were to ever consider the installation of a sewer system, the multiplier from 15A NCAC 02T .0114 would appear to govern projections. Based on data from the Carteret County tax office in 2014, there were 6,080 bedrooms in Pine Knoll Shores, to include hotel rooms. The multiplier per bedroom is 120 gallons per day, so the projection for sewer capacity for the residential units in Town would be 729,600 gallons per day. The Town has a number of additional facilities that would boost the requirements higher, first would be the Aquarium at Pine Knoll Shores, which has an existing treatment plant capacity of 25,000 gallons, the Country Club of the Crystal Coast, with 332 members at 60 gallons per member would be 19,920 gallons, there are restroom facilities at the Iron Steamer Public Beach Access, which would have an estimate of 325 gallons per fixture, with four fixtures adding 1,300 gallons, there are marina facilities at Brock Basin, Hall Haven, and in Beacon's Reach, with estimates of 10 gallons per slip with no bathhouse: Hall Haven appears to have 57 spaces with no bathhouse (570 gallons), Brock Basin has 37 spaces (370 gallons), and 62 for Beacon's Reach with no bathhouse (620 gallons), The Trinity Center has 44 rooms, so the estimate would be 120 gallons each, for 5,280 gallons of capacity needed, its kitchen can serve 225 people at one seating at 5 gallons per meal is an additional 1,125 gallons. The Clamdigger Inn has restaurant facilities with seating for 343, at an estimate of 40 gallons per seat, for a need of 13,720.

Beyond the estimated existing needs of around 800,000 gallons, the Town would need to consider future construction as well. Assuming a moderate growth rate of single-family dwellings of 2 acres per year, with 4 units per acre, and 3.5 bedrooms per house at 120 gallons per bedroom would be 86,400 gallons of additional capacity over thirty years. A maximum figure of 160 multi-family units with 3.5 bedrooms at 120 gallons per bedroom would be an additional 67,200 gallons of capacity over thirty years. A rough estimation for needed capacity would be 944,000 gallons. An estimate of 90% of water system capacity is another potential estimation that would result in a needed capacity of 1,000,000 gallons, based on the 1.2 million gallons per day of existing capacity of the Town's water system. This figure is based on capacity and not actual usage, so a wastewater system could likely be smaller than 1,000,000 gallons, especially if existing private package treatment plant capacity of 360,460 gallons could be reduced from the Town's capacity needs.

The environmental considerations for such a sewer system would be considerable: there would be Division of Coastal Management setback requirements from the ocean, canal, and Sound and wells and other water sources. Engineering considerations that would be site-specific and relate to soil type, elevation of water table, and disposal and treatment technique would determine the size of the system and whether or not permitting fell under Carteret County or the State of North Carolina.

SECTION VII. TOOLS FOR MANAGING DEVELOPMENT

A. GUIDE FOR LAND USE DECISION MAKING

It is intended that this document be an integral part of the Town of Pine Knoll Shores decision making process concerning future land use. This document will be consulted prior to any decision being made by the Pine Knoll Shores staff, Planning Board, and/or Town Council concerning land use and development.

B. EXISTING DEVELOPMENT PROGRAM

The existing management program includes the following ordinances: Town of Pine Knoll Shores Zoning Ordinance, Town of Pine Knoll Shores Subdivision Ordinance, North Carolina Building Code, National Flood Insurance Program, the 2008 Pine Knoll Shores Land Use Plan, and the Pine Knoll Shores Strategic Plan.

C. ADDITIONAL TOOLS

The Town of Pine Knoll Shores will utilize the following additional tools, if needed, to implement this plan:

1. Conduct annual training sessions for the Town of Pine Knoll Shores Planning Board and Board of Adjustment.
2. The Planning Department staff, in concert with the Planning Board, shall prepare an annual report assessing the effectiveness of plan implementation. This report shall be presented to the Town Council starting in July 2016.
3. At a minimum, update the Land Use Plan and implementation process every six to seven years.
4. Revise the Town's zoning and subdivision ordinances to support the policies and implementing actions contained in this plan.
5. Prepare a capital improvements plan/program to address the following community facilities: water, stormwater, utilities, and transportation.

D. ACTION PLAN/SCHEDULE

- a. The Town will encourage public participation in all land use decisions and procedure development processes and encourage citizen input via its boards and commissions.
- b. The Town of Pine Knoll Shores will advertise all meetings of the Town’s Planning Board and Board of Adjustment through newspaper advertisements and public service announcements.
- c. The Town of Pine Knoll Shores will utilize advisory committees to assess and advise the Town on special planning issues/needs.
- d. The Town will conduct a joint meeting every January of the Pine Knoll Shores Town Council and the Town’s Planning Board to identify planning issues/needs.
- e. All Planning Department activities will be outlined on the Town’s web-site. The site will include this plan.
- f. All public hearings for changes to land use related ordinances that affect AECs shall include in the notice a specific description of the impact of the proposed change on the AECs.
- g. Ensure that the membership of all planning related and ad hoc advisory committees has a broad cross section of Pine Knoll Shores’ citizenry.

2. Action Plan/Schedule

The following describes the priority actions that will be taken by the Town of Pine Knoll Shores to implement this town-developed CAMA Core Land Use Plan and the fiscal year(s) in which each action is anticipated to begin and end. This action plan will be used to prepare the implementation status report for the CAMA Land Use Plan.

Policy References	Implementing Actions	Schedule	
		Begin	End
LUC. 1.	LUC. 1.3. The Town may conduct studies on the areas designated as “Study Areas” on the Future Land Use Map	C-2016;	C-2018

Policy References	Implementing Actions	Schedule	
		Begin	End
		D and A1-2017; A-2018; B-2019	D and A1-2018; A-2019; B-2020
LUC. 8.	LUC. 8.2. The Town will study environmentally low-impact uses for parcels along Pine Knoll Boulevard and the gateway to the Roosevelt Natural Area.	2018	2019
LUC. 10.	LUC. 10.1. The Town will study its non-residential development needs and aspirations prior to rezoning designated parcels to a purely residential usage.	2015	2016
LUC. 10.	LUC. 10.2. The Town will consider incorporating mixed-use development into its Zoning Ordinance.	2018	2019
LUC. 12.	LUC. 12.2. The Town will review and study risk levels for oceanfront structures as it considers setback requirements, if flexibility is allowed by the Coastal Resources Commission. The Town supports redevelopment of previously developed areas, provided that it is compliant with all applicable policies, regulations, and ordinances.	2015	2017
LUC. 16.	LUC 16.1. The Town will establish a working group to consider impacts from varying amounts of sea level rise to determine the thresholds that the Town's current development can withstand, to identify adaptation/remediation strategies for when sea level rise exceeds those thresholds, and to develop strategies to protect future development from the impacts of sea level rise.	2016	2020
WQ. 5 and 6	Water Quality Study	2018	2020
LAC. Rec. 1 and	LAC. Rec. 1.3./2.1. The Town will survey Town	2017	2017

Policy References	Implementing Actions	Schedule	
		Begin	End
2	residents every five years to determine recreational needs.		
LAC. Rec. 3.	LAC. Rec. 3.1. The Town will review its Parks and Recreation Plan after each quinquennial survey and make necessary updates based on public input and resource changes.	2018	2018
LAC. S. 2.1.	LAC. S. 2.1. The Town will examine service demand trends considering both full time and part-time residents, as called for in the Town's Strategic Plan.	2015	2016
LAC. AFC. 1.	LAC. AFC. 1.1. The Town will research age-friendly policies and infrastructure investments.	2015	2017
LAC. QoL. 1.	LAC. QoL. 1.1. The Town will develop and provide informational materials to rental agents and homeowners for dissemination to prospective renters. Such materials will provide tenants with needed town information such as parking regulations, trash and recycle pick up schedules, location of town services, noise ordinances, fire, police and EMS contact numbers, perhaps a general map of local area attractions and a description of PKS as an environmentally friendly town, and its designation as a Tree City USA, Bird and Turtle sanctuaries.	2015	2016
LAC. QoL. 1.	LAC. QoL. 1.2. The Town will continue to study the impacts of income-producing land uses in Pine Knoll shores	2015	2018

E. RESOURCE CONSERVATION MANAGEMENT ACTION PLAN/POSITIVE AND NEGATIVE IMPACTS OF LAND USE PLAN POLICIES

The Town of Pine Knoll Shores believes that the policies, management goals, planning objectives, and land use plan requirements contained in this document will have positive impacts for the Town. However, the following could have some negative impacts:

1. Transportation changes in sensitive areas.
2. Potential infringement of growth on sensitive areas.
3. Negative impact of population growth on the Carteret County School System.
4. Increased stormwater runoff.
5. Possible degradation of water quality.

The management objectives, policies, and implementing actions address the issues associated with these possible negative impacts.

APPENDIX I

TOWN OF PINE KNOLL SHORES 2004-2008 CITIZEN PARTICIPATION PLAN

PREPARATION OF A CORE LAND USE PLAN PHASE I

The Town of Pine Knoll Shores has received a Coastal Area Management Act grant for preparation of a Core Land Use Plan, Phase I. Adequate citizen participation in the development of the plan is essential to the preparation of a document responsive to the needs of the citizens of the Town of Pine Knoll Shores. To ensure such input, the following citizen participation program will be utilized by the town.

The Pine Knoll Shores Board of Commissioners will appoint a Town of Pine Knoll Shores Land Use Plan Committee (LUPC) to work with the town's planning consultant to ensure that the final product will be a plan suitable for adoption by the town. The committee will include representatives from the Planning Board and Board of Commissioners.

Specifically, the planning consultant and the LUPC will be responsible for ensuring accomplishment of the following:

- Develop and adopt the Citizen Participation Plan; conduct public information meeting; and conduct a meeting to identify community concerns, key planning issues, and aspirations. In addition, prepare analysis of existing and emerging conditions.
- Complete analysis of existing and emerging conditions; prepare natural systems analysis and analysis of land use and development (including Existing Land Use Map).
- Prepare community facilities analysis; prepare/review land suitability analysis and map; review existing CAMA plan, ordinances, and policies.

The following schedule will be utilized for Phase I:

1. **September, 2004**
 - **Conduct public information meeting.**
 - Board of Commissioners adopt the Citizen Participation Plan.
2. **October, 2004**
 - Conduct initial meeting with LUPC and review Citizen Participation Plan and process for preparing the land use plan.

- Conduct town issues identification meeting.
- 3. November, 2004 to April, 2005 - Prepare preliminary draft land use plan which will include analysis of existing conditions, land suitability analysis, natural systems analysis, and community facilities analysis. Conduct monthly meetings with the LUPC.
- 4. May, 2005 - Present draft of Phase I to the Planning Board.
- 5. June, 2005 - Present draft of Phase I to the Board of Commissioners.

All meetings of the LUPC and Board of Commissioners at which the Plan will be discussed will be advertised in a local newspaper. The public information meeting, town meeting, and public hearing will also be advertised in a local newspaper. In addition, public service announcements will be mailed to local radio stations and posted at the Town Hall and other public buildings as directed by the LUPC and Board of Commissioners. All meetings will be open to the public. The town will encourage and consider all economic, social, ethnic and cultural viewpoints. No major non-English speaking groups are known to exist in the Town of Pine Knoll Shores.

8/30/04

TOWN OF PINE KNOLL SHORES
CITIZEN PARTICIPATION PLAN

PREPARATION OF A CORE LAND USE PLAN
PHASE II

The Town of Pine Knoll Shores has received a Coastal Area Management Act grant for preparation of a Core Land Use Plan, Phase II. Adequate citizen participation in the development of the plan is essential to the preparation of a document responsive to the needs of the citizens of the Town of Pine Knoll Shores. To ensure such input, the following citizen participation program will be utilized by the Town.

The Pine Knoll Shores Board of Commissioners has appointed the Town of Pine Knoll Shores Land Use Plan Committee (LUPC) to work with the Town's planning consultant to ensure that the final product will be a plan suitable for adoption by the Town. The committee will include representatives from the Planning Board and Board of Commissioners.

Specifically, the planning consultant and the LUPC will be responsible for ensuring accomplishment of the following:

- Adopt and implement Citizen Participation Plan for Phase II.
- Revise preliminary plan based on public review.
- Complete plan for the future (including future land use map and tools for managing development).
- Present the draft plan to the Board of Commissioners.
- Submit plan to state/DCM for review; provide plan to adjacent jurisdictions for review; conduct public information hearings.
- Review plan based on state and local review; conduct public hearing; Board of Commissioners adoption; submit for CRC certification.

The following schedule will be utilized for Phase II:

6. **August - September, 2005**
 - Update Citizen Participation Plan
 - Begin preparation of Phase II portion of LUP
7. **October, 2005 - January, 2006**
 - Hold monthly meetings with LUPC
 - Revise preliminary plan based on public review
8. **February, 2006 - Provide plan to adjacent jurisdictions to review**
9. **March, 2006 - Submit plan (with any revisions) to the Pine Knoll Shores Planning Board for review and preliminary approval**
10. **April, 2006 - Submit draft plan to state for DCM review**

11. **May, 2006**

- Revise plan based on state and local review
- Conduct public hearing for Board of Commissioners to adopt plan
- Submit to CRC for certification

All meetings of the LUPC and Board of Commissioners at which the Plan will be discussed will be advertised in a local newspaper. The public hearing will also be advertised in a local newspaper. In addition, public service announcements will be posted at the Town Hall and other public buildings as directed by the LUPC and Board of Commissioners. All meetings will be open to the public. The town will encourage and consider all economic, social, ethnic and cultural viewpoints. No major non-English speaking groups are known to exist in the Town of Pine Knoll Shores.

7/14/05

TOWN OF PINE KNOLL SHORES
CITIZEN PARTICIPATON PLAN

PREPARATION OF A CORE LAND USE PLAN
PHASE III

The following schedule will be utilized for Phase III:

- July, 2008
Final revisions made to state/DCM
Town staff meeting with planner to revise draft plan
- August, 2008
Board of Commissioners call for a Public Hearing
Draft Plan put on public display
- September, 2008 – Public Hearing held on draft plan
- October, 2008 – Draft plan presented to state/DCM
- November, 2008 – Draft plan submitted to CRC for certification

APPENDIX II

**Town of Pine Knoll Shores
2004-2008 CAMA Land Use Plan Property Owners Survey Results**

1. Pine Knoll Shores should increase its efforts/services to provide a retirement friendly community.

<i>Absentee Property Owners</i>			<i>In-Town Property Owners</i>		
Agree	No Opinion	Disagree	Agree	No Opinion	Disagree
344	173	105	207	54	71

<i>Total</i>		
Agree	No Opinion	Disagree
551	227	176

2. The Town of Pine Knoll Shores should maintain its stance on limiting commercial development within the corporate limits.

<i>Absentee Property Owners</i>			<i>In-Town Property Owners</i>		
Agree	No Opinion	Disagree	Agree	No Opinion	Disagree
546	21	55	275	17	40

<i>Total</i>		
Agree	No Opinion	Disagree
821	38	95

3. In light of the recent increased restrictions regarding stormwater runoff control currently being implemented in a majority of towns and counties across the state, the Town should continue to take a proactive approach to stormwater control.

<i>Absentee Property Owners</i>			<i>In-Town Property Owners</i>		
Agree	No Opinion	Disagree	Agree	No Opinion	Disagree
494	95	33	286	28	18

<i>Total</i>		
Agree	No Opinion	Disagree
780	123	51

4. Pine Knoll Shores should support the development of a town-wide sewage collection system.

<i>Absentee Property Owners</i>			<i>In-Town Property Owners</i>		
Agree	No Opinion	Disagree	Agree	No Opinion	Disagree
382	146	94	161	59	112

<i>Total</i>		
Agree	No Opinion	Disagree
543	205	206

5. The town should identify a solution that will ease traffic flow and congestion along NC Highway 58.

<i>Absentee Property Owners</i>			<i>In-Town Property Owners</i>		
Agree	No Opinion	Disagree	Agree	No Opinion	Disagree
365	132	125	172	61	99

<i>Total</i>		
Agree	No Opinion	Disagree

537	193	224
-----	-----	-----

6. The town should make it a priority to develop a town-wide bicycle/pedestrian corridor.

<i>Absentee Property Owners</i>			<i>In-Town Property Owners</i>		
Agree	No Opinion	Disagree	Agree	No Opinion	Disagree
364	131	127	174	55	103

<i>Total</i>		
Agree	No Opinion	Disagree
538	186	230

7. Pine Knoll Shores should pursue the development of a town-owned and operated central storage area for both boats and recreational vehicles.

<i>Absentee Property Owners</i>			<i>In-Town Property Owners</i>		
Agree	No Opinion	Disagree	Agree	No Opinion	Disagree
149	168	305	83	75	174

<i>Total</i>		
Agree	No Opinion	Disagree
232	243	479

8. **Ranking of key issues:** The following issues were identified and ranked by permanent residents of the Town at a public meeting held on November 11, 2004. All property owners as identified by Carteret County tax records were asked to rank each issue identified from 1 to 10, with 1 being the most important need and 10 being the least important need. Following are the results of the ranking by absentee property owners and in-town property owners:

ISSUE	Absentee Rank	In-Town Rank
Develop long-term plan for beach renourishment 20-30 years	1	5
Maintain strict residential zoning restrictions	2	1
Preserve the maritime forest	3	3
Solve problems involved with water system (purchase and/or improvements)	4	6
Maintain housing standards	5	2
Address stormwater management issues	6	4
Identify strategy for use and preservation of Roosevelt natural area	7	7
Phase-in underground utilities	8	8
Maintain the canal	9	9
Develop a multi-use recreational facility	10	10

Mailed out 1,975 surveys (617 in-town; 1358 absentee)

Received 959 responses (333 in-town; 626 absentee)

Appendix III
Existing Land Use with Flood Hazard Areas

Sources: Base Layers from Carteret County GIS and Holland Consulting Planners, Inc.

Local Water Supply Plan (2013)



Pine Knoll Shores

The Division of Water Resources (DWR) provides the data contained within this Local Water Supply Plan (LWSP) as a courtesy and service to our customers. DWR staff does not field verify data. Neither DWR, nor any other party involved in the preparation of this LWSP attests that the data is completely free of errors and omissions. Furthermore, data users are cautioned that LWSPs labeled PROVISIONAL have yet to be reviewed by DWR staff. Subsequent review may result in significant revision. Questions regarding the accuracy or limitations of usage of this data should be directed to the water system and/or DWR.

1. System Information

Contact Information

PROVISIONAL

Water System Name:	Pine Knoll Shores	PWSID:	04-16-031
Mailing Address:	100 Municipal Circle Pine Knoll Shores, NC 28512	Ownership:	Municipality
Contact Person:	Ernie Rudolph	Title:	Public Services Director
Phone:	252-247-4353	Fax:	252-247-4355
Secondary Contact:	Sonny Cunningham	Phone:	252-247-4353
Mailing Address:	100 Municipal Circle Pine Knoll Shores, NC 28512	Fax:	252-247-4355

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	4-8	26.90 %
Ductile Iron	6-8	0.30 %
Polyvinyl Chloride	2-10	72.80 %

What are the estimated total miles of distribution system lines? 29 Miles
 How many feet of distribution lines were replaced during 2013? 0 Feet
 How many feet of new water mains were added during 2013? 0 Feet
 How many meters were replaced in 2013? 34
 How old are the oldest meters in this system? 20 Year(s)
 How many meters for outdoor water use, such as irrigation, are not billed for sewer services? 0
 What is this system's finished water storage capacity? 0.400 Million Gallons
 Has water pressure been inadequate in any part of the system since last update? No

Programs

Does this system have a program to work or flush hydrants? Yes, Weekly
 Does this system have a valve exercise program? Yes, Annually
 Does this system have a cross-connection program? Yes
 Does this system have a program to replace meters? Yes
 Does this system have a plumbing retrofit program? No
 Does this system have an active water conservation public education program? Yes
 Does this system have a leak detection program? Yes

Water Conservation

What type of rate structure is used? Increasing Block
 How much reclaimed water does this system use? 0.000 MGD For how many connections? 0
 Does this system have an interconnection with another system capable of providing water in an emergency? Yes

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
White Oak River (17-1)	100 %	Carteret	100 %

What was the year-round population served in 2013? 2,111
 What was the seasonal population and months served in 2013? (if applicable) 4,198 (May J
 Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	1,614	0.241	0	0.000

Commercial	65	0.059	0	0.000
Industrial	0	0.000	0	0.000
Institutional	0	0.000	0	0.000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.024 MGD

Water Sales

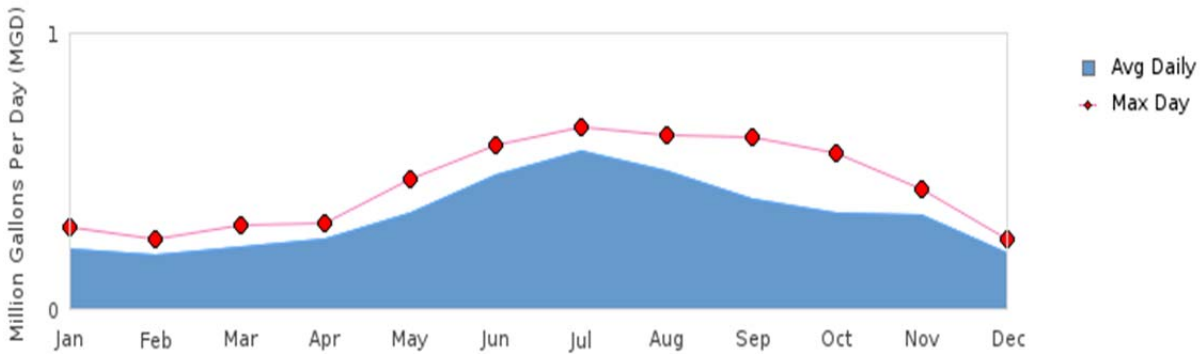
Purchaser	PW SID	Average Daily Sold (MGD)	D a y s U s e d	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MG D	Expirati on	Recurri ng			
Atlantic Beach	04-16-035	0.000	0	0.500		Yes	Yes	8	Emergency
Bogue Banks WC	04-16-028	0.000	0	0.500		Yes	Yes	8	Emergency

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	0.218	0.292	May	0.345	0.472	Sep	0.397	0.624
Feb	0.193	0.250	Jun	0.484	0.590	Oct	0.346	0.562
Mar	0.219	0.304	Jul	0.569	0.655	Nov	0.336	0.431
Apr	0.251	0.311	Aug	0.500	0.629	Dec	0.197	0.253

Pine Knoll Shores's 2013 Monthly Withdrawals & Purchases



Ground Water Sources

Name or Number	Average Daily Withdrawal (MGD)		Max Day Withdrawal (MGD)	12-Hour Supply (MGD)	CUA Reduction	Year Offline	Use Type
	MGD	Days Used					
Well 1	0.093	354	0.176	0.201	CUA0		Regular
Well 2	0.111	324	0.228	0.259	CUA0		Regular
Well 3	0.001	65	0.006	0.234	CUA0		Regular
Well 4	0.137	365	0.291	0.288	CUA0		Regular

Ground Water Sources (continued)

Name or Number	Well Depth (Feet)	Casing Depth (Feet)	Screen Depth (Feet)		Well Diameter (Inches)	Pump Intake Depth (Feet)	Metered?
			Top	Bottom			
Well 1	186	139			6	84	Yes
Well 2	210	162			6	104	Yes
Well 3	169	140			6	80	Yes
Well 4	158	124			8	84	Yes

Are ground water levels monitored? Yes, Monthly

Does this system have a wellhead protection program? Yes

Water Purchases From Other Systems

Seller	PWS ID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Atlantic Beach	04-16-035	0.000	0	0.500		Yes	Yes	8	Emergency
Bogue Banks WC	04-16-028	0.000	0	0.500		Yes	Yes	8	Emergency

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Output Metered?	Source
Well 1	0.250	Yes	Yes	Ground water supply.
Well 2	0.323	Yes	Yes	Ground water supply.
Well 3	0.269	Yes	Yes	Ground water supply.
Well 4	0.358	Yes	Yes	Ground water supply.

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2013? No

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2013? No

If yes, was any water conservation implemented?

Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? No

4. Wastewater Information

Monthly Discharges

Average Daily	Average Daily	Average Daily
---------------	---------------	---------------

	Discharge (MGD)		Discharge (MGD)		Discharge (MGD)
Jan	0.000	May	0.000	Sep	0.000
Feb	0.000	Jun	0.000	Oct	0.000
Mar	0.000	Jul	0.000	Nov	0.000
Apr	0.000	Aug	0.000	Dec	0.000

How many sewer connections does this system have? 0

How many water service connections with septic systems does this system have? 1,679

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

5. Planning

Projections

	2013	2020	2030	2040	2050	2060
Year-Round Population	2,111	2,150	2,175	2,200	2,250	2,300
Seasonal Population	4,198	5,200	5,400	5,900	6,300	6,800
Residential	0.241	0.500	0.515	0.565	0.600	0.650
Commercial	0.059	0.140	0.145	0.160	0.170	0.185
Industrial	0.000	0.000	0.000	0.000	0.000	0.000
Institutional	0.000	0.000	0.000	0.000	0.000	0.000
System Process	0.024	0.060	0.065	0.070	0.075	0.080
Unaccounted-for	0.002	0.016	0.016	0.018	0.019	0.020

Future Supply Sources

Source Name	PWSID	Source Type	Additional Supply	Year Online	Year Offline	Type
Well # 5	04-16-031	Ground	0.300	2017		Regular
Well # 6	04-16-031	Ground	0.300	2020		Regular

Demand v/s Percent of Supply

	2013	2020	2030	2040	2050	2060

Surface Water Supply	0.000	0.000	0.000	0.000	0.000	0.000
Ground Water Supply	0.982	0.982	0.982	0.982	0.982	0.982
Purchases	0.000	0.000	0.000	0.000	0.000	0.000
Future Supplies		0.600	0.600	0.600	0.600	0.600
Total Available Supply (MGD)	0.982	1.582	1.582	1.582	1.582	1.582
Service Area Demand	0.326	0.716	0.741	0.813	0.864	0.935
Sales	0.000	0.000	0.000	0.000	0.000	0.000
Future Sales		0.000	0.000	0.000	0.000	0.000
Total Demand (MGD)	0.326	0.716	0.741	0.813	0.864	0.935
Demand as Percent of Supply	33%	45%	47%	51%	55%	59%

The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 114 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs? To educate the consumer the importance of water conservation and the fact that water is a fragile resource. Water conservation will need to be a collective effort from everyone to make an impact on protecting the resource. Our billing system uses an increasing block structure which discourages waste.

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs? NCRURAL Water will continue to be utilized to assist in these challenges. Leak detection is one of NCRURAL Water's forte, this recovered water will be utilized to keep from having to come up with future supply. This will ensure that our water accountability will be in check also. Water meter testing is a way of making sure that the consumer is paying for the water that they are being billed for.

How does the water system intend to implement the demand management and supply planning components above? NCRURAL Water can give the Town of Pine Knoll Shores technical assistance for free.

Additional Information

Has this system participated in regional water supply or water use planning? No

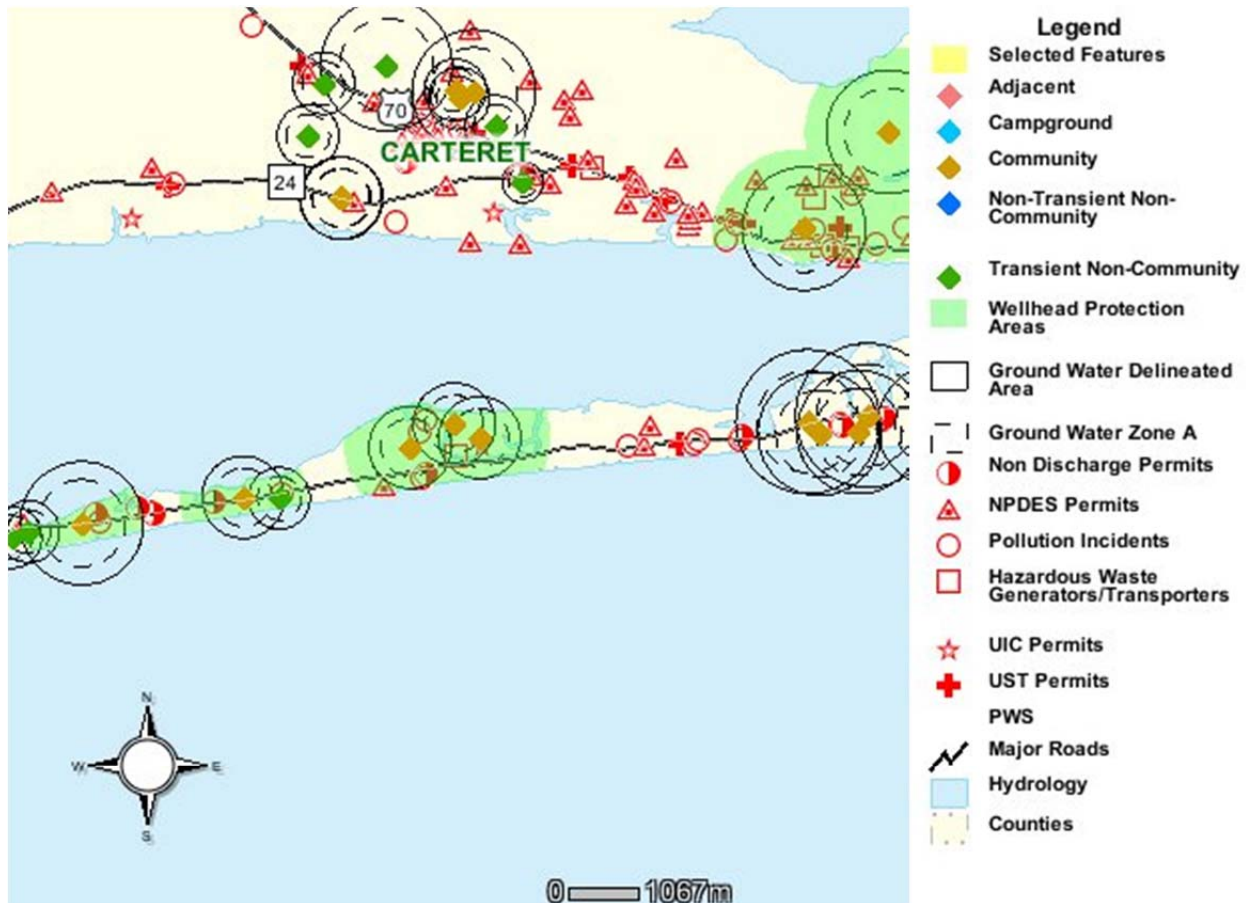
What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

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Appendix V.

Wellhead Protection Areas, Water Facilities, Source Waters, Permits, Pollution Incidents, and Hazardous Waste Generators in Pine Knoll Shores



Source: NCDENR Source Water Assessment Program

(<http://swap.ncwater.org/website/swap/viewer.htm>)

Community: A community water system is a public water system that serves 15 or more connections or regularly serves 25 or more year-round residents. Examples of community water systems include cities, towns, subdivisions and mobile home parks. Non-discharge permits

Transient, Non-community: A transient non-community water system is a public water system that serves 25 or more people at least 60 days per year. Examples of transient non-community water systems include restaurants, DOT rest areas, convenience stores and churches

NPDES Permits: The National Pollutant Discharge Elimination System (NPDES) database identifies facilities permitted for the operation of point source discharges to surface waters in accordance with the requirements of Section 402 of the Federal Water Pollution Control Act. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into public waters.

UIC Permits: The UIC program permits Class V injection wells that do not inject waste into the subsurface. Examples of permitted Class V facilities include heat pump/air conditioning water wells, remediation wells, tracer wells, and experimental technology wells

UST Permits: An underground storage tank system (UST) is a tank and any underground piping connected to the tank that has at least 10 percent of its combined volume underground. The federal UST regulations apply only to underground tanks and piping storing either petroleum or certain hazardous substances. These facilities are regulated under Subtitle I of RCRA and must be registered with the state and receive an operating permit annually. Until the mid-1980s, most USTs were made of bare steel, which is likely to corrode over time and allow UST contents to leak into the environment. Faulty installation or inadequate operating and maintenance procedures also can cause USTs to release their contents into the environment. The greatest potential hazard from a leaking UST is that the petroleum or other hazardous substance can seep into the soil and contaminate groundwater. A leaking UST can also present other health and environmental risks, including the potential for fire and explosion. The facilities shown in this database have tanks registered with the UST Section.

Non-Discharge Permits: The non-discharge database identifies industrial and municipal facilities that are permitted to operate any sewer system, treatment works, disposal system, petroleum contaminated soil treatment system, animal waste management system, storm water management system or residual disposal/utilization system which does not discharge to surface waters of the state, including systems which discharge waste onto or below land surface.

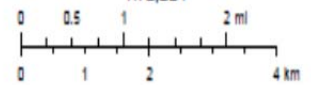
Appendix VI.
Impaired Waters, Pine Knoll Shores, NC



March 18, 2015

— DWR_WQ_Classifications

1:72,224



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL,

NC DENR - Division of Water Resources

Red line indicates shellfish closures.

Appendix VII.

Review of the 2008 CAMA Core Land Use Plan Implementing Actions

The CAMA Land Use Plan rules and regulations require a review of what the Town has accomplished since the last plan update. Although the Town has not necessarily continuously or actively worked on this list, it has undertaken many efforts that do support the 2008 CAMA Land Use Plan.

<i>Accomplished</i>
1. The Town will prepare a parks and recreation plan and seek funding for the preparation of the plan. This update will address recreational needs as identified by the Recreational Advisory Committee.
2. The Town has received funding under the North Carolina CAMA Shoreline Access funding program (15A NCAC 7M, Section.0300, Shorefront Access Policies). These funds will, if possible, be utilized to assist in acquiring and constructing the project discussed in P.4, above.
4. The Town will work with citizens, state permitting agencies, and the NC Division of Coastal Management to identify and plan for a suitable use within the Roosevelt Natural Area. This planning should be focused on establishing a use that will have minimal impacts on the natural environment, and will serve to maintain the quality of adjacent Outstanding Resource Waters (ORW). An example of a suitable use would be the renovation and expansion of the trail system which currently extend from the NC State Aquarium property.
5. The Town will provide parking for all public beach access sites as required by the US Army Corps of Engineers and will petition the NCDOT to provide pedestrian crosswalks.
6. The Town will consider establishing a marina zoning district on sites where marinas and boat access sites exist in order to have no net loss of existing marinas.
25. The Town of Pine Knoll Shores will research all opportunities for funding options to phase in underground utilities throughout its planning jurisdiction. This effort will focus on grant state and federal grant funding, as well as cooperation with private developers and all utility providers.
33. In response to possible sea level rise, the Town of Pine Knoll Shores will review all local building and land use related ordinances and consider establishing setback standards, density controls, bulkhead restrictions, buffer vegetation protection requirements, and building designs which will facilitate the movement of structures.
43. The Town of Pine Knoll Shores will prepare a public recreational plan to address the growing needs of a predominantly year-round residential community.
44. The Town of Pine Knoll Shores will emphasize the protection of environmentally sensitive areas in the update of its public recreational plan (refer to Section V.B. Natural Systems Analysis).
50. The Town of Pine Knoll Shores will research options for development, design, and financing of indoor, multi-use recreation facility.

<i>Ongoing</i>
9. The Town of Pine Knoll Shores will consider revisions to the zoning ordinance for non-residential sites to ensure adequate buffering and landscaping to separate residential and incompatible non-residential uses, and adequate regulation of off-site lighting, hours of operation, and vehicular access and parking locations. Non-residential development should be bound to those areas specified on the future land use map included in this plan.
10. The Town of Pine Knoll Shores will regulate through its zoning and subdivision ordinance the development of conflicting land uses in areas where non-residential development is permitted.
11. The Town of Pine Knoll Shores will enforce its zoning regulations and rely on state permitting

agencies to ensure that all commercial development within or adjacent to Areas of Environmental Concern is carried out in accordance with all local, state, and federal regulations.
12. The Town of Pine Knoll Shores will review its zoning and subdivision ordinances to ensure compliance with residential and non-residential policies.
13. Protect the Town of Pine Knoll Shores’ fragile areas from inappropriate, unplanned, or poorly planned development through the following: (1) By enforcing the Town of Pine Knoll Shores Zoning Ordinance and implementing the future land use map, limit land uses in the vicinity of historic sites, natural heritage areas, and designated conservation areas to compatible land uses. (2) The Town of Pine Knoll Shores will coordinate all housing code enforcement/redevelopment projects/ public works projects with the NC Division of Archives and History to ensure the preservation and identification of significant historic structures and archaeological sites.
14. The Town of Pine Knoll Shores will review its zoning and subdivision ordinances to ensure compliance with all conservation properties.
15. As additional issues arise related to stormwater control, including the potential implementation of National Pollutant Discharge Elimination System (NPDES) Phase II stormwater requirements, the Town will review its stormwater management ordinance to ensure that all necessary steps are being taken to minimize the impacts of stormwater runoff on both adjacent properties and water quality.
16. Pine Knoll Shores will take measures to ensure compliance with all North Carolina Coastal Stormwater Rules.
17. The Town of Pine Knoll Shores will review its stormwater control ordinance and include updates regarding regulations for water detention and/or retention facilities in new developments as new state and federal policy require.
18. The Town of Pine Knoll Shores supports ongoing planning and capital improvement efforts to address the drainage problem associated with flooding from tropical storm events. The Town will continue to work toward a comprehensive solution to current storm drainage issues that exist within the Town’s planning jurisdiction. This action specifically applies to the two “Areas of Stormwater Concern” detailed on Map 14 (page 71) of this plan.
19. The Town of Pine Knoll Shores will continue to seek grant funding from state and federal agencies for assistance in funding capital improvement projects that will aid the Town in alleviating flooding and storm drainage problems with [sic] exist throughout the Town’s planning jurisdiction.
20. The Town of Pine Knoll Shores will consult the future land use map when considering new public facilities and private development.
21. The Town of Pine Knoll Shores will rely on the NC Division of Environment and Natural Resources and the Carteret County Health Department to oversee the proper operation, management, and maintenance of all wastewater treatment facilities (private septic tanks and package treatment plants) within the Town.
22. The Town of Pine Knoll Shores may consider adopting an operating and capital financing plan for the development of water system upgrades in preparation for future demand.
23. The Town of Pine Knoll Shores will provide emergency management personnel and facilities to serve the projected population growth.
24. The Town of Pine Knoll Shores will coordinate the development of recreational facilities with all

applicable Homeowners' Associations in order to maximize the potential quality, access, and use of these facilities.
26. The Town of Pine Knoll Shores will review and update its subdivision ordinance to ensure compliance with policies P28 through P41.
27. The Town of Pine Knoll Shores will continue to consider the adoption of streets right-of-ways for Town maintenance. Adoption of existing and proposed streets will be determined on a case-by-case basis, and will be based on whether the respective street right of way meets the design specifications of the Town of Pine Knoll Shores.
28. The Town of Pine Knoll Shores will continue to rely on the North Carolina Department of Transportation for the maintenance of NC Highway 58 (Salter Path Road) and all state roads.
29. The Town of Pine Knoll Shores will continue to enforce its Floodplain Ordinance and participate in the National Flood Insurance Program. It will rely on the North Carolina Department of the Environment and Natural Resources, Division of Coastal Management to monitor and regulate development in areas up to five feet above mean high water susceptible to sea level rise and wetland loss. Subdivision regulations will be enforced-requiring elevation monuments to be referenced so that floodplain elevations can be more easily determined.
30. The Town of Pine Knoll Shores will monitor development proposals for compliance with Section 404 of the Clean Water Act and will continue to enforce local land use ordinances to regulate development within or adjacent to freshwater swamps, marshes, and 404 wetlands.
31. In the event of a natural disaster, the Town of Pine Knoll Shores permits redevelopment of previously developed areas, provided redevelopment is in compliance with all applicable policies, regulations, and ordinances. Redevelopment, including infrastructure, should be designed to withstand natural hazards.
32. The Town of Pine Knoll Shores will enforce the density controls in the zoning ordinance and subdivision ordinance in potential redevelopment areas to control growth intensity.
34. The Town of Pine Knoll Shores will utilize the future land use map for development in accordance with applicable statutes as a guideline. This map is coordinated with the land suitability map and existing infrastructure maps.
35. The Town of Pine Knoll Shores will consider the development of a dune stabilization program through installation of properly installed sand fences or fence enclosures around the primary dune line along oceanfront portions of the Town. This effort will also involve the planting of sea oats and Bitter Panicum to increase the stability of the dune line. The Town has established a working group within the Board of Commissioners to determine the requirements for continued beach renourishment and dune stabilization.
36. The Town of Pine Knoll Shores will comply with CAMA and NC Division of Environmental Management stormwater runoff regulations, and by coordinating local development activities involving chemical storage or underground storage tank installation/abandonment with the Town Emergency Management personnel and the Groundwater Section of the North Carolina Division of Environmental Management. The Town of Pine Knoll Shores will plan for an adequate long range water supply. In the planning process, the Town will cooperate with all regional counties to protect water resources.
37. The Town of Pine Knoll Shores will enforce its zoning and subdivision regulations and its ordinances which address stormwater runoff to aid in protecting sensitive shoreline areas. The Town will also rely on state and federal agencies to promote and protect Bogue Sound, as well as any other nursery and habitat areas adjacent to the Town.
38. The Town of Pine Knoll Shores will rely on the technical requirements and state program approval for underground storage tanks (40 CFR, Parts 280 and 281), and any subsequent state regulations

concerning underground storage tanks adopted during the planning period.
39. The Town of Pine Knoll Shores will continuously enforce through the development and zoning permit process, all current regulations of the NC State Building Code and North Carolina Division of Health Services relating to building construction and septic tank installation/replacement in areas with soils restrictions.
40. Preservation of wetlands is important to the protection/improvement of water quality in the Town of Pine Knoll Shores. The following will be implemented through zoning and/or subdivision regulations as required: <ol style="list-style-type: none"> 1. Coordinate all development review with the appropriate office of the US Army Corps of Engineers and the Soil Conservation Service. 2. Require that wetland areas be surveyed and delineated on all preliminary and final subdivision plats. 3. Consider cluster development in order to protect sensitive natural areas. A cluster development is defined as a development that concentrates buildings in specific areas on a site to allow the remaining land to be used for recreation, common open space, and preservation of environmentally sensitive areas.
41. The Town of Pine Knoll Shores recognizes the impact that pet and animal waste can have on water quality. The Town has and enforces a pet waste pickup ordinance.
42. The Town of Pine Knoll Shores will continue to enforce its existing land development ordinances which were drafted with an aim of medium density residential development. Enforcement of this code will help minimize the effects of stormwater runoff as future development/redevelopment occurs.
45. The Town of Pine Knoll Shores will pursue funding through state and federal programs that are considered supportive of local economic development efforts: <ol style="list-style-type: none"> (1) The Town of Pine Knoll Shores is generally receptive to state and federal programs, particularly those which provide improvements to the Town. The Town will continue to fully support such programs, especially the NC Department of Transportation road and bridge improvement programs, which are very important to the Town and its regional accessibility. (2) Examples of other state and federal programs that are important and supported by Pine Knoll Shores include: dredging and channel maintenance by the US Army Corps of Engineers, federal and state projects that provide efficient and safe boat access for sport fishing, public beach and coastal waterfront access grant funds, and the recently completed US Army Corps of Engineers Section 933 Beach Renourishment Project.
46. The Town of Pine Knoll Shores will continue to support the activities of the NC Division of Travel and Tourism; specifically, the monitoring of tourism-related industry, efforts to promote tourism-related commercial activity, and efforts to enhance and provide shoreline resources.
47. Floodplain regulation is a concern in the Town of Pine Knoll Shores. To accomplish protection of public health and service needs, Pine Knoll Shores will continue to enforce the flood hazard reduction provisions of the Town of Pine Knoll Shores Land Development Ordinance.
48. The Town of Pine Knoll Shores will continue to rely on the support of the Coastal Regional Solid Waste Management Authority for solid waste collection. The Town will also continue to utilize privatized curb side waste removal services.
49. The Town of Pine Knoll Shores will continue to promote the recycling of all recyclable materials. The effort will be handled by the Town's private waste collection service.

Appendix VIII.
2008 CAMA Core Land Use Plan Policy Analysis

<u>POLICY</u>	<u>LAND USE/ DEVELOPMENT ORDINANCES SUPPORT</u>	<u>POLICY CREATING DESIRED LAND USE PATTERNS AND PROTECTING NATURAL SYSTEMS</u>
1. The Town supports recreational-related developments that protect and preserve the natural environment while promoting the Town as a vacation destination while consistent with the residential nature of the town. It supports the private and public development of waterfront access through private funds and federal/state grant monies.	YES	YES
2. The Town supports providing shoreline access for persons with disabilities where possible.	NO N/A	YES
3. The Town supports state/federal funding of piers for crabbing, fishing, and sightseeing, as well as other facilities to serve the public at beach and estuarine access sites.	NO	YES
4. The Town supports the development of estuarine access areas which comply, to the maximum extent possible, with all state and federal regulatory requirements to ensure adequate shoreline access. Areas that have traditionally been used by the public should be given special attention. One particular project of local interest is the establishment of an access area to Bogue Sound adjacent to Town Hall that will offer maritime forest and estuarine access for citizens and visitors. The Town supports the use of local public funds and state grant money for this effort.	YES	YES
5. The Town of Pine Knoll Shores supports the exploration of the requirements for additional facilities as identified in the 2007 Recreational Advisory Committee Survey.	YES	YES
6. The Town supports the development of an environmentally sound, low impact use for the Roosevelt Natural Area.	YES	NO
7. The Town of Pine Knoll Shores will seek to meet all requirements set forth by the US Army Corps of Engineers Section 933 Project guidelines with respect to public beach access.	YES	YES
8. The Town supports no net loss of existing marinas or boating access.	YES	YES
9. The Town of Pine Knoll Shores discourages the re-zoning of residentially-developed or zoned areas to	YES	YES

<p>non-residential and multi-family classifications in an effort to maintain the overall residential character of the Town of Pine Knoll Shores. Such re-zoning and amendments in classifications to the future land use map should be carefully balanced with a demonstrated need for such proposed development that will be the best overall land development policy for the Town. This policy should be focused on carrying out the policies established in this plan, as well as the Town's Vision statement outlined on page 9.</p>		
<p>10. The Town discourages the construction of excessively large structures and will monitor building permit activity in an effort to control this type of development. The Town's zoning ordinance has been amended to establish maximum impervious lot cover requirements.</p>	YES	YES
<p>11. The Town of Pine Knoll Shores supports quality development reflecting the spectrum of housing needs ranging from single-family homes to multi-family (where indicated on the future land use map) and planned unit developments.</p>	YES	YES
<p>12. The Town of Pine Knoll Shores supports regulating growth to coincide with the provision of public facilities and services. This policy should especially apply to the proper provision of wastewater treatment facilities, and their ability to operate in a manner that will minimize impacts on the open waters of Bogue Sound, the Pine Knoll Shores canal system, and the Town's groundwater.</p>	YES	YES
<p>13. The Town of Pine Knoll Shores supports the continued establishment and maintenance of buffers along major thoroughfares.</p>	YES	YES
<p>14. The Town of Pine Knoll Shores supports providing adequate conservation/open space buffers between areas designated for residential development as indicated on the future land use map and any adjacent non-residential land use, including commercial, office and/or institutional, and utility areas.</p>	YES	YES
<p>15. The Town of Pine Knoll Shores supports all covenants established by all Homeowners Associations (HOA) throughout its planning jurisdiction. Proposals for development or redevelopment should not only comply with Town land development policies and ordinances, but should also abide by all restrictions established under a given properties (sic) respective HOA restrictive covenants.</p>	VARIABLE	VARIABLE

16. The Town of Pine Knoll Shores supports allowing home occupations in residential districts as evidenced in Chapter XXI, page 169.3 of the Pine Knoll Shores Code.	YES	YES
17. The Town of Pine Knoll Shores supports commercial development consistent with the Town of Pine Knoll Shores' future land use map and current zoning ordinance. It should be noted; however, that the Town would like to maintain a primarily residential community, and the infringement of commercial development will be held to specific locales through strict enforcement of the Town's development code.	YES	YES
18. The Town of Pine Knoll Shores opposes the establishment of private or public solid waste collection or holding sites with the Town of Pine Knoll Shores planning jurisdiction. Solid waste collection is contracted out and taken to the Tri-County Landfill. Solid waste is picked up curbside on a weekly basis. Recycling is collected curbside every other Thursday.	NO	NO
19. The Town of Pine Knoll Shores prohibits the construction of any additional public or private open water or upland marina facilities. Modification of existing marinas will be permitted, assuming the geographical extent of the existing facility is not expanded. This policy exceeds guidelines established under 15 NCAC 7H. While the Town prohibits the construction of new marinas, it supports the maintenance and no net loss of existing marinas.	YES	YES
20. Except as otherwise permitted in this plan, residential, commercial, and office/institutional development should not be supported in natural heritage areas, conservation areas, or coastal wetlands. Residential and commercial development which meets 15A NCAC 7H use standards will be allowed in estuarine shoreline, estuarine water, and public trust areas. In all other areas, development will be allowed that is consistent with applicable local, state, and federal regulations.	YES	YES
21. The Town of Pine Knoll Shores will support larger lots in conservation classified areas as designated on the future land use map through enforcement of the Town of Pine Knoll Shores subdivision and zoning ordinances in zoned areas.	YES	YES
22. The Town of Pine Knoll Shores aims to maintain its character as an eco-friendly residential community. Commercial development should be permitted only in	YES	YES

areas already designated for this use through the Town of Pine Knoll Shores' zoning ordinance and Future Land Use Map.		
23. The Town of Pine Knoll Shores supports reducing soil erosion, runoff, and sedimentation to minimize the adverse effects on surface and subsurface water quality. This policy is especially important in areas adjacent to the Outstanding Resource Waters located along the Roosevelt Natural Area as well as the waters within the Town's canal system.	YES	YES
24. The Town of pine Knoll Shores supports the enforcement of all controls and regulations, specifically design standards, tie-down requirements, flood-proofing, CAMA regulations, and FEMA regulations, deemed necessary by the Town Board of Commissioners to mitigate the risks of lives and property caused by severe storms and hurricanes, specific policy recommendations and implementing actions supporting this may be found in the Town's locally adopted Hazard Mitigation Plan.	YES	YES
25. The Town of Pine Knoll Shores supports providing adequate community services and facilities which meet the needs of the Town's citizens and businesses.	YES	YES
26. The Town of Pine Knoll Shores will work to ensure that sufficient water service is provided to promote growth, to alleviate public health problems, and to provide fire protection for the town.	YES	YES
27. The Town of Pine Knoll Shores supports the extension of water services from existing systems and encourages the use of central systems for new developments whether residential, commercial, or office/institutional in nature. It also supports the continued public provision of solid waste disposal, law enforcement, and educational services, including upgrades to the web-site, to all citizens of the town.	YES	YES
28. The Town of Pine Knoll Shores will rely on its existing land use and development ordinances to regulate development and may amend or modify regulations to encourage or require the provision of central water service to lots or parcels proposed in new developments.	YES	YES
29. The Town of Pine Knoll Shores supports the installation and use of properly permitted septic tank systems and package treatment plants, with oversight and enforcement from the Carteret County Health Department, North Carolina Department of Environment and Natural Resources (NCDENR), and	YES	YES

local development regulations regarding lot sizes, waste disposal system placement, system type, and maintenance. The Town recognizes how important the proper installation and maintenance of these systems is to the continued protection of environmentally sensitive areas.		
30. The Town of Pine Knoll Shores supports the provision of public recreational facilities and areas and will pursue funds and donations for open space and recreational facilities.	YES	YES
31. The Town of Pine Knoll Shores supports continued efforts to improve the provision of utilities to all Town residents, both water and waste water. Although the Town does not own or operate any wastewater treatment facilities, other than those serving municipal operations, the Town supports identifying a solution to the mounting concerns related to wastewater treatment facilities.	YES	YES
32. The Town of Pine Knoll Shores supports the transition of all overhead utility lines to underground lines.	NO	NO
33. The Town of Pine Knoll Shores supports interconnected street systems for residential and non-residential development.	YES	YES
34. The Town of Pine Knoll Shores supports limited access from development along all roadways to provide safe ingress and egress.	YES	YES
35. The Town of Pine Knoll Shores supports maintaining an effective signage and addressing system for all right-of-ways including private drives and access streets.	YES	YES
36. The Town of Pine Knoll Shores supports state and federal funding for maintenance/dredging of the Beaufort Inlet. Additionally, Pine Knoll Shores supports the requirements to place all beach quality sand from dredging projects on the beaches along Bogue Banks. The Town will continue to work with the Carteret County Shore Protection Office to ensure that this alternative remains a priority.	NO	YES
37. The Town of Pine Knoll Shores opposes the construction of a third bridge accessing Bogue Banks from Morehead City. The plans for this third bridge have the thoroughfare entering the Island in the vicinity of Salter Path and Indian Beach. This will have substantial adverse impacts on the Town's existing transportation and parking problems.	NO	YES
38. The Town of Pine Knoll Shores supports the	YES	YES

installation of properly engineered and permitted bulkheads, assuming this development is in compliance with all 15A NCAC 7H Guidelines.		
39. The Town of Pine Knoll Shores supports the US Army Corps of Engineers' regulations and the applicable guidelines of the Coastal Area Management Act and the use of local land use ordinances to regulate development within or immediately adjacent to freshwater swamps, marshes, and 404 wetlands.	YES	YES
40. The Town of Pine Knoll Shores supports, but does not fund, relocation of structures endangered by erosion, if the relocated structure will be in compliance with all applicable policies and regulations.	YES	YES
41. The Town of Pine Knoll Shores supports hazard mitigation planning. Refer to Appendix IV for specific policies and implementing actions related to hazard mitigation. Any updates to the Land Use Plan or the Hazard Mitigation Plan will be cross-referenced to ensure consistency.	YES	YES
42. The Town of Pine Knoll Shores supports the land use densities that are specified on pages 122-126 of this plan. Through enforcement of the zoning ordinance, these densities will minimize damage from natural hazards and support the hazard mitigation plan.	YES	YES
43. The Town of Pine Knoll Shores recognizes the significance of protecting the dune line along oceanfront portions of Pine Knoll Shores' planning jurisdiction. The Town of Pine Knoll Shores supports continued efforts to protect these dunes through the establishment of a proactive dune stabilization and protection program.	YES	YES
44. The Town of Pine Knoll Shores supports the efforts of the Carteret County Shore Protection Office to establish a long term comprehensive approach to addressing beach renourishment throughout oceanfront portions of the Town's jurisdiction.	NO N/A	YES
45. The Town supports and relies on the Town's Emergency Operations Plan and the Carteret County Emergency Operations Plan for evacuation procedures and policies necessary as a result of natural disasters.	YES	YES
46. The Town of Pine Knoll Shores supports the guidelines of the Coastal Area Management Act and the efforts and programs of the North Carolina Department of Environment and Natural Resources, Division of Coastal Management and the Coastal Resources Commission to protect the coastal wetlands, estuarine waters, estuarine shorelines, and public trust	YES	YES

waters of the Town.		
47. The Town of Pine Knoll Shores supports conserving its surficial groundwater resources. The Town specifically supports the enforcement of the Capacity Use Rules tied to the Castle Hayne Aquifer in an effort to ensure groundwater quantity and quality throughout the planning period and beyond.	NO N/A	YES
48. The Town of Pine Knoll Shores supports commercial and recreational fishing in its waters and will cooperate with other local governments and state and federal agencies to control pollution of these waters to improve conditions so that commercial and recreational fisheries will not be depleted. It also supports the preservation of nursery and habitat areas.	YES	YES
49. The Town of Pine Knoll Shores opposes the disposal of any toxic wastes, as defined by the US Environmental Protection Agency's Listing of Hazardous Substances and Priority Pollutants (developed pursuant to the Clean Water Act of 1977), within its planning jurisdiction, or in waters adjacent to Town including the waters of the Atlantic Ocean.	NO	YES
50. The Town of Pine Knoll Shores recognizes the value of water quality maintenance to the protection of fragile areas and to the provision of clean water for recreational purposes and supports the control of stormwater runoff to aid in the preservation of water quality. The Town of Pine Knoll Shores will support existing state regulations relating to stormwater runoff to aid in the preservation of water quality. The Town of Pine Knoll Shores will support existing state regulations relating to stormwater runoff resulting from development (Stormwater Disposal Policy 15 NCAC 2H.0001-.1003). Additionally, the Town supports all efforts of the NPDES Phase II stormwater rule as established by the Environmental Protection Agency, and enforced by the NCDENR.	YES	YES
51. The Town of Pine Knoll Shores supports regulation of underground storage tanks in order to protect its groundwater resources and implementation of the Town's wellhead protection plan.	YES	YES
52. The Town of Pine Knoll Shores supports the policy that all State of North Carolina projects should be designed to limit to the extent possible stormwater runoff into coastal waters. This will be addressed further through Phase II implementation plans.	YES	YES
53. The Town of Pine Knoll Shores supports implementation of the White Oak River Basinwide	NO N/A	YES

Water Quality Management Plan.		
54. The Town of Pine Knoll Shores supports protection of those waters known to be of the highest quality or supporting biological communities of special importance, this especially applies to the Outstanding Resource Waters adjacent to the Roosevelt Natural Area and those within the Town’s canal system. The Town has passed ordinances that address stormwater runoff from single-family and multi-family development sites.	YES	YES
55. The Town of Pine Knoll Shores supports management of problem pollutants particularly biological oxygen demand and nutrients, in order to correct existing water quality problems and to ensure protection of those waters currently supporting their uses. This effort should focus on residential development adjacent to the Town’s canal system.	YES	YES
56. The Town of Pine Knoll Shores opposes the installation of package treatment plants and septic tanks or discharge of waste in any areas classified as coastal wetlands, freshwater wetlands (404), or natural heritage areas. This policy does not apply to constructed wetlands. All decisions regarding the construction of these facilities should have the oversight of the Carteret County Health Department and the NCDENR.	NO N/A	YES
57. The Town of Pine Knoll Shores supports the following actions by the General Assembly and the Governor: (1) Sufficient state funding should be appropriated to initiate a program of incentives and grants to address pollution of our rivers from both point sources and nonpoint sources. (2) An ongoing source of state funding should be developed to provide continuous support for an incentives grant program. (3) The decision-making process for the award of incentives and grants should involve river basin organizations representing local governments and other interest groups in the review of all applications for state funding.	NO N/A	YES
58. The Town of Pine Knoll Shores does not support the location of floating homes within its jurisdiction. This policy exceeds state requirements.	YES	YES
59. The Town of Pine Knoll Shores supports the following goals of the NC Coastal Habitat Protection Program (CHPP): (1) Document the ecological role and function	NO N/A	YES

<p>of aquatic habitats for coastal fisheries.</p> <p>(2) Provide status and trends information on the quality and quantity of coastal fish habitat.</p> <p>(3) Describe and document threats to coastal fish habitat, including threats from both human activities and natural events.</p> <p>(4) Describe the current rules concerning each habitat.</p> <p>(5) Identify management needs.</p> <p>(6) Develop options for management action using the above information.</p>		
<p>60. The Town of Pine Knoll Shores supports the efforts of the Carteret County Health Department to develop and maintain a system to identify and track the maintenance of all wastewater treatment facilities throughout the County. This will have positive benefits not only for Pine Knoll Shores, but all communities along Bogue Banks.</p>	<p>NO N/A</p>	<p>YES</p>
<p>61. Any underground storage tank (UST) systems installed within 500 feet of a public water supply well or within 500 feet of any surface water classified as HQW, ORW, WS-I, WS-II, or SA must be secondarily contained.</p>	<p>NO N/A</p>	<p>YES</p>
<p>62. The Town of Pine Knoll Shores supports the removal of any abandoned or out-of-use USTs within the planning area.</p>	<p>NO N/A</p>	<p>YES</p>
<p>63. The Division of Water Quality has determined that current coastal stormwater rules have not adequately addressed water quality impacts to public trust waters and that local governments that strictly defer to state and federal rules to address water quality issues have impaired water quality issues. Their findings concluded that:</p> <p>(1) Areas that have impervious surfaces of 10% or greater contribute to local stream degradation;</p> <p>(2) Biological diversity has been shown to drop when areas of impervious surface increases beyond 10-15%;</p> <p>(3) Stream stability is affected when impervious surface approaches 10% in an area;</p> <p>(4) Estuaries generally degrade when areas have 10% impervious surfaces;</p> <p>(5) Sensitive fish species loss increases with 12% impervious surface.</p> <p>The Town of Pine Knoll Shores supports efforts to improve water quality and will modify ordinances if required by the Division of Water Quality.</p>	<p>YES</p>	<p>YES</p>

64. The Town of Pine Knoll Shores will preserve and protect its valuable natural resources. Special attention will be given to the Roosevelt Natural Area, and adjacent Outstanding Resource Waters.	YES	YES
65. The Town of Pine Knoll Shores will protect its waterfront/shoreline areas, estuarine shorelines and waterbodies, Town wide canal system, and valuable scenic areas.	YES	YES
66. The Town of Pine Knoll Shores supports the local North Carolina Aquarium in their efforts to provide a regional education and cultural destination.	NO N/A	YES
67. The Town of Pine Knoll Shores will maintain medium density residential development (4 dwelling units/acre in single family residential areas, and 8 dwelling units or less per acre in multi family residential areas) in order to maintain the desirable quiet residential character of the Town (see page 126).	YES	YES
68. The Town of Pine Knoll Shores supports tourism, including eco-tourism, as an important asset to overall economic development of Bogue Banks in general. The Town is primarily a residential community and supports/relies on commercial establishments in Atlantic Beach and Emerald Isle.	NO N/A	YES
69. The Town of Pine Knoll Shores encourages the use of advanced wastewater treatment technologies which will reduce the amount of land required for drain and repair fields. These systems should help reduce pollutants in stormwater runoff, which have historically contributed to water quality issues in waters adjacent to town.	NO N/A	YES
70. The Town of Pine Knoll Shores, in conjunction with the Carteret County Health Department and NCDENR, requires the use of package treatment wastewater systems for effective economic development of multi-family, condotel, and motel/hotel development.	YES	YES
71. The Town of Pine Knoll Shores does not oppose non-residential development, which is consistent with Town policies and ordinances. The Town does, however, want to focus this development in areas designated for commercial/office space development on the Town's future land use map.	YES	YES
72. The Town of Pine Knoll Shores supports the economic development efforts of the Carteret County Tourism Development Authority.	NO N/A	YES
73. The Town of Pine Knoll Shores opposes any low level military training flights that are not in compliance	NO N/A	YES

with the minimum safe altitudes for aircraft operations as described in the Federal Aviation Regulations, Part 71.		
74. The Town of Pine Knoll Shores opposes the location of new outlying landing fields within the regional vicinity of Pine Knoll Shores.	NO N/A	YES
75. The Town of Pine Knoll Shores supports a comprehensive recreational program to provide a broad range of recreation facilities for its citizens.	YES	YES
76. The Town of Pine Knoll Shores will continue to implement its locally adopted Hazard Mitigation Plan in an effort to improve public safety in the event of a natural disaster.	YES	YES
77. The Town of Pine Knoll Shores supports the provision of superior health care facilities within Carteret County, as well as Bogue Banks. Additionally, the Town supports the development of facilities and services targeted at the aging population to include areas within the Town's jurisdiction.	NO N/A	YES
78. The Town of Pine Knoll Shores will continue to provide mutual aid in the form of Fire/EMS service with adjacent communities, should this need arise. The Town is aware it operates the most comprehensive and modernized fire/EMS facility along Bogue Banks, and will continue to utilize this resource to further improve public safety throughout Pine Knoll Shores and neighboring jurisdictions. The Town has recently signed an updated county-wide cooperative agreement.	NO N/A	YES

Appendix IX.
2014 Policy Consistency Analysis
B=Beneficial; N=Neutral; D=Detrimental

	Pine Knoll Shores will provide, as required, public access to town beaches.	Pine Knoll Shores will ensure that development and use of resources or preservation of land will minimize direct and secondary environmental impacts and avoid risks to public health, safety, and welfare.	Pine Knoll Shores will ensure that infrastructure systems are appropriately sized, located and managed so the quality and productivity of areas of environmental concern are protected.	Pine Knoll Shores will conserve and manage shorelines, flood plains, and other coastal features for their natural storm protective functions and natural beauty.	The Town of Pine Knoll Shores will manage, protect, and where possible enhance water quality in all surface waters and wetlands within the town's jurisdiction giving consideration to public health, safety and welfare issues.
PA. 1. The Town supports public and private shoreline accesses that protect and preserve the natural environment while promoting the Town as a vacation destination, consistent with the residential nature of the Town.	B	B	B	B	N
PA. 2. The Town supports the private and public development of waterfront access through private funds, federal and state grant money, and local taxes.	B	N	N	N	N

<p>PA. 3. The Town supports providing shoreline access for persons with disabilities where reasonably possible.</p>	B	N	N	N	N
<p>PA. 4. The Town supports the development of estuarine access areas which comply to the maximum extent possible with all state and federal regulatory requirements to ensure adequate shoreline access. Areas that have traditionally been used by the public should be given special attention.</p>	B	B	B	B	N
<p>LUC. 1. The Town supports re-zoning and amendments in classifications to the future land use map that are carefully balanced with a demonstrated need for such proposed development that will be in the best interest of the Town. This policy should be focused on carrying out the policies established in this plan, as well as the Town's Vision statement outlined on page ____.</p>	N	B	B	B	B

LUC. 2. The Town supports quality development reflecting the spectrum of housing needs ranging from single-family homes to multi-family (where indicated on the future land use map) and planned unit developments.	N	B	N	N	N
LUC. 3. The Town supports regulating growth to coincide with the provision of public facilities and services.	N	B	B	N	N
LUC. 4. The Town supports the continued establishment and maintenance of buffers along major thoroughfares, especially Hwy 58.	N	B	N	N	N
LUC. 5. The Town supports providing adequate conservation/open space buffers between areas designated for residential development as indicated on the future land use map and any adjacent non-residential land use, including commercial, office and/or institutional, and utility areas.	N	B	N	N	N
LUC. 6. The Town	N	B	N	N	N

supports allowing home occupations in residential districts.					
LUC. 7. The Town will rely on its existing land use and development ordinances to regulate development.	N	B	B	B	B
LUC. 8. The Town will preserve and protect its valuable natural resources. Special attention will be given to the Roosevelt Natural Area and adjacent Outstanding Resource Waters.	N	B	B	B	B
LUC. 9. The Town of Pine Knoll Shores will maintain medium density residential development (4 dwelling units/acre in single family residential areas, and 8 dwelling units or less per acre in multi-family residential areas) in order to maintain the character of the Town.	N	B	N	N	N
LUC. 10. The Town does not oppose non-residential development, which is consistent with Town policies and ordinances. The Town does, however, want to focus this development in areas designated for	N	B	N	N	N

commercial/office space development on the Town's future land use map.					
LUC. 11. The Town will support larger lots in conservation classified areas as designated on the future land use map through enforcement of the Town of Pine Knoll Shores subdivision and zoning ordinances in zoned areas.	N	B	N	N	B
LUC. 12. The Town supports the enforcement of controls and regulations, i.e. design standards, flood-proofing, CAMA regulations, and FEMA regulations, deemed necessary by the Town Board of Commissioners to mitigate the risks to lives and property caused by severe storms and hurricanes.	N	B	N	N	N
LUC. 13. The Town, in conjunction with the Carteret County Health Department and NCDENR, requires the use of package treatment wastewater systems for effective development of multi-family units, condotels, and motel/hotels.	N	B	N	N	N

LUC. 14. The Town supports hazard mitigation and emergency operations planning.	N	B	N	B	N
LUC. 15. The Town supports the preservation of its maritime forest and tree canopy.	N	B	B	B	B
ICC. 1. The Town of Pine Knoll Shores supports providing adequate infrastructure, community services, and facilities which meet the needs of the Town's citizens and businesses to include, but not limited to, water service, stormwater management, emergency response, administration, and solid waste collection.	N	B	B	N	N
ICC. 2. The Town will ensure that water service supports growth, alleviates public health problems, provides effective service, and supplies fire protection for the town.	N	B	B	N	N
ICC. 3. The Town supports the extension of water services from existing systems and encourages the use of	N	B	B	N	N

central systems for new developments whether residential, commercial, or office/institutional in nature.					
ICC. 4. The Town may amend or modify regulations to encourage or require the provision of central water service to lots or parcels proposed in new developments.	N	B	B	N	N
ICC. 5. The Town supports the installation and use of properly permitted septic tank systems and package treatment plants, with oversight and enforcement from the Carteret County Health Department, North Carolina Department of Environment and Natural Resources (NCDENR), and local development regulations regarding lot sizes, waste disposal system placement, system type, and maintenance. The Town recognizes how important the proper installation and maintenance of these systems is to the continued protection	N	B	B	N	B

of environmentally sensitive areas.					
ICC. 6. The Town supports continued efforts to improve the provision of utilities to all Town residents, e.g. water, waste water, cellular coverage, cable, and electric.	N	N	B	N	N
ICC. 7. The Town supports maintaining an effective signage and addressing system for all right-of-ways including private drives and access streets.	N	B	B	N	N
ICC. 8. The Town supports state and federal funding for maintenance/dredging of the inlets on either side of Bogue Banks. Additionally, Pine Knoll Shores supports the requirements to place all beach quality sand from dredging projects on the beaches along Bogue Banks.	B	B	B	B	N
ICC. 9. The Town supports keeping its Pedestrian Master Plan updated.	N	N	B	N	N
ICC. 10. The Town supports appropriate transportation projects for the community.	N	B	B	N	B
ICC. 11. The Town supports conserving	N	B	B	N	N

its <u>drinking water supply</u> .					
ICC. 12. The Town supports maintaining professional, safe, functional, and attractive public facilities as called for in the Town's Strategic Plan.	N	N	B	N	N
NHA. 1. The Town supports the US Army Corps of Engineers' regulations and the applicable guidelines of the Coastal Area Management Act and the use of local land use ordinances to regulate development within or immediately adjacent to freshwater swamps, marshes, and 404 wetlands.	N	B	N	B	B
NHA. 2. The Town will protect its waterfront/shoreline areas, estuarine shorelines and waterbodies, town-wide canal system, and valuable scenic areas.	N	B	N	B	B
NHA. 3. The Town recognizes the significance of protecting the dune line along oceanfront portions of Pine Knoll Shores' planning jurisdiction. The Town of Pine Knoll Shores supports continued	B	B	B	B	N

efforts to protect these dunes through the establishment of a proactive dune stabilization and protection program.					
NHA. 4. The Town supports the efforts of the Carteret County Shore Protection Office to establish a long term comprehensive approach to addressing beach renourishment throughout oceanfront portions of the Town's jurisdiction.	B	B	B	B	N
WQ. 1. The Town supports the guidelines of the Coastal Area Management Act and the efforts and programs of the North Carolina Department of Environment and Natural Resources, Division of Coastal Management and the Coastal Resources Commission to protect the coastal wetlands, estuarine waters, estuarine shorelines, and public trust waters of the Town.	N	B	N	B	B
WQ. 2. The Town supports commercial and recreational fishing in its waters and will cooperate	N	N	N	N	B

with other local governments and state and federal agencies to control pollution of these waters to improve conditions so that commercial and recreational fisheries will not be depleted. It also supports the preservation of nursery and habitat areas.					
WQ. 3. The Town opposes the disposal of any toxic wastes, as defined by the US Environmental Protection Agency's Listing of Hazardous Substances and Priority Pollutants (developed pursuant to the Clean Water Act of 1977), within its planning jurisdiction, or in waters adjacent to Town including the waters of the Atlantic Ocean.	N	B	N	N	B
WQ. 4. The Town supports the policy that all State of North Carolina projects should be designed to limit to the extent possible stormwater runoff into coastal waters.	N	B	B	N	B
WQ. 5. The Town supports protection of those waters known to	N	B	B	B	B

<p>be of the highest quality or supporting biological communities of special importance, this especially applies to the Outstanding Resource Waters adjacent to the Roosevelt Natural Area and those within the Town's canal system.</p>					
<p>WQ. 6. The Town of Pine Knoll Shores supports management of problem pollutants particularly biological oxygen demand and nutrients, in order to correct existing water quality problems and to ensure protection of those waters currently supporting their uses. This effort should focus on residential development adjacent to the Town's canal system.</p>	N	B	N	N	B
<p>WQ. 7. The Town of Pine Knoll Shores opposes the installation of package treatment plants and septic tanks or discharge of waste in any areas classified as coastal wetlands, freshwater wetlands (404), or natural heritage areas. This policy does not apply</p>	N	B	B	B	B

to constructed wetlands. All decisions regarding the construction of these facilities should have the oversight of the Carteret County Health Department and the NCDENR.					
WQ. 8. The Town encourages the use of advanced wastewater treatment technologies which will reduce the amount of land required for drain and repair fields. These systems should help reduce pollutants in stormwater runoff, which have historically contributed to water quality issues in waters adjacent to town.	N	B	B	B	B
WQ. 9. The Town of Pine Knoll Shores supports reducing soil erosion, runoff, and sedimentation to minimize the adverse effects on surface and subsurface water quality. This policy is especially important in areas adjacent to the Outstanding Resource Waters located along the Roosevelt Natural Area as well as the waters within the Town's canal system.	N	B	B	N	B
WQ. 10. The Town of	N	B	B	B	B

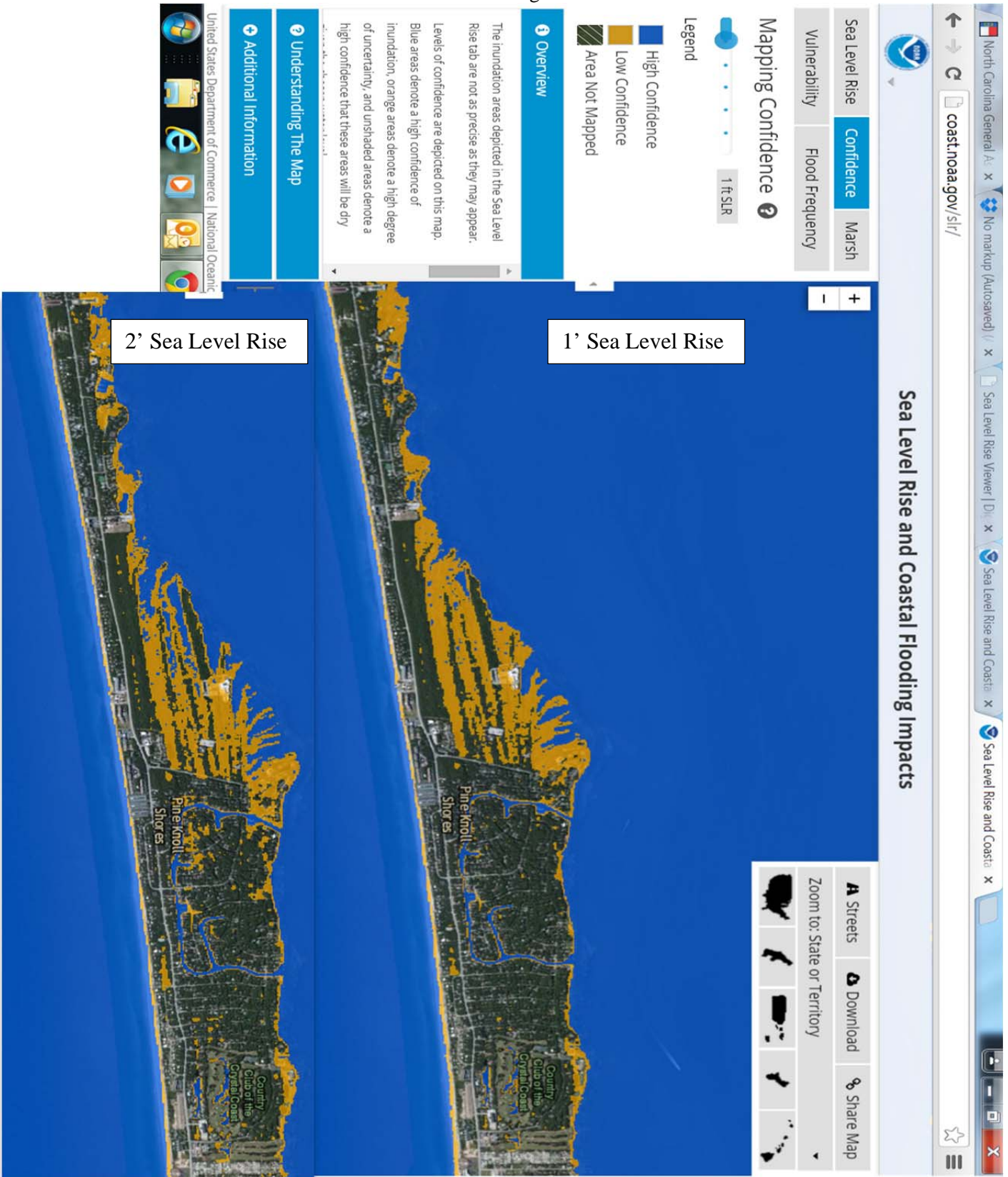
Pine Knoll Shores recognizes the value of water quality maintenance to the protection of fragile areas and to the provision of clean water for recreational purposes and supports the control of stormwater runoff to aid in the preservation of water quality.					
WQ. 11. The Town does not support the location of floating homes within its jurisdiction.	N	N	N	N	B
WQ. 12. The Town supports efforts to improve water quality.	N	B	B	N	B
LAC. T. 1. The Town of Pine Knoll Shores supports the local North Carolina Aquarium in their efforts to provide a regional education and cultural destination.	N	N	N	N	N
LAC. T. 2. The Town of Pine Knoll Shores supports the tourism development efforts of Carteret County.	B	N	N	N	N
LAC. T. 3. The Town of Pine Knoll Shores supports the continued presence of tourism-related businesses within the town limits, e.g. hotels, motels, condotels, the Aquarium, etc.	N	N	N	N	N
LAC. Rec. 1. The Town supports recreational <u>activities</u> for its citizens and visitors.	B	N	B	N	N

LAC. Rec. 2. The Town supports the provision of public and private recreational facilities and areas in keeping with the desires of citizens.	B	N	B	N	N
LAC. Rec. 3. The Town supports the maintenance of an up to date recreation plan.	B	N	B	N	N
LAC. S. 1. The Town supports the provision of solid waste collection and recycling services for residents.	N	B	B	N	B
LAC. S. 2. The Town supports providing adequate public services to its population.	N	B	B	N	N
LAC. AIP. 1. The Town supports efforts to make Pine Knoll Shores an age-friendly community.	N	B	N	N	N
LAC. ED. 1. The Town supports the economic development efforts of the Carteret County Economic Development Council.	N	N	N	N	N
LAC. ED. 2. The Town generally opposes the presence of industrial or manufacturing land uses within the town limits.	N	B	B	N	B
LAC. ED. 3. The Town supports tourism as a component of economic development, as outlined in policy LAC. T. 3.	B	N	N	N	N
LAC. ED. 4. The Town supports limited office/professional and	N	N	N	N	N

commercial development within the Town. This development should be consistent with the policies outlined in the Land Use Compatibility section.					
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Appendix X.

NOAA One Foot and Two-foot Sea Level Rise Projection with Confidence Levels from coast.noaa.gov/slr



Notes from NOAA:

The inundation areas depicted in the Sea Level Rise tab are not as precise as they may appear.

Levels of confidence are depicted on this map. Blue areas denote a high confidence of inundation, orange areas denote a high degree of uncertainty, and unshaded areas denote a high confidence that these areas will be dry given the chosen water level.

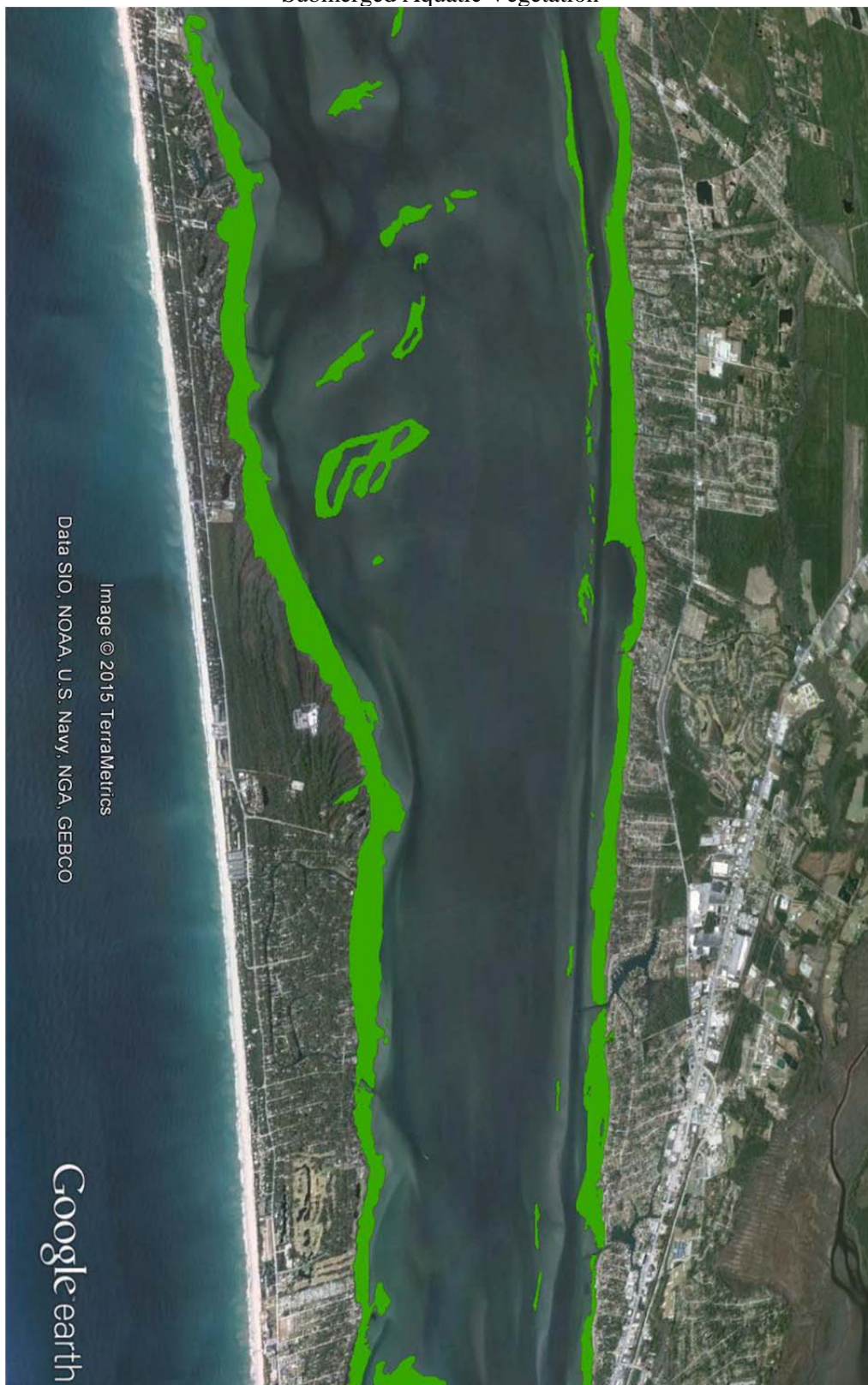
In this application 80% is considered a high degree of confidence such that, for example, the blue areas denote locations that may be correctly mapped as 'inundated' more than 8 out of 10 times. Areas with a high degree of uncertainty represent locations that may be mapped correctly (either as inundated or dry) less than 8 out of 10 times.

Note from Pine Knoll Shores:

Although the CRC's Science Panel has not yet released its projections for our area, they have not predicted a one-foot sea level rise change for North Carolina over the next 30 years. These projections are something to monitor over future planning future periods as the Town does prepare for future sea level rise.

These are two maps from the website: coast.noaa.gov/slr. For further information, the site features a map that can be manipulated to reflect 0-6' of sea level rise and a variety of inundation rates. It is important to note that inundation covers long term effects of sea level rise, and it will be important for the Town to examine SLOSH models with sea level rise to consider short term/intense inundations that may occur as a result of hurricanes and storm surge.

Appendix XI.
Submerged Aquatic Vegetation



Map courtesy of North Carolina Division of Marine Fisheries

**Green indicates known instances of submerged aquatic vegetation.

Appendix XII.
Shallow Coastal Flooding Areas



**Shallow coastal flooding areas denoted in red

Source: <http://coast.noaa.gov/slr>

Appendix XIII. Glossary

Ad Valorem Tax: A tax levied on the value of real property and certain personal property.

Albemarle-Pamlico Region: The portion of North Carolina that forms the watershed of the Albemarle and Pamlico Sounds.

American Community Survey (ACS): The American Community Survey is a product of the US Census Bureau, released annually, that takes sampling data over a five year period and provides estimates for key demographic characteristics with statistical sampling margins of errors. This plan incorporates data from the 2008-2012 ACS.

Annual Average Daily Traffic (AADT): The total volume of traffic on a road in a year divided by the number of days in the year to get the average daily rate. This figure is used by NCDOT in identifying capacity issues within the transportation network.

Aquarium: The North Carolina Aquarium at Pine Knoll Shores, 1 Roosevelt Blvd., Pine Knoll Shores, NC.

Aquifer: Generally, this is a large underground water source that supplies water for domestic consumption and use. Within this plan, references to aquifers typically refer to the Castle Hayne Aquifer, the primary water source for eastern North Carolina.

Archaeological sites: Per Division of Coastal Management regulations, “areas that contain archaeological remains (objects, features, and/or sites) that have more than local significance to history or prehistory.”

Areas of Excessive Erosion: Areas where erosion exceeds the rate of soil formation.

Areas of Excessive Slope: Areas where the slope exceeds 12%.

Areas sustaining remnant species: Per Division of Coastal Management regulations, “areas that support native plants or animals determined to be rare or endangered (synonymous with threatened and endangered), within the coastal area.”

Beach Quality Sand: Per the *CAMA Handbook for Development in Coastal North Carolina*: “Sand used for beach nourishment must be similar in quality and grain size to sand in the area being nourished.”

Beach Renourishment: The process of adding dredged “beach quality sand” along the ocean shoreline of the Town.

Bogue Banks: Formerly known as the “Isle of Pines,” is a 21-mile long barrier island off the coast of North Carolina in Carteret County. The towns of Atlantic Beach, Pine Knoll Shores, Indian Beach, Emerald Isle, and the unincorporated area of Salter Path are located on the island.

Carteret County Area Transit System (CCATS): The county operated public transit system.

Carteret County Health Department Environmental Health Division: The Division of the Carteret County

Health Department that regulates septic tank installation and certain types of package treatment plants.

Carteret County Shore Protection Office: The Carteret County Department that administers the portion of the County's occupancy tax legislatively-mandated for beach nourishment, and serves as staff for the County's Beach Commission. The Office is intimately involved with federal and state permitting related to dredging, beach nourishment, and oceanfront land use; in addition to matters pertaining to the Endangered Species Act, Sea-Level Rise, offshore energy, and other policy issues impacting the coast.

Cherry Point: Marine Corps Air Station Cherry Point, NC.

Coastal Flooding: The inundation of land areas along the oceanic coast by sea waters over and above normal tidal action.

Coastal Wetlands: According to DCM regulations, “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), provided this does not include hurricane or tropical storm tides.”

Community Emergency Response Team (CERT): A corps of volunteers who supplement the efforts of the Pine Knoll Shores Fire and Emergency Management Department.

Community Rating System (CRS): A component of the National Flood Insurance Program (NFIP) administered by FEMA, the CRS is an incentive program that allows communities that take particular voluntary actions to improve their insurance rates.

Comprehensive Transportation Plan (CTP): The Carteret County Transportation Plan is a multi-modal transportation planning document that covers projected transportation projects in Carteret County.

Contaminant Rating: Per the North Carolina Public Water Supply Section: “The Contaminant Rating for a drinking water source(s) was determined based on the number and location of Potential Contaminant Sources (PCSs) within the delineated area. Each PCS identified within the delineated area was assigned a risk rating of higher, moderate or lower. If a PCS is a facility regulated in an existing environmental program, it will receive a risk rating of higher. The number of PCSs that occur within the delineated area was determined and a contaminant rating of higher, moderate or lower was assigned to a drinking water source(s).” It is a component of the source water assessment, and used to calculate the susceptibility rating with the inherent vulnerability rating.

Core CAMA Land Use Plan: This type of plan is the standard CAMA Land Use Plan required for all 20 coastal counties.

Country Club: The Country Club of the Crystal Coast, 152 Oakleaf Drive, Pine Knoll Shores, NC.

EPA Phase II Stormwater Management Program:

Estuarine waters: According to DCM regulations and NCGS 113A-113(b)(2) include all the waters of the Atlantic Ocean within the boundary of North Carolina and all the waters of the

bays, sounds, rivers and tributaries thereto seaward of the dividing line between coastal fishing waters and inland fishing waters.

Fecal coliform bacteria: Bacteria from the intestines of warm-blooded animals that are located in excrement. They can cause illness in humans if ingested and are a common source of water impairment.

Federal Emergency Management Agency (FEMA): The federal agency that, per its website, “coordinates the federal government's role in preparing for, preventing, mitigating the effects of, responding to, and recovering from all domestic disasters, whether natural or man-made, including acts of terror.”

Flood insurance rate maps (FIRM): Issued by FEMA, these maps reflect the risk of flooding for particular locations based on modeling. The risk levels indicated by these maps are used by insurance companies in setting insurance rates. The FIRMS also reflect base flood elevations for particular properties.

Groundwater: Subsurface water deposits. The term encompasses the water table and the aquifer.

High hazard flood area: According to Division of Coastal Management regulations, “the area subject to high velocity waters (including hurricane wave wash) in a storm having a one percent chance of being equaled or exceeded in any given year, as identified as zone V1-30 on the flood insurance rate maps of the Federal Insurance Administration, U.S. Department of Housing and Urban Development.”

Highway 58: The North Carolina highway that runs through Pine Knoll Shores. Within Town limits, it is also known as “Salter Path Rd.”

Highway 70: The United States route that provides primary access to Carteret County from points west, like Raleigh. Does not pass within the town limits of Pine Knoll Shores.

Historic sites: Per the Division of Coastal Management regulations, “districts, structures, buildings, sites or objects that have more than local significance to history or architecture.”

Hydric soils: soils formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions within the upper part.

Inherent Vulnerability Rating: Per the North Carolina Public Water Supply Section: “The inherent vulnerability rating of a well(s) refers to the geologic characteristics or existing conditions of the well and its delineated assessment area. These characteristics include aquifer rating, unsaturated zone rating and well integrity/well construction rating. The aquifer rating is an assessment of the water transmitting characteristics of the aquifer. The unsaturated zone rating is an assessment of the likelihood that contaminants from surface and shallow sources will follow the path of aquifer recharge and reach the water table. The well integrity/construction rating is an assessment of the quality of the construction of the well. An inherent vulnerability rating of higher, moderate or lower was assigned to a well(s).” It is a component of the source water assessment, and used to calculate the susceptibility rating with the contaminant rating.

Inlet hazard areas: Per Division of Coastal Management regulations, “natural-hazard areas that are especially vulnerable to erosion, flooding and other adverse effects of sand, wind, and water because of their proximity to dynamic ocean inlets. This area extends landward from the mean low water line a distance sufficient to encompass that area within which the inlet shall migrate, based on statistical analysis, and shall consider such factors as previous inlet territory, structurally weak areas near the inlet and external influences such as jetties and channelization.”

Kayak for the Warriors: Annual kayak race and associated activities organized by the citizens of Pine Knoll Shores that serves as a fundraiser for Hope for the Warriors.

Level of Service (LOS): An A-F qualitative scale used to rate the level of congestion on a street, with A being the least congested and F being the most congested.

Library: Bogue Banks Public Library, 320 Salter Path Rd., Pine Knoll Shores, NC.

Long Range Water Supply Plan: A document annually prepared by the Town and prepared for the North Carolina Public Water Supply Section that takes a long-term view of the Town’s water system demands and capacity needs.

Marina: Under CRC rules, a marina is any publicly or privately owned dock, basin or wet boat storage facility built to accommodate more than 10 boats and providing permanent or temporary docking space, dry stack storage, haul-out facilities or repair services.

Maritime Forest: wooded habitat typically found on barrier islands frequently impacted by salt spray, harsh winds, and sand.

Multi-family units: structures that are occupied by three or more dwellings.

National Flood Insurance Program (NFIP): A federal program administered by FEMA that attempts to lessen the impact of flooding on structures by providing affordable insurance and encouraging communities to enact best practices through the CRS.

National Oceanic and Atmospheric Administration (NOAA): The federal agency that focuses on the science of the oceans and the atmosphere. It houses, among other things, the Division of Marine Fisheries and the National Weather Service.

National Pollution Discharge Elimination Permit (NPDES): A federal program administered by the Environmental Protection Agency (EPA) that regulates the discharge from point sources into the waters of the United States.

Natural Resource Fragile Areas: 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.

North Carolina Coastal Area Management Act (CAMA): 1974 legislation that developed a regulatory program specific to the 20 coastal counties of North Carolina.

North Carolina Coastal Resources Commission (CRC): An appointed body established by the Coastal

Area Management Act to enact and establish specific regulatory requirements for the coastal counties of North Carolina. It also serves as the decision-making body for CAMA Land Use Plans and variance requests.

North Carolina Department of Natural Resources and the Environment (DENR): The North Carolina agency responsible for regulating the environment and natural resources of the State. It is the Department where the Division of Coastal Management is housed.

North Carolina Department of Transportation (NCDOT): The North Carolina agency responsible for the construction and maintenance of state roads and bridges.

North Carolina Division of Coastal Management (DCM): The State agency that administers the regulations promulgated by the Coastal Resources Commission.

North Carolina Division of Water Resources (DWR): The State agency responsible for regulating water resources. As of the 2013-2014 reorganization of DENR, its responsibilities subsumed those of the North Carolina Division of Water Quality (DWQ), which ceased to exist as a separate division.

Ocean beaches and shorelines: Lands consisting of unconsolidated soil materials (sands) 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.

Ocean erodible areas: According to Division of Coastal Management Regulations, "This is the area in which there exists a substantial possibility of excessive erosion and significant shoreline fluctuation. The oceanward boundary of this area is the mean low water line. The landward extent of this area is determined as follows: (a) a distance landward from the first line of stable and natural vegetation as defined in 15A NCAC 07H .0305(a)(5) to the recession line that would be established by multiplying the longterm annual erosion rate times 60, provided that, where there has been no long-term erosion or the rate is less than two feet per year, this distance shall be set at 120 feet landward from the first line of stable natural vegetation. For the purposes of this Rule, the erosion rates are the long-term average based on available historical data. The current long-term average erosion rate data for each segment of the North Carolina coast is depicted on maps entitled "2011 Long-Term Average Annual Shoreline Rate Update" and approved by the Coastal Resources Commission on May 5, 2011 (except as such rates may be varied in individual contested cases, declaratory or interpretive rulings). In all cases, the rate of shoreline change shall be no less than two feet of erosion per year. The maps are available without cost from any Local Permit Officer or the Division of Coastal Management on the internet at <http://www.nccoastalmanagement.net>; and (b) a distance landward from the recession line established in Sub-Item (1)(a) of this Rule to the recession line that would be generated by a storm having a one percent chance of being equaled or exceeded in any given year."

Outstanding Resource Waters (ORW): According to DWR, a subset of High Quality Waters. This supplemental classification is intended to protect unique and special waters having excellent water quality and being of exceptional state or national ecological or recreational significance. To qualify, waters must be rated Excellent by DWR and have one of the following outstanding resource values:

- Outstanding fish habitat and fisheries,
- Unusually high level of waterbased recreation or potential for such kind of recreation,
- Some special designation such as North Carolina Natural and Scenic River or National Wildlife Refuge,

- Important component of state or national park or forest, or
- Special ecological or scientific significance (rare or endangered species habitat, research or educational areas)

Peak Seasonal Population: the total number of overnight visitors in the Town of Pine Knoll Shores on the busiest day of the year

Pleistocene Age: The Pleistocene is actually a geological epoch lasting from 2.5 million years ago until 11,000 years ago.

Public right of way: The space that includes the paved portion of street and the unpaved portion up to a certain distance off the paved surface, usually indicated by utility poles, maintained by the Town or the State of North Carolina.

Public Trust Areas: According to DCM regulations, waters of the Atlantic Ocean and the lands thereunder from the mean high water mark to the seaward limit of state jurisdiction; all natural bodies of water subject to measurable lunar tides and lands thereunder to the normal high water or normal water level; all navigable natural bodies of water and lands thereunder to the normal high water or normal water level as the case may be, except privately-owned lakes to which the public has no right of access; all water in artificially created bodies of water containing public fishing resources or other public resources which are accessible to the public by navigation from bodies of water in which the public has rights of navigation; and all waters in artificially created bodies of water in which the public has acquired rights by prescription, custom, usage, dedication, or any other means.

Registered Natural Landmarks: Per the National Natural Landmarks Program, these are outstanding biological and geological resources designated by the Secretary of the Interior. The National Parks Service administers the program.

Roosevelt Natural Area: A 290 acre parcel of land owned by the State of North Carolina that is maintained in its natural state with the exception of a 25 acre portion set aside for the North Carolina Aquarium at Pine Knoll Shores.

Saffir-Simpson Scale: According to the National Hurricane Center: “The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane’s sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage.”

Sales and Use Tax: A tax levied on the sale of goods and services. In North Carolina, these tax revenues are distributed by the State to the counties, and apportioned by the counties to the municipalities on either a per capita or ad valorem method.

Sea, Lake and Overland Surges from Hurricanes (SLOSH) models: A model generated by NOAA to show predicted storm surge from hurricanes based on variety of factors.

Seasonally occupied structures: Structures that are occupied on a part-time rather than a full-time basis.

Single-family residences: Stand-alone housing units with a single-family or individual living in the overall structure.

Source water assessment: State reports that provide information about drinking water supply, including past pollution incidents, potential contaminants, and potential susceptibility to particular risks. The source water assessment combines a variety of environmental factors to calculate the level of risk for each well-site.

State port: Refers to the North Carolina Port in Morehead City, 113 Arendell Street, Morehead City, NC.

Static (Vegetation) Line: Per Division of Coastal Management regulations, “In areas within the boundaries of a large-scale beach fill project, the vegetation line that existed within one year prior to the onset of initial project construction shall be defined as the static vegetation line.”

Static Line Exception: An exception to the rules that apply to the Static Vegetation Line described in 15A NCAC 07J Section .1200.

Storm Surge: 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.

Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis: A form of environmental scan that examined the Town’s strengths, weaknesses, opportunities, and threats.

Submerged aquatic vegetation: According to NOAA, “Grasses that grow to the surface of—but do not emerge from—shallow water.”

Susceptibility Rating: Per the Public Water Supply Section: “The final susceptibility rating for a drinking water source(s) is determined by combining the contaminant rating and the inherent vulnerability rating.” It is a component of the source water assessment.

The Shoreline: The Town’s monthly newspaper, sent to all property owners.

Stormwater: pure rainwater plus anything the rain carries along with it.

Tri-County Landfill: government-controlled facility operated by Carteret, Craven, and Pamlico counties, located near Tuscarora in Craven County.

Trinity Center: Property of the Episcopal Diocese of East Carolina, this is a 62 acre conference and retreat center located at 618 Salter Path Rd., Pine Knoll Shores, NC.

Unique geological formations: Per Division of Coastal Management regulations, “sites that contain geologic formations that are unique or otherwise significant components of coastal systems, or that are especially notable examples of geologic formations or processes in the coastal area.”

Unvegetated beach area: Per Division of Coastal Management regulations, “Beach areas within the Ocean Hazard Area where no stable natural vegetation is present” designated by the Coastal Resources Commission.

Volunteers in Police Service (VIPS): A corps of citizen volunteers who assist the Pine Knoll Shores Police Department with administrative and other non-enforcement tasks.

Wetland: a generic term for all the different kinds of wet habitats where the land is wet for some

period of time each year but not necessarily permanently wet.

Appendix XIV.
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