18346

North Carolina Coastal Management Program

DARE COUNTY
LAND DEVELOPMENT PLAN

MAY 1976

UNDERTAKEN BY DARE COUNTY IN CONFORMANCE WITH THE NORTH CAROLINA COASTAL MANAGEMENT ACT OF 1974.

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DARE COUNTY SYNOPSIS

The Synopsis of the Dare County CAMA Land Use Plan is included as pages 151 through 169 of this report. The Dare County Commissioners intend to have a copy of the approved Synopsis mailed to every household in the county and to have it published in the local newspaper, THE COASTLAND TIMES.

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SECTION I

PRESENT CONDITIONS

GENERAL PHYSICAL CHARACTERISTICS OF DARE COUNTY

Location and Geographic Data

Dare County is part of the Coastal Plain of North Carolina, a low and partially submerged area varying in width up to 125 miles and confined between the Piedmont Plateau on the west and the continental shelf on the east. The County is composed of two distinct areas: (1) The Outer Banks, including Roanoke Island, and (2) the mainland. Both regions are flat and low-lying, and with the exception of the dunes along the Outer Banks, land elevations seldom exceed fifteen feet above mean sea level.

The mainland is almost entirely covered with thick impenetrable forest and is sparsely populated. The Outer Banks (with the exception of Roanoke Island) are generally open and devoid of forest cover, except for the broader sections of the Northern Banks and at Cape Hatteras. Roanoke Island is approximately ten miles in length with a total area of approximately 20 square miles. It is separated from the Bodie Island sector of the Outer Banks by Roanoke Sound and from the mainland by Croatan Sound. Although the Island is blocked from the Atlantic Ocean by Bodie Island, the area is still within the sphere of influence of the ocean coastline as prevailing conditions of winds and other natural factors are somewhat similar to those on the coast exposed to the ocean.

The Outer Banks portion of Dare County consists of Bodie Island and Hatteras Island. Bodie extends from the Dare County Line on the north to Oregon Inlet on the south, a distance of about thirty-three miles. The Island varies in width from one-half mile to approximately 2 miles. Hatteras Island has a beach frontage of 52 miles and is separated from Bodie Island by Oregon Inlet. The Island is generally narrow on most sections, having a width of less than one-half mile except in the Cape Hatteras area.

The Cape Hatteras National Seashore Recreation Area extends on the Outer Banks from Whalebone Junction at the southern boundary of Nags Head about 70 miles southward through Ocracoke Island. The Seashore which is operated by the National Park Service, preserves forty-five miles of beach land and covers the entire area of the Outer Banks except for the unincorporated towns and villages.

There are three incorporated towns in Dare County. Manteo (pop. 547) is the county seat and is located on Roanoke Island. Nags Head (pop. 434) and Kill Devil Hills (pop. 357) are on the Outer Banks. There are three unincorporated communities on the Mainland; East Lake, Stumpy Point, and Mann's Harbor. On the Outer Banks, the two unincorporated communities north of Kill Devil Hills are Kitty Hawk and Duck. South of Oregon Inlet on the Outer Banks are the unincorporated villages of Rodanthe, Waves, Salvo, Avon, Buxton, Frisco and Hatteras.

Sounds

The sounds in the county (Albemarle, Currituck, Roanoke, Croatan, and Pamlico) vary in depth and salinity. To the north are Albemarle and Currituck Sounds which have no direct outlets to the ocean and essentially are composed of fresh water with an average depth of eighteen and seven feet respectively. Pamlico Sound, to the south, has three inlets to the Atlantic Ocean through which waters of four major rivers flow. Although Pamlico averages twenty feet in depth, it is also extremely shoaly in specific sectors. Roanoke Sound, which separates Bodie Island and Roanoke Island, is shallow and narrow, averaging approximately three feet in depth. Croatan Sound averages eight feet in depth and provides the main outlet for the waters of the Albemarle Sound.

Currents

The Gulf Stream flows to the northeast during all months of the year and merges with the Labrador current only ten miles east of Cape Hatteras. There is substantial seasonal character of off-shore currents from Cape Hatteras to Chesapeake Bay. In the fall, surface drift is southerly and has an on-shore component. In winter, the pattern is basically indistinct, with flow conforming closely to the prevailing northwest winds. In the spring, a transition to summer conditions is experienced with a somewhat southerly surface drift. In summer, the surface drift is somewhat variable with no discernible pattern.

Waves approaching the beaches at an angle generate alongshore currents called littoral currents. Observations made along the Dare Beaches have revealed that wave-induced littoral currents have a southward flow.

Climate

Dare County, in particular the Outer Banks sector, experiences a maritime climate with cooler summers and warmer winters than inland areas of the same latitude. Cape Hatteras is the northern natural limit of palmetto and citrus trees. The ten-year mean annual precipitation measured for the Dare Beaches area is 43.2". The wettest months are July and August which average approximately nine thunderstorms per month. On Roanoke Island and further inland, average annual precipitation is a significant six inches higher while the average temperature is only slightly higher (61° to 62°).

The shoreline of the County is exposed to waves induced by winds onshore and alongshore from the northeast, through east and south to southwest. Prevailing wind is from the south-southwest and consists mostly of winds with speeds of less than nineteen m.p.h. Stronger winds are more frequent from the north, south, and southwest. The portion of the coast north of Cape Hatteras is generally exposed to waves induced by winds from the north through east to south.

The years 1914-1958 showed 195 storms of all kinds, tropical and extratropical, with winds over 45 m.p.h. Changes in the Dare Beaches are brought about principally by these powerful forces of wind and water which act on the North Carolina Coast. There are more storms in March than any other month while the period August through October represents the greatest threat of hurricanes. Northeasters, which occur mainly in October-April, account for great damages in the form of beach and dune erosion.

DARE COUNTY

WEATHER RECORDED REFLECTS THE AVERAGE TEMPERATURE AND PRECIPITATION FOR THE PAST 12 YEAR PERIOD

Temperature	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
Average Max.	51	51	58	67	75	82	87	86	80	72	63	53
Average Min.	35	34	40	49	58	67	72	71	67	58	47	37
Precipitation	4.8	4.6	2.9	3.1	3.8	4.5	6.3	6.0	5.2	3.3	3.1	3.5

SOURCE: National Park Service

Geology

The N. C. Coastal Plain is a series of marine deposits, attesting to several cycles of uplift and submergence, which were deposited upon the ancient rocks of the area. The fluctuation in sea level in past geological times appears to be correlated with Pleistocene glacial and interglacial stages, during which great quantities of water were alternately withdrawn and returned to the sea by the freezing and thawing of the great continental ice sheets. With each emergence and submergence, larger areas were left above the sea. During the flooding resulting from the last interglacial stage, the seaward part of the Coastal Plain was covered by a thin mantle of the lowest of these terraces - the Pamlico. This layer composed almost entirely of sand, was deposited by waves and currents. The sea level never rose higher than the present one when it receeded during the last glacial stage. During the last glacial maximum, the sea was between 250 - 450' below what is now the Outer Banks.

Dare County's barrier island chain is a relatively recent geologic phenomenon, having been formed about 5,000 years ago. Theories concerning formation of the barrier islands conflict, but it is generally agreed that some of the islands were formed when rising seas surrounded mainland ridges and others were formed by the elongation of coastal sand spits. These barrier islands represent a delicate physical system which is undergoing continual change. The lagoons and sounds inland of the barrier islands accumulate sediment slowly from erosion of adjacent mainland and overwash from the ocean side creating marsh areas.

Soils

Dare County is unique in North Carolina in that it is composed of three distinct and separate land forms which reflect distinct and contrasting soil types and use potentials. The soils of the mainland are generally organic in nature. Roanoke Island soil types vary from deep, well drained sandy soils supporting maritime forests to fertile marshes. These marshes provide a source of nutrients and habitats for numerous species of shellfish, as well as many other marine and wildlife species. The soils of the Outer Banks sector vary from marshes to large, shifting sand dunes. Indications are that the Outer Banks chain is slowly shifting westward as a result of wind and water action from the Atlantic Ocean.

POPULATION CHARACTERISTICS*

Age

Age structure is an important variable in estimating requirements for facilities and services such as schools, health care, housing and recreation. Sex and age characteristics are the basic causative elements in natality, mortality, and migration trends.

The median age is a statistical measure of age composition which may be defined as the age dividing the population into two equal-size groups, one older and one younger than the median age. Those counties with medians under twenty may be described as "young" while those with medians of thirty and over are described as "old".

MEDIAN AGE OF NORTHEASTERN NORTH CAROLINA COUNTIES

County	Median Age
Beaufort	29
Camden	27.7
Currituck	31
Dare	33.6
Hyde	29.8
Pasquotank	25.9
Tyrrell	31.8

SOURCE: U. S. Bureau of Census

According to data from the 1950, 1960 and 1970 censuses, Dare County's population has fallen into the "old age" bracket for the last twenty years. (1950 - 30.8; 1960 - 32.4; 1970 - 33.6). A declining birth rate and a theoretical in-migration in the older age groups for recreation and retirement purposes are major factors which must be considered when attempting to account for this age increase. Dare's 1970 median age is usually high as revealed in the above table.

*The population and economy section of this Land Use Plan is based primarily on information found in Stephen Associates' Dare County Economic Development Plan of 1974.

Changes in Age Profile of Dare County Population, 1950-1960 & 1960-1970

	Under 18	18-64	65+	Total
Number of Persons				
1950	1806	3132	467	5405
1960	1986	3312	637	5935
1970	2060	4035	900	6995
Changes in No.				
1950-60	180	180	170	530
1960-70	74	723	263	1060
Changes in %				
1950-60	10.0%	5.7%	36.4%	9.8%
1960-70	3.7%	21.8%	41.3%	17.9%

The youngest age group in Dare County (under 18 years of age) increased by ten percent in the period 1950-1960 but dropped below four percent in the 1960-1970 decade. This decrease is primarily a product of a reduction in the birth rate as well as in-migration in older families.

The middle age group (18-64) constitutes the majority of the labor force. The number of persons in this group has remained relatively constant over the 1950-1970 period as a percent of total population--28.8% to 29.4%. However, with an increase in the median age of population, this age group should become proportionally smaller and the economy will have to support a greater concentration of older people unless economic growth provides job opportunities to attract and hold younger groups.

The aging trend in Dare County has two major implications for the planning program:

(1) it will produce specialized demands on the county's services and facilities, particularly in the area of health care delivery systems and recreation since older persons require more medical care and more specialized recreation programs than the rest of the population;

(2) with a larger number of families receiving fixed incomes, fluctuations in the national economy will have a greater impact on the county.

Sex

The investigation into the balance of the sexes provides information on the social roles and employment patterns within the community. Dare County's population sex ratio, defined as the number of males per 100 females, indicates that the county is developing an exceptionally large proportion of females.

DARE COUNTY SEX RATIO

Year	Male	Female	Total	Male Sex Ratio (Dare Co.)	Male Sex Ratio (State)
1950	2683	2722	5405	98.57	98.6
1960	2952	3010	5935	97.18	97.3
1970	3403	3592	6995	94.74	95.9

Source: U. S. Bureau of Census, 1950, 1960, 1970

The major economic planning implication of Dare's large female population is illustrated by the relationship between families with female heads and the county's income statistics. According to the 1970 Census, 10% of the county's 1908 families had female heads. Mean family income was $8350 but for families with female heads, mean income was $6371. Of the 254 families considered below the poverty level, 29% were female heads. These statistics indicate that Dare County not only has a concentration of females, but also as a group, females are more economically depressed.

By examining the basic shape of the Dare County population pyramid, it is possible to identify the population's combined age-sex characteristics:

(1) The middle section is concave which indicates a relatively small proportion of the county's population is 30 to 50 years old; a vestige of out-migration during the 1950's.

(2) The base curves inward; a result of reduction in birth rates.

(3) The bulge at the top represents an in-migration of older people.

(4) An excess of females occurs in the older age groups. This lessens to some degree the need for specialized employment opportunities for women. However, consideration must be given to providing more job opportunities appropriate for females in the County's long-range economic development goals. Also emphasis should be placed in providing for cultural and recreational programs designed for older women.

Race

The nonwhite population of Dare County has maintained a relatively constant proportion of the total population for the past twenty years, ranging from 6.8% in 1960 to 7.3% in 1970. Nonwhites increased in numbers from 1950 to 1960 from 380 to 406 (6.8%). This increase can be totally accounted for by natural increase because there is an estimated outmigration of almost 6% of the 1950 nonwhite population. Over the same period, the total county population increased by almost 10%, causing a decline in the proportion of nonwhites from 7.0% in 1950 to 6.8% in 1960.

During the most recent census period (1960-1970), the nonwhite population grew more rapidly than the total county population, registering a 25.1% increase to the county's 17.9% increase.

RACIAL COMPOSITION & TRENDS, DARE COUNTY

Year	White	% Total	% Increase	Non-White	% Total	% Increase
1950	5023	93.0		380	7.0	
1960	5529	93.2	9.2	406	6.8	6.4
1970	6487	92.6	17.9	508	7.4	25.1

Source: U. S. Bureau of Census

Education

The educational levels attained by Dare County residents have consistently paralleled those of all North Carolina residents. In 1950, the median school years completed by persons 25 years of age or older was 7.9. This means that half of Dare County's residents had received less than eight years of formal education. This level equalled that of North Carolina and was higher than the neighboring counties of Currituck and Tyrrell. However, both the state and Dare County were considerably lower than the median United States achievement of 9.3 years of education.

By 1970, this level had increased by 2.6 years so that fifty percent of Dare County residents had completed over 10.5 years of school. This increase is comparable to the statewide increase of 2.7 years but is slightly behind the United States 20 year change of 2.8 years, which climbed to a national median of 12.1 school years completed. While the educational level of Dare County residents has increased over the past twenty years to remain on a par with statewide levels, it has increased more rapidly than other counties in the immediate region.

There has been a steady increase in the percentage of Dare residents with 4 years or more of high school as well as in the number of college graduates. While Dare County has a higher percentage of residents in this category than either Currituck or Tyrrell Counties, it still remains below the levels of North Carolina and the United States. The in-migration of retired persons to Dare County has probably raised the educational level, while some of the more educated people have left Tyrrell County since in-migration occurs more frequently among highly educated people.

MEDIAN NUMBER OF SCHOOL YEARS COMPLETED
BY PERSONS 25 YEARS AND OLDER

	1950	1960	1970	Change 1950-70
Dare	7.9	8.9	10.5	2.6
Currituck	7.3	8.4	9.6	2.3
Tyrrell	7.2	7.8	8.4	1.4
North Carolina	7.9	8.9	10.6	2.7
United States	9.3	10.5	12.1	2.8

Source: U. S. Census of Population, 1950, 1960, 1970.

Size of Families

The population per household figure for Dare County in 1970 was 2.67. This figure is a 16% decrease over the 1960 figure. The population per household in Dare County was lower than the state size of 3.23. This lower figure can again be attributed to the in-migration of older persons to the county.

POPULATION TRENDS

Analyses of county growth trends are useful in several respects. First, growth trends are an indicator of the pressure on the county's land resources and its public services and facilities. If the pressure is great, without proper management, it is possible that the county will begin to lose control of the land development process and be unable to keep pace with the demand for public services. Second, growth trend analysis permits identification of growth differentials within the county since all areas within the county seldom experience uniform growth rates. Third, analysis of historic growth trends provides a basis for forecasts of the county's future population levels.

COMPARATIVE GROWTH RATES 1950-60 to 1960-70

	1950-60	1960-70
Dare County	9.8	17.9
Currituck County	6.4	5.7
Tyrrell County	-10.4	-15.8
North Carolina	12.2	11.5
South Carolina	12.5	8.7
Virginia Beach	101.6	102.0
Virginia	19.5	16.6
South Atlantic Area	22.6	18.1
United States	18.5	13.3

Note: Dare County ranked 25th out of 100 North Carolina Counties in 1950-1960 and 17th in the 1960-1970 period.

Source: United States Census of Population

Township Growth

While Dare has experienced a rapid population growth over the past two decades, a closer examination of this growth at the township level reveals that some areas are growing rapidly while others have declining populations.

The most significant intra-county growth trend is that the beach areas of Dare County are growing while the mainland areas are experiencing a population decline. Atlantic and Nags Head Townships include the Dare Beaches area, as well as Roanoke Island. Over the 40 year period 1930-1970, the share of Dare County population living in these two townships has increased from 48.9% in 1930 to almost 64% in 1970. At the same time, the population of Manteo, which comprises a large percentage of the non-beach population of these townships, has decreased by almost 14% since 1950.

Hatteras Township has increased in population by 17.8% over four decades and has held a relatively stable share of county population while the other three townships have all declined both in absolute numbers and in shares of total population.

COMPARATIVE GROWTH RATES: 1950-1960 and 1960-1970

	1950-1960	1960-1970
Dare Beaches	27.6*%	32.4*%
Dare County	9.8 %	17.9 %

* Estimated

Source: Stephens Associates

For the past twenty years, the growth of the Dare Beaches has surpassed that of the County, registering ten-year increases of 27.6% for 1950-1960 and 32.4% for the decade 1960-1970. In 1950, 17% of all county residents lived on the beaches; by 1970, this figure had increased to over 22%.

Considering the past sixty years, the growth rate for the past two decades represents a great quickening in population increase for Dare County. If the 691 temporary workers present for the 1940 census are excluded from the figures, a steady but small rate of growth occurs, ranging from an adjusted 1.0% rate for the period 1940-50 to a 5.6% increase from 1910 to 1920. The decade 1950-1960 saw an increase in the growth rate to 10% which is roughly comparable to that experienced by the state as a whole. Over the past two decades, North Carolina's population increased by approximately 25% while Dare's grew by almost 30%. However, Dare's 17.9% increase from 1960 to 1970 was almost 50% greater than that experienced by the state.

According to population forecasts made by the North Carolina Department of Human Resources, Dare County's population as of July 1, 1974, is 9000 persons. This represents a 22% increase since the 1970 census which is greater than the percentage increase during the entire decade 1960 to 1970.

Population Trends - Dare County

	No. of Persons	Change from Previous Census	% Change from Previous Census
1910	4841	-	-
1920	5115	274	5.6
1930	5202	87	1.7
1940	6041 (5350)*	839 (148)*	16.1 (2.8)*
1950	5405	-636	-10.5 (1.0)*
1960	5935	530	9.8
1970	6995	1060	17.9

* In 1940, there were 691 WPA and CCC temporary workers residing on the Outer Banks. Subtracting these persons gives a net change 1930-1940 of 148 persons, indicating a 10 yr. growth of 2.8% and a 1940-1950 growth rate of 1.0%.

Source: U. S. Census of Population

The rapid growth of Dare County is not typical of other Northeast North Carolina counties. For example, neighboring counties Currituck, Hyde and Tyrrell all declined in population over the past twenty year period. The net population increase of the Currituck-Albemarle-Pamlico Economic Region was only 0.3 percent. The economies of most of Dare's neighboring counties are predominantly agricultural with a predominant out-migration of people as opposed to Dare's recreation-based economy. For the past decade, Dare County's equalled that of the South Atlantic Area of 18% and surpassed the 13% growth rate of the United States.

Components of Population Change

In studying population change, it is important to look at its causes. The two basic factors are natural increase (the excess of live births over deaths in the period being studied) and net migration (those moving into or out of the area under consideration). After the natural increase is determined for a period of time, it is added to the base year population to determine the expected population 10 years hence. Any differential between the expected population and the actual census count at the end of the decade under study is attributed to net migration; a flow of persons into or out of the county.

In the decade 1950-1960, natural increase accounted for all of Dare County's 9.8% growth as the county experienced a net out-migration of 2.3% of its 1950 population. The out-migration of younger males in the working age group, especially among Blacks, is a well documented trend in 1950-1960 in Dare and the rural South.

Analysis of Dare's population growth over the past two decades has revealed two important trends. First, the county is in the midst of a rapid growth phase. While the county's economic region grew by 0.3 percent between 1950 and 1970, Dare's population increased by 29.7 percent. With an estimated increase of 1300 residents since the last census, the county's recent growth has been even more rapid. Although the population has been increasing at the county level, at the township level some areas of the county have been growing while others have experienced population declines. In general, the county's eastern-oriented townships have been growing, and the mainland townships have been losing population. This second trend illustrates a reorientation of the county's settlement patterns toward the beach areas which has accompanied the development of the county's recreational industry. The changing settlement patterns indicate increased demand for public services and the need for careful land management in the county's beach areas.

COMPONENTS OF DARE COUNTY POPULATION CHANGE: 1950-1960 and 1960-1970

		1950-1960	1960-1970
	Beginning Population	5405	5935
Change:	Births	1245	1260
	Deaths	591	819
	Natural Increase	654	441
	Net Migration	-124	+691
	Total Increase	530	1060
	Ending Population	5935	6995
	% Migration*	-2.3	+10.4

*Rates are expressed as % of beginning population.

Source: W. B. Clifford & A. C. Davis, Population Change for N. C. and N. C. Counties 1950-1960 and 1960-1970: Estimates of Net Migration and Increase; N.C.S.U., 1971.

In the decade 1960-1970, the rate of natural increase dropped from 12.1% to 7.4%. During the decade, Dare experienced an 18 percent overall growth rate which is largely attributable to a ten-year net in-migration of 10.4% of the 1960 population. The population distribution within the county indicates that a large number of the in-migrants are locating on the beach areas.

NET MIGRATION RATES: 1950-1960 and 1960-1970

	1950-1960	1960-1970
Dare	-2.3%	10.4%
Currituck	-7.0	1.8
Tyrrell	-24.0	-20.3
North Carolina	-8.1	-1.6

Rates expressed as % of population at the beginning of each decade.

Source: William Clifford - 1971 - Population Change for N. C. 1950-60 and 1960-70, N.C.S.U.

Net out-migration of the 1950-60 period was lower in Dare than in the other counties shown in the Table or the state. In 1960-70 Dare showed sharpest gains in in-migration, while Currituck also showed a significant turnaround. Dare ranked 9th in the state in 1960-70 net migration. Dare attracted this large in-migration at a time when out-migration rates for the region were increasing.

From 1950 to 1960, Dare's rate of natural increase was significantly lower than that of North Carolina and somewhat lower than the neighboring counties of Currituck. Although Dare's rate of natural increase dropped during the past decade and North Carolina's increased, Dare did not drop as low as either Tyrrell or Currituck Counties.

COMPARATIVE NATURAL INCREASE 1950-60 and 1960-70

	1950-60	% of 1950 Population	1960-70	% of 1960 Population
Dare	654	21.1	441	7.4
Currituck	831	13.4	257	3.9
Tyrrell	686	13.6	203	4.5
North Carolina	822,213	20.2	1,011,772	22.2

Source: Wm. Clifford, 1971. Population Change for N. C. 1950-1960 and 1960-1970.

Summary of Population Growth

The change in Dare's migration trend is the result of the increasing popularity of the county as a retirement area and the increasing economic opportunities associated with the county's recreation industry. Also, age characteristics of the in-migrating population have had a major impact on the county's birth rate. In effect, this net in-migration in the older age groups in the 1960's has produced an aging population which has resulted in a reduction of the county's birth rate and a slight increase in the death rate. All factors point toward an increasingly older population in the county.

Income Characteristics

Evaluation of the economic well-being of Dare County's population is extremely difficult due to an absence of definite economic indicators and the county's unique life-style given that there are variations in needs, desires, and tastes among various sectors of the population, the accessibility of goods and services is perhaps the best available measure of Dare's basic economic well-being. Thus income, as a rough measure of accessibility of goods and services, is used as a crude measure of Dare's overall economic well-being.

Average Income

Average income is one of the most common measures of a population's income characteristics. Typically, the mean and median are the "average" measures used in the analysis of income characteristics, but it is important to make a distinction between the two measures. Most people when speaking of the "average" are actually referring to the arithmetic mean, and in the case of incomes, the mean is simply the sum of all family incomes divided by the number of families. Since this measure does not account in any way for the distribution of income, it may be considered a summary average which reflects the total income available in an area.

The median, as a measure of average income, is the income level at which half the families make more, and half make less. Median income is a measure of income distribution and, as such, it might be considered a typical average which gives a rough idea of the typical income of families in an area.

Thus, in an area where there exists a considerable disparity between the number of families in the lower income groups and those in the upper income groups, the median income may be considerably below the mean income. However, only in the case of a perfectly even income distribution will they be equal.

Due to the unique features of each county--needs, tastes, expectations, type of economy, population level, and so forth--inter-county comparisons of mean and median incomes are not highly significant. However, the disparity between Dare's mean income of $9,354 and its median income of $6,823 does represent an important income characteristic. As discussed above, in an even income distribution, the mean and median are equal. Therefore, with a median effective buying income substantially smaller than the mean, the county has a disproportionately large number of families in the lower income groups.

Income Distribution

The distribution of income for households in Dare County is found below. Approximately 35 percent of the county's households have annual incomes less than $5,000 and 70 percent make less than $10,000 per year.

Household Effective Buying Income Distribution

Income Group	Percentage of Households	
0 - $ 2,999	20.1	= 35.4
$ 3,000 - 4,999	15.3	
$ 5,000 - $ 7,999	23.3	= 34.6
8,000 - 9,999	11.3	
$10,000 - $14,999	17.1	= 30.0
15,000+	12.9	

Source: Sales Management, "Survey of Buying Power," 1973.

This analysis of Dare's income characteristics indicates that higher income levels are an obvious target for the county's economic development program.

ECONOMY

An understanding of the structure and function of Dare's economy is a foundamental element of the county's planning and management program, providing economic information essential for decisions concerning the future.

Economic History

Until recent years, the predominant theme in the development of Dare County has been isolation. Although the first permanent white settlers are thought to have come to the area in the late 1600's, the resident population has remained sma-l, due primarily to the fact that the county was not tied to mainland North Carolina by any convenient transportation links. Prior to 1931 when Wright Memorial Bridge was built between lower Currituck County and Kitty Hawk, the only means of transportation to Dare County was by water.

During isolation, the economy of Dare County was dependent upon the utilization of natural resources. Stock raising and resultant overgrazing caused problems in regard to beach stabilization. By the 1800's, fishing technology improved and made commercial fishing the dominant sector of the Outer Banks economy. Overall, fishing has declined in recent years but commercial and sport fishing remain as important segments of Dare's economy.

Concern in the 1800's for the protection of shipping brought opportunities for new employment to Dare County. Residents were employed to work in lighthouses and life saving stations. By 1920, the Federal Government provided approximately one-fourth of the employment in the County and coastguarding was a promising cash career for a Dare County boy.

The popularity of the county as a resort area first came in the early 1800's as a retreat from the sun, humidity and insects. These early "tourists" built a hotel at Old Nags Head. However, the tourist economy was at a disadvantage due to a lack of access. In the early 1900's the Outer Banks area was accessible only by steamer from Elizabeth City while other resort areas such as Virginia Beach, Morehead City and Wrightsville Beach were served by railroads.

Construction of the Roanoke Island Bridge in 1928 was the first link in a transportation net tying Dare County with the mainland of North Carolina. This net was complete with the construction of Wright Memorial Bridge in 1931. Construction of the Croatan Sound Bridge in 1956 and the Alligator River Bridge removed a major constraint on the development of a recreational economy. In retrospect, it is fortunate that access came so late to Dare County, because the delay prevented some of the more undesirable types of growth which have been experienced by other similar areas. The county has been left with a highly diversified environment which has appeal for almost every segment of the recreation population. Outstanding facilities are available for recreationists, including fine hotels, rental cottages, camping areas, sport-fishing fleets, restaurants, and gift shops. With proper planning and public investment, the future of the recreation industry on the Dare beaches is bright.

Labor Force Characteristics

Characteristics of Dare's labor force are a major factor in the development of the county's economy. Utilizing factors such as labor force, job characteristics of the workers, annual and seasonal unemployment, and commutation patterns, it is possible to define the county's manpower problems and resources which become the focus of long-range economic development programs.

Total Employment

The age-sex specific activity rate is one of the most useful measures of labor force participation. These rates are calculated for each sex in the active (16-65) age group and they are a device for relating the economically active population in a particular age group, to the total population of that group. The most obvious point in the comparison is that both the county's activity rates are substantially below those of the economic region as a whole.

There are several factors which probably contribute to these low rates:

(1) Dare's tourist industry employment is seasonal in nature;

(2) The large percentage of both male and female retirees residing in the county;

(3) The lack of diversified economic opportunities.

Therefore, making available appropriate job opportunities should be an important consideration in the county's economic development program.

AGE-SEX-SPECIFIC ACTIVITY RATES - 1970

	Age-Specific Population		Age-Specific Employment		Activity Rate	
	Male	Female	Male	Female	Male	Female
Dare County	2,040	2,100	1,496	837	73.3	39.8
Currituck-Albemarle-Pamlico Economic Region	24,754	26,810	19,880	11,698	80.3	43.6

Source: U. S. Census; Stephens Associates.

A summary of Dare's employment in major industrial groupings for 1950, 1960 and 1970 is found in the following table. The pattern of employment clearly illustrates the evolution of the county's economy over recent years. In 1950, when the current recreation "boom" was in its infancy, the leading industries in the county's economy were agriculture, forestry, and fisheries, with fisheries employment dominant in the group. Retail trade and service industries were significant elements in the county's economy; however, the concentration of employment in these two categories was typical for counties similar to Dare.

Between 1950 and 1960 there was a sharp decline in the number of workers employed in Dare natural resource based industries (28.2 percent to 15.8 percent). At the same time, the concentration of employment in the service industries increased sharply from 12.3 percent to 23.2 percent, marking the initial growth phase in the county's recreation industry.

Employment activities related to the National Park Service are also reflected in Dare's changing employment patterns. In 1950, 6.8 percent of the county's labor force was employed in government, which is typical for counties of Dare's size. By 1960, however, government employment had increased to 9.4 percent, which is well above other Northeastern North Carolina counties.

Between 1960 and 1970, the Dare economy became dominated by the recreation industry. Employment in the natural resource based industries--agriculture, forestry, and fisheries--declined to 7.8 percent of the total. In response to recreation demand, the retail trade industries--food stores, restaurants, motels, and hotels, and so forth--became one of the leading employers of the economy, increasing from 16.3 percent in 1960 to 25.6 percent in 1970. Services, the largest employer in the county, increased its share of total employment from 23.2 percent to 27.7 percent.

Employment Summary by Major Industry Groups

Industry Groups	1950	%	1960	%	1970	%
Agriculture, Forestry and Fisheries	395	28.2	280	15.8	181	7.8
Construction	239	17.0	234	13.2	316	13.5
Manufacturing	64	4.6	99	5.6	132	5.7
Transportation, Communication and Utilities	117	8.3	174	9.7	158	6.8
Wholesale Trade	44	3.1	28	1.6	78	3.3
Retail Trade	233	16.6	288	16.3	598	25.6
Services	172	12.3	411	23.2	647	27.7
Government	96	6.8	166	9.4	233	9.6
Not Reported	43	3.1	94	5.3	0	0
	1,403	100.0	1,772	100.0	2,333	100.0

Source: U. S. Census

Unemployment

Unemployment statistics are important economic indicators which permit assessment of the overall strength and vitality of Dare County's economy and, perhaps more importantly, identification of the magnitude of the economy's seasonal fluctuations. The most current unemployment statistics are reported by the North Carolina Employment Security Commission. The Employment Security Commission's statistics are based on the concept of work force and reflect employment by place of work and are therefore not exactly comparable with Census Bureau statistics which are reported by place of residence.

Unemployment is defined as all persons who did not work at all during the reporting period but were able, available, and looking for work. The rate of unemployment is simply the number of unemployed as a percent of the total work force. Given today's highly mobile work force, for all practical purposes it is impossible to achieve a "zero" rate of unemployment. In fact, economists at the national level consider a 4 percent unemployment rate as "full employment."

This provides a comparison of the 1974 unemployment rates of Dare County and North Carolina, as well as the monthly unemployment figures. In total, Dare's rate is slightly above that of the state; however, examination of the county's monthly unemployment rate reveals marked seasonal fluctuations. In February, the county's unemployment was at 20.6 percent, it declined steadily to 0.7 percent in August, and rose again to 9.3 in December.

DARE COUNTY AND NORTH CAROLINA UNEMPLOYMENT RATES

Unemployment Rate	Dare County	North Carolina
1974 Total	6.0%*	4.5%*
1974 Monthly		
January	15.2	4.8
February	20.6	4.0
March	16.9	3.8
April	9.2	3.3
May	4.1	3.1
June	1.9	3.8
July	1.0	4.5
August	0.7	3.4
September	.9	4.0
October	1.8	4.6
November	4.4	6.6
December	9.3	4.6

Source: N. C. Employment Section Commission, Sept., 1975.

* All figures are preliminary and subject to change.

Seasonal fluctuations are a long-recognized characteristic of economies based primarily on the recreation industry. These fluctuations are the result of changing demand which can be traced to three factors:

1. The product of the recreation industry--recreational experiences--must be consumed within the county by the purchasers, leading to highly seasonal demand because the consumer may choose the time to travel to the county;

2. The demand for recreation has a high income--elasticity, meaning that vacations are one of the first expenditures to be cut when a family's disposable income drops and that the industry is highly susceptible to fluctuations in the national economy;

3. Recreation demand is subject to changes in the weather.

While it would be unrealistic to suggest that the fluctuations in Dare's unemployment could be dampened to the extent that it would resemble trends of more conventional economies, it is possible, through innovative economic programming, to capitalize on the county's apparent off-season labor resources and thereby reduce the high off-season unemployment.

Commuting Patterns

According to 1970 Census statistics shown on Page 24 , approximately 18 percent of Dare's labor force commutes into the county for employment. The commuters are primarily from Currituck, Pasquotank, Tyrrell and Hyde Counties. By contrast, in 1970 only 4 percent of the work force commuted out of the county for employment.

The commutation patterns illustrate two important factors relating to the county's economy:

1. They show the tremendous increase in economic opportunities within the county;

2. They show that Dare County's recreation industry is becoming an economic resource for surrounding areas as well as the residents of the county.

In addition to job opportunities, commuting patterns are a function of residential preferences and are difficult to modify to any great extent. However, considering that the 12 percent of the county's workers live outside the county and spend most of their incomes in these other areas, the county should attempt to attract these commuting workers into the county. Such programs should include a concentrated effort to provide suitable housing in appropriate price ranges, year-round recreational and cultural facilities, and medical services.

Dare Commuting Patterns

Area	Out-Commuting	In-Commuting
Currituck	15	216
Tyrrell	21	43
Norfolk-Portsmouth	42	0
Hyde	0	33
Beaufort	0	7
Washington	0	8
Camden	0	6
Pasquotank	0	63
Elsewhere	19	51
TOTALS	97	427
Net Commuting	+330 Workers	

Source: U. S. Census, 1970.

ECONOMIC BASE ANALYSIS

The analysis of Dare County's economy has two purposes. The primary purpose is to identify valid economic goals and objectives and to provide an informational base for the formulation of an economic development plan. The second and more technical purpose is to provide quantitative estimates of future employment and population which can serve as very general guides to the formulation of plans for land use and capital facilities.

Economic Base Technique

In recent years economists have devised several techniques for urban economic analysis, but the technique most frequently employed in comprehensive planning studies is the "economic base analysis." The popularity of the economic base technique stems from its flexibility in accommodating several types of readily available data and the fact that the economic base analysis provides a complete "snapshot" of the community's economy.

In concept, the economic base analysis views the county's economy as two segments: (1) firms and individuals serving markets outside the county; and (2) firms and individuals serving markets inside the county. The activities producing goods and services for sale outside the county are considered export, or basic. The remaining activities are viewed as producing strictly for the county, and are termed service, or non-basic activities. In non-technical language, the county's basic activities may be considered "income earners" and the non-basic activities as "spenders."

Economic base analysis recognizes that not all activities will fit neatly into the basic or non-basic categories because firms may sell their products in both markets. For example, a good store in Dare County may make part of its sales to tourists (basic) and part to local residents (non-basic). Thus, a firm may be partly basic and partly non-basic, and therefore for each industry, employment is placed in the basic or non-basic category or divided between the two. Then, totals are added up for both basic and non-basic employment.

Classification of the county's employment as basic or non-basic provides direct benefits to the planner, government officials, civic leaders, businessmen, and development groups. It provides a complete understanding of the county's sources of income. The base study pinpoints weaknesses in the economy; for example, an export sector predominantly tied to one industry. For government officials, the base study provides information for evaluating economic policy and for making decisions.

The county's basic/non-basic employment ratio is an important forecasting tool For example, if Dare County's ratio of basic employment were 1 to 2, then an addition of 100 basic jobs would create an additional 200 non-basic jobs. Thus by forecasting increases in employment in the county's basic sector, it is possible to derive long-range estimates of total employment which can also be converted to population estimates.

Measurement of Economic Base

Employment is the most common measure of the economic base, and the location quotient is the most widely used technique for allocating employment to the basic and non-basic sectors. The basic concept of the location quotient technique is simple. If a given county is highly specialized relative to a reference economy (usually the nation) in the production of a particular good or service, the product is assumed to be an export item and employment above the location quotient is classified as basic.

The location quotient for a particular industry is derived by the following formula:

$$\frac{X}{\text{Total Local Employment}} = \frac{\text{Reference Area Employment in Industry (i)}}{\text{Total Reference Area Employment}}$$

Solving for X determines the numbers which would be employed in industry (i) in the county if it had just enough to supply its own needs. Dare's location quotients have been calculated on the basis of the employment in the eight-county Currituck-Albemarle-Pamlico Economic Region. These counties are similar in life-styles, geography, economic orientation, and economic history, and they should reflect more closely the tastes, needs, and productivity of Dare residents than the nation as a whole.

Basic Industries

Using the county's location quotients calculated from employment in the Currituck-Albemarle-Pamlico Economic Region, Table 1 classifies employment in Dare's 32 industry groupings into basic/non-basic sectors. These calculations indicate that the county's basic non-basic ratio is 1.89, with 807 basic employees and 1,526 non-basic employees.

However, to facilitate analysis of the county's economic base, the information in Table 1 has been summarized in Table 2, using the eight major industry classifications. Following the county's employment patterns, the major industries producing income from outside Dare are services, retail trade and construction.

Within the services category, lodging (motels, hotels, and cottage courts) and Insurance-Real Estate-Finance are the dominant basic employers, emphasizing the recreation orientation of the economy. Dominance of these industries is a unique characteristic of a recreation economy because in almost all other economies, the services industries would be classified non-basic.

The leading industries in the retail trade classification are restaurants, food stores, and service stations. These three industries account for more than 90 percent of the basic trade employment; however, with 60 percent of the total basic employment, restaurants are the largest employers.

Through the construction of vacation homes and other housing accommodations, as well as other commercial facilities to serve the county's recreation trade, the construction industry is a third major basic employer. While smaller than services and retail trade, the construction industry does account for slightly over 14 percent of Dare's basic employment.

TABLE 1

ANALYSIS OF BASIC AND NON-BASIC INDUSTRIES

Industry	Total Employment	Location Quotient	Basic Employment	Non-Basic Employment
Agriculture, Forestry & Fisheries	181	183	0	181
Construction	316	202	114	202
Manufacturing	132	460	0	114
Machinery	5	10	0	5
Transportation equipment	19	69	0	19
Concrete products	30	22	8	22
Food and kindred products	15	32	0	15
Textile products	6	130	0	6
Printing and publishing	18	8	10	8
Paper and leather products	39	47	0	39
Transit, Water & Air Transportation	102	40	62	40
Communications	4	32	0	4
Utilities and Sanitary Services	52	25	27	25
Wholesale Trade	78	86	0	78
Retail Trade	598	397	211	387
Food, bakery & dairy store	117	80	37	80
Restaurants	179	55	124	55
General merchandise retailing	40	50	0	40
Motor vehicle retailing and service stations	96	64	32	64
Other retail trade	166	148	18	148
Banking and Credit Agencies	14	28	0	14
Insurance, Real Estate and Other Finance	75	36	39	36
Business and Repair Services	34	42	0	34
Private Households	12	78	0	12
Other Personal Services	279	98	181	98
Entertainment & Recreation Services	13	10	3	10
Hospitals	3	52	0	3
Health Services	12	36	0	12
Public Schools	70	157	0	70
Private Schools	5	19	0	5
Other Education & Kindred Services	10	8	2	8
Nonprofit Organizations	54	25	29	25
Legal, Engineering & Professional Services	66	44	22	44
Public Administration	223	124	99	124
TOTAL	2,333	2,333	807	1,526

Source: Stephens Associates

Table 2 SUMMARY OF BASIC AND NON-BASIC INDUSTRIES

Industry Group	Employment	%	Basic Employment	%	Non-Basic Employment
Agriculture, Forestry and Fisheries	181	7.8	0	0	181
Construction	316	13.5	114	14.1	202
Manufacturing	132	5.7	18	2.2	114
Transportation, Communication and Utilities	158	6.8	89	11.0	69
Wholesale Trade	78	3.3	0	0	78
Retail Trade	598	25.6	211	24.9	387
Services	647	27.7	276	34.2	371
Government	223	9.6	99	12.3	124
TOTALS	2,333	100.0	807	100.0	1,526

Source: Stephens Associates

Referring to Table 2 , it is interesting to note that while construction is a major income producer, employment in this industry has actually shown a small relative decrease over the past 20 years. Increased in-commutation of construction workers appears to be responsible for this trend; however, based on wage characteristics, failure of the construction industry to keep pace with expansion of the trade and service industries represents an economic loss to the county. The trade and service industries are characterized by relatively low wages in a recreation economy, while employees in the construction industry receive high wages. Therefore, on a "per employee" basis, the construction industry generates more income for the county.

Table 2 also identifies several other less important basic employers. However, they all appear to be directly linked to the recreation industry. For example, the major basic employer within the manufacturing category is the concrete products industry, which provides materials for recreation construction.

The Recreation Industry

Dare County, like many areas located near recreational amenities such as the ocean, relies heavily on tourism as the main source of outside income. The main economic impacts of the recreation industry stem from the direct effect of tourist expenditures.

National Park Service estimated that the Dare Beaches had 1,525,228 visitors in 1974. This estimate indicates the enormous impact summer visitors have on resort areas which is felt both physically and economically. Travel spending in Dare County in 1974 amounted to $57.5 million, making the county the fifth highest in the state according to figures published by the North Carolina Travel Survey. This figure represents an increase of 14% over 1973. The trend is continuing in 1975 as figures of July 30, 1975 indicate that vacation travel to the Dare Coast is ahead of the first six months of 1974. This increase is occurring in spite of the gradual slowing of the national economy.

It is obvious that proximity and total population contribute to the market area of North Carolina's coastal region (see Table 3). The great majority of visitors to Dare Beaches are from the eastern seaboard with Virginia having 24% of that total. North Carolina has 17% of these visitors due to the large population centers in the Piedmont. Pennsylvania and Maryland combine for 20% of the total visitors. These four states are the residence for 62% of all visitors to the Dare Beaches.

The primary market area extends approximately 350 miles to the north, including most of the New York City metropolitan area. It approximates the configuration of the "Megalopolis Corridor" extending somewhat more to the west in Philadelphia and Virginia. In North Carolina, it extends only 100 miles to the southeast due to the effects of other coastal resorts outside this area. In 1970, the market area had a population of 30,897,072 people or roughly 15% of the total population of the United States.

TABLE 3 ORIGIN OF VISITORS TO THE DARE BEACHES AND VIRGINIA BEACH, VIRGINIA

State	Percent of Total Visitors			
	Dare Beaches			Virginia Beach
	1970 Study	1972 Survey	1972 Hotel Guests	1971 Overnight Visitors Registration
Virginia	24	24	19	24.2
North Carolina	17	17	9	2.0
Pennsylvania	12	12	14	13.1
Maryland	9	9	14	10.1
Ohio	6	6	8	8.7
New York	5	5	7	14.4
New Jersey	4	4	6	7.3
West Virginia	2	2	3	1.9
South Carolina	2	2	--	.1
Dist. of Columbia	2	1	3	2.1
Delaware	--	1	2	.6
Others	17	17	15	15.5
TOTAL	100	100	100	100.0

SOURCE: 1970 Greater Nags Head Chamber of Commerce Visitors Study; Tourist Survey by North Carolina Office of Travel and Promotion; 1972; Survey of Labor Day Visitors to Sea Oatel and Carolinian, 1972; Tourist Development Division, City of Virginia Beach, Registration Data, 1971.

Analysis of Dare's economic base substantiates its reliance on recreation as its primary source of outside income and emphasizes the short-term as well as long-term problems inherent in a narrowly-based recreation economy:

1. Dare County's major product is recreational experiences; however, their consumption is seasonally oriented leading to extreme fluctuations in demand and under-utilization of labor resources.

2. Employment in recreation does not compare favorably with other resource-based industries. Wages are characteristically very low.

3. The recreation industry is extremely sensitive to fluctuations in the national economy. Under adverse economic conditions, recreation is one of the first items removed from the family budget.

4. The recreation resource is extremely sensitive to public policy. Poor land management policies on the part of public officials can severely damage the economic potential of recreation resources.

On the positive side, the recreation industry is favored by a growing population, increases in disposable income, and increased leisure.

Non-Basic Industry

Just as employment greater than the county's location quotient is considered to be basic, employment substantially below the location quotient can be considered a deficiency, or a source of leakage. Detailed analysis of Table 1 reveals three deficiencies in Dare's economy. In health-related industries--hospitals, and health services--employment is more than 80 percent below the county's quotient, indicating a very serious leakage of income for high-cost medical services. More importantly it reveals a low level of health services in the county which could be detrimental to the long-range development of the recreation industry.

A second employment deficiency is in the wholesale trade industries. Wholesale operations, such as warehousing, distribution, industrial supplies, and commercial laundries, are almost totally lacking in Dare County. The result is substantial amounts of money flowing to other communities and ultimately lower quality service to the county's visitors.

Lack of wholesale operations is partly a function of the state of the county's economic development. However, the absence of suitable areas set aside for these functions appears to be a contributing factor.

A third area of deficiency is manufacturing. Overall, the county's location quotient for manufacturing employees is 460; however, it has only 132 workers employed in manufacturing industries. This area would normally receive major emphasis in a development program, but considering Dare's geographic location, its lack of transportation, and the sensitivity of its recreation resources, it is felt that any programs for development employment opportunities in manufacturing should concentrate on small business supplying the recreation industry and designed to capitalize on high off-season unemployment.

Retail Sales

Retail sales are another indicator of Dare's economic growth. With recent population growth, rising incomes, development of the recreation industry, and inflation, the level of retail sales is expected to increase. However, the rate of increase is dependent primarily on the county's economic activity. As shown in Table 4 , retail sales have increased over 500 percent since 1960, reflecting the rapid expansion of the county's recreationally-oriented industries.

The growth of Dare's retail trade industries, as measured by sales, has been very strong over the past 15 years. Even under adverse national economic conditions during the 1967-69 period, the county's retail sales increased by almost 25 percent. Retail sales trends in Dare also verify the development of the recreation industry which was identified by the analysis of the county's employment.

Table 4 RETAIL SALES -- 1960-1975 - DARE COUNTY

Fiscal Year	Retail Sales Current Dollars	Percent Increase
1960-61	8,921,844	---
1961-62	10,021,531	12.3
1962-63	10,798,805	7.8
1963-64	12,156,285	12.6
1964-65	13,291,380	9.3
1965-66	14,920,985	12.3
1966-67	16,692,708	11.9
1967-68	17,577,479	5.3
1968-69	20,783,047	18.2
1969-70	23,490,677	13.0
1970-71	28,290,561	20.4
1971-72	32,222,254	13.9
1972-73	37,881,600	17.6
1973-74	44,676,070	17.9
1974-75	48,731,661	9.1

Source: N. C. Department of Revenue; Stephens Associates.

TRANSPORTATION

The character of local and regional transportation systems is one of the dominant factors controlling an area's growth and development. The history of isolation and slow growth on the Outer Banks serves to illustrate this relationship. An area in which a major portion of the economy is tied directly to recreation is even more heavily dependent upon access for economic development. Three major factors which determine the success of a recreation area are:

1. Travel time from geographic centers of population to the recreation area;

2. The comfort or discomfort of travel conditions; and

3. Total cost per visit.

Regional Access

Transportation systems serving the county are composed of many elements; including highways, air, water, and rail. Highways are the most important element providing access to Dare County at the present time. However, increasing disposable income and leisure time, as well as advances of air and water transportation in the future development of Dare County.

Highways

For all practical purposes, access to Dare County is limited to U.S. Highway 158 from the North and U.S. 64-264 from the west. Highway 158 enters the county from lower Currituck County via the Wright Memorial Bridge over Currituck Sound. The highway is two lanes and was first constructed in 1931. Highway 64-264 is two lanes crossing the Alligator River, the Croatan Sound and the Roanoke Sound. Dare County is completely dependent on this regional highway system.

Traffic Volumes

Average daily traffic (ADT) is defined as the average 24-hour traffic volume for a given period of time. Highways are designed to accommodate a certain peak ADT. The North Carolina State Highway Commission has collected volume data (64) at the Alligator River Bridge and Highway 158 at the Wright Memorial Bridge. These data in ADT form are presented in Table 5 for each month of the year.

It is estimated that approximately 75% of the traffic on U.S. 64 is composed of passenger cars and that the remainder is commercial vehicles. Although traffic composition counts were not made on U.S. 158, commercial usage would be approximately the same as that on U.S. 64.

Table 5

Dare Beaches Monthly Traffic Volume

AVERAGE DAILY TRAFFIC

MONTH	HIGHWAY 64 1970	1971	1972	1973	1974	Mean	HIGHWAY 158 1970	1971	1972	1973	1974	Mean
January	290	382	441	542	525	436	1233	1327	1718	2119	1809	
February	348	427	448	578	432	447	1487	1691	1821	2417	1694	1822
March	481	503	601	680	518	557	2049	1812	2509	2571	2232	2235
April	526	890	864	1031	883	839	2459	3271	3435	4173	3861	3440
May	775	1046	998	1225	1246	1058	4037	4037	4064	4290	4818	5015
June	1078	1442	1536	1649	1634	1468	4843	5227	5516	5955	5610	5430
July	1194	1687	1790	1917	1848	1687	5711	6332	6741	7152	6853	6558
August	1491	1522	1883	1901	1918	1743	5892	6169	6782	7256	7096	6639
September	993	1060	1267	1375	1284	1196	3785	4257	4472	4973	4618	4421
October	871	856	1088	1219	1314	1070	2709	2632	3150	3995	2794	3236
November	687	715	837	885	985	822	2084	2492	2567	3045	3009	2639
December	409	507	534	516	580	521	1583	1889	2054	1968	2060	1910
MEAN	767	920	1024	1120	1100	987	3156	3422	3465	4200	3970	3701

Source: N. C. State Highway Commission

Highway Capacities

The Highway Research Board of the National Academy of Sciences - National Research Council has published standards for judging traffic volume capacity of various types of highways. These capacities are based primarily on the width of the pavement.

Routes U.S. 64-264 and U.S. 158 are both two laned highways with a pavement width of approximately 24 feet. Under the standards developed by the Highway Research Board, these highways can accommodate a maximum of 7,300 vehicles per day.

The data on average daily traffic presented in Table 5 indicates that the U.S. 64-264 facility entering the county from the west will be adequate well into the future. Route 158 entering the Dare Beaches from the north is already dangerously close to capacity during the peak summer months of July and August. Average daily traffic on Route 158 for the month of July increased about 22 percent per year from 1970 to 1973, reaching a 1973 peak of 7256. The ADT decreased slightly in 1974 but an increase is again expected which should be reflected in the 1975 figures.

Prior to the construction of the bridges and highways in the Dare County area, access was a major factor inhibiting the growth of the area. Similarly, current trends seem to indicate that highway congestion may again limit access to the Dare Beaches, placing a major constraint on development.

N. C. 12 carried the majority of an estimated 1,525,000 visitors to Cape Hatteras National Seashore through September of 1975. This highway is in need of widening to a standard width of 24 feet and resurfacing.

Air Transportation

Air travel, which had its birth in the Dare Beaches area, cannot be discounted in the future development of the Dare Beaches area. At this point, however, the future of air travel and its impact on the county is not clear. Past trends in the advance of air transportation technology and the increase in the number of people utilizing air transport leads to the general conclusion that air travel will be a major mode of transport in the future. Thus, future land use plans should provide space for this presently undeveloped use.

Currently, the only locality providing regular commercial air service is Norfolk, Virginia, a distance of about 70 miles. Within a 60 mile radius of the county, there are five airports capable of handling private air traffic. These airports are located at Edenton, Elizabeth City, Kill Devil Hills, Hatteras, and Manteo. The airport at Kill Devil Hills is located on the site of the Wright Memorial and is operated by the National Park Service. Although this airport offers no facilities other than the runway, it appears to be the logical site for the development of private and light commercial air facilities to serve the Dare Beaches.

Water Travel

Water travel will never again be as important to the growth and development of the county as it was in the period prior to the construction of the bridge systems. It should, however, be viewed as an important recreational experience. Consideration should be given to providing space for land uses, such as marinas, which are related to water travel.

Local Transportation System

Internal vehicular circulation in the beach is dependent primarily on corridors, route 158 Business and 158 Bypass running in a north-south direction between Kitty Hawk and Whalebone Junction. The area south of Whalebone is served by route 12. The Southern Shores and Duck communities north of Kitty Hawk are served by State Route 1200.

Due to the linearity of the beach area, efficient internal movement of people and goods is difficult to achieve. This problem is destined to become more difficult if current development practices continue. Route 158 Business, which is located on the ocean side of the beach area, is heavily developed with commercial, commercial-residential, and residential uses, each having individual access on the two-lane highway. During the peak summer season, congestion resulting from large numbers of automobiles entering and leaving the highway makes rapid movement impossible.

Route 158 Bypass is located on the soundside of the Dare Beaches area and is intended to route through traffic around congested 158 Business area. Location of business uses on the Bypass threaten this vital function.

EXISTING LAND USE

Existing uses of land within Dare County were mapped according to the following generalized categories.

(1) Commercial - includes all retail and minor wholesale operations, commercial recreation facilities, and commercial services and businesses, i.e., laundromats, barber shops, realty offices, motels, hotels, rental cottages and all other commercial;

(2) Residential - includes all residential uses;

(3) Government and Institutional, Cultural, Entertainment, and Recreation - Government and Institutional, and other uses generally available to the public at large.

(4) Industrial - manufacturing and processing uses.

(5) Transportation, Communication, & Utilities

(6) Undeveloped Land

(7) Agriculture

(8) Forestland

(9) Water

(10) Wetland

(11) Barren - including beaches, surface extraction and cleared transitional land.

This information is displayed on the existing land use map which accompanies this report.

Commercial

A majority of the commercial development in Dare County is recreationally oriented with restaurants, fast food service, gift shope, entertainment facilities, and gasoline service stations comprising a large portion of the total. Other commercial uses consist primarily of grocery stores, fishing piers (with bait and tackle shops) and commercial services such as realty offices, laundromats, and barber shops. Appliances, hardware and building supplies and other secondary commercial uses are found in Manteo, Wanchese, Buxton, Hatteras and some of the more permanent communities.

A large percentage of all developed land in the area of the Beaches is occupied by motels, hotels, and other commercial residential uses. With few exceptions, most of the land uses in this classification are located between the Route 158 By-Pass and the ocean beach extending from the Kitty Hawk area southward to the Whalebone Junction area of Nags Head, along U. S. 64-264 through the Manteo area and along N. C. 12 in the villages of Hatteras Island.

It was impossible to make a distinction between rental cottages and permanent residences while conducting the land use survey, even though such a distinction would be useful. It should be noted, however, that many of the rental cottages are occupied by persons engaged in temporary employment, such as construction, during the "off season." As this occupancy trend becomes more widespread and the recreation season becomes longer, the distinction between permanent and rental cottages on the beaches will be less significant.

It should be noted that the land uses in this classification vary in the degree to which they are used for commercial purposes, ranging from the motel which is used exclusively for commercial purposes, to the single-family resort home which is perhaps used two or more weeks by the owner and rented to other persons for the remainder of the time.

Residential

Throughout the county but predominantly in the area of the beaches there is a general mixture of permanent and seasonal residences. Concentrations of permanent residenc occur in the Duck area, Southern Shores, Kitty Hawk Village, Colington areas in Kill Devil Hills and Nags Head west of the Route 158 By-Pass, in South Nags Head, on Roanoke Island in Wanchese and North and West of Manteo, in the areas off the highways on the mainland and South of Oregon Inlet.

In general, the housing conditions in the county are good, but a number of unsound structures were noted. Most of the deteriorated and dilapidated structures exist as single units among other better constructed and maintained dwellings. There are large numbers of mobile homes among the more permanently settled areas of the county.

According to information obtained from "Social Indicators - Census Data Service" of the University of North Carolina and 1970 census data, there were 4,728 housing units in Dare County. Of this total, approximately 12% or 584 houses were found to be substandard. These figures indicate that approximately 4,144 units exist that are standard.

HOUSING CONDITIONS, DARE CO., 1970

Owner Occupied Total	1909
Renter Occupied Total	543
Vacant for Rent	166
Vacant for Sale Only	56
Vacant Other Vacant Year Round	528
Count of Vacant Seasonal and Vacant Migratory Units	1526

Total Housing Units	Substandard Housing	% of Total Housing
4,728	584	12.4

GOVERNMENT AND INSTITUTIONAL, CULTURAL, ENTERTAINMENT AND RECREATION

Outside the relatively insignificant amount of land in uses such as churches, post offices, county and town owned property, and fire stations, the major public lands are held by the Federal Government, consisting of approximately 21,771 acres of roughly 246,000 acres within the county.

At this time the only available public beaches in Dare County are those provided by the Park Service in the southern portion of Bodie Island. These beaches are not readily accessible to tourists in the northern portion of the Dare Beaches. Although the small amount of public beaches apparently is not a problem at this time, it will become more serious as the amount of development increases.

A related problem is the lack of non-water oriented recreation development in the county. It is true that the primary recreational attraction has been the ocean, but as the year-round resident population increases with the expansion of the recreation industry, the need for more diversified recreational developments will increase. The existing private golf courses are examples of the types of facilities which should be provided.

Industrial

Only a few parcels of land in the county are currently used for industrial purposes. One parcel, located in Nags Head, is used for the manufacture of concrete, another parcel located in the Kitty Hawk area west of the 158 By-Pass, is used for generation of electricity for peak load requirements. The seafood processing facilities at Wanchese and scattered small boat building operations and construction equipment yards on Roanoke Island and the mainland constitutes the other industrial areas in the county. These are generally mixed with residential and commercial uses.

Significant Land Use Compatibility Problems

Throughout the county the most significant compatibility problems are those of conflict between permanent neighborhoods and more intensive land uses such as relatively high density residential uses with seasonal occupancy and the scattering of commercial uses along the highways of the county. As a result of this uncontrolled mixture of land uses some residents of permanent neighborhoods are not afforded adequate protection from the offensive characteristics of these operations. At the same time, the operator of a commercial use cannot fully develop the potential of his property if his customers must fight for parking spaces, make unsafe turning movements across traffic lanes and be forced to make multiple stops for different commodities or services.

Major Problems From Unplanned Development With Implications For Future Land Use

The physical environment and its relationship to development in Dare County is an important factor for consideration. Some problem areas are: vegetation covering and protecting the sand dunes, the protective function of the barrier dune system, and hazards of active beach area, and the unrecognized economical importance of the marsh areas and sub-standard subdivision.

The results of indiscriminant destruction of vegetation in Dare County especially along the Outer Banks are clearly visible. Removal of dune grasses in the barrier dune area for the purposes of development has resulted in the destabilization of the dune and the eventual destruction of the protective function of the dune system. This continuing practice has the effect of increasing development costs through increased expenditures for soil stabilization. More importantly, destruction of the barrier dune places lives and property in jeopardy during extreme weather events.

The destruction of vegetation through development, lumbering, and grazing on the inland dune has had a similar effect. The moving sands from once stable dunes are gradually swallowing up parts of the most desirable locations for development and recreation in Dare County will be destroyed.

The active beach area is the most dynamic portion of the Outer Banks. The continual deposition and erosion of sand by the action of wind and water make this area unsuitable for development; yet, some new construction is being permitted in many active beach areas. The potential for loss of life and property is great.

The marsh areas of the Dare County have come under the close control of state and federal agencies. Development on lands contiguous to the marsh areas also presents a problem. Since at this time the only means of sewage treatment in the Dare Beaches is by individual septic tanks, the seepage of waste water into the marsh areas could endanger their continued support of many fish and wildlife species.

Some subdivisions with lots of insufficient size to support a septic tank system will require close monitoring to insure they do not endanger public health or safety through pollution of groundwater supplies or shellfish waters. This type of development occurred before the present county ordinances were adopted and serve as an example for the necessity of conscientious enforcement of good development standards.

Areas Likely To Experience Major Changes In Predominant Land Use

A. Dare Mainland

The First Colony Farms Operation covers the major portion of the Dare County Mainland. This area has been predominantly used for timber production in the

past. Development plans call for the conversion of approximately 102,000 acres of this land to pasture or row crop production with the reservation of around 75,000 acres as a wilderness area. In a study on the hydrology of this region made by the U. S. Geological Survey the authors caution that since this conversion requires the construction of a dense network of drainage channels and may, in time, require large quantities of water for irrigation and other purposes that some important problems seem likely to result from the developments in the region. In their relative order of occurrence in time, they are:

1. Changes in water quality of the sounds and estuaries resulting from the rapid runoff of storm waters containing dissolved material and bacteria harmful to the fishery resources.

2. Relatively rapid subsidence of the land surface in an irregular pattern in the extensive areas underlain by thick organic soils as a result of biochemical oxidation, past fires, and wind storms.

3. Acceleration of salt-water encroachment in both shallow and deep aquifers as a result of land drainage and increased withdrawals of ground water for irrigation and other uses.

Although none of these problems can be completely avoided, some of their adverse effects can be significantly reduced by the application of presently available technology. The development and enforcement of sound policies can assure the application of the technology. The development of policies applicable to the region must be done with full realization of the economic benefits of the agricultural developments and of the fishery and other resources of the area to both the State and the Nation. Because it is not possible to protect any one resource without due consideration of the others, solutions to the problems will require cooperation of both public agencies and private interests.

B. Wanchese

The development of the major fishing port with dock facilities and seafood processing plants will mean a great intensification of existing land use within the Village of Wanchese. The commercial fishing complex is being developed by the State of North Carolina and the Federal government at a cost approaching $15 million.

The State Ports Authority will operate the Wanchese Harbor complex, to be built on a 20-acre tract donated by landowners and Dare County.

The port will be the most completely integrated seafood facility in the country and is considered by top State officials to be the key to development of North Carolina's seafood industry.

Included in the master plan are grading and earthwork, concrete sheet pile bulkhead, hardstand surface, access road, storm drainage, electrical distribution and overhead lights, reconstruction of existing fuel dock, water system, sewerage system, administration building, finger piers, and seafood unloading and transfer facilities.

The center is designed to comply with rigid environmental water and air standards, including individual vessel discharge outlets to a central disposal system.

The port at Wanchese will provide space on which private industry may construct much needed seafood receiving and processing plants, and other enterprises to support the seafood industry on land leased from the Authority and created by the Authority as a result of the harbor development. All the basic facilities will be provided such as: water, sewer, street access, shore power, bulkhead, docking facilities, potable water supply, sewerage collection, and treatment facilities.

An analysis of the economic impact on northeastern North Carolina resulting from the development of Wanchese Harbor and the deepening and stabilization of Oregon Inlet recently prepared by the Division of Commerce and Industry, estimates $30 million in capital investment and in excess of 600 new jobs during the five year period following construction.

CURRENT PLANS, POLICIES AND REGULATIONS

1. The following plans, policies and regulations are currently in effect:

Dare County General Development Plan (1974)

A land use plan which designates future land use in various areas as Residential, Recreation, Agricultural Production, Forest Production or Conservation. The Plan proposes a County Center, Community Center and Neighborhood Center Concept through the county. The plan was prepared by Envirotek.

Engineering Report on Water and Sewer Facilities (1973)

The study projects requirements for water and sewer facilities through 2020 for the Roanoke Island and North Dare Beaches area. A previous study outlines the service area and requirements for the Hatteras Island portion of the county. Current engineering studies are underway to provide the facilities discussed in those plans.

Flood Insurance Regulations (1972)

The County Building Inspector enforces the provisions of the Dare County Flood Insurance Regulations for structures located in flood prone areas of the County. All of the susceptible unincorporated lands of the County and are covered under the emergency program and the Southern Shores Area is designated under the permanent program.

Zoning Ordinance

The most recent revision of the zoning text and map were adopted in November, 1975. The Kitty Hawk Beaches Area, the Southern Shores Area and the North End of Roanoke Island are included in the county's zoning jurisdiction. The zoning ordinance divides the county into districts and regulates and restricts the use of land, buildings, structures within these zoning districts. The ordinance is enforced by the Zoning Administrator.

Subdivision Regulations

The current subdivision regulations were adopted in 1972 and the Planning Board has recently recommended substantial revisions. The subdivision regulations govern the arrangement of lots and streets in new subdivisions, the provision of improvements as necessary and sets standards for developable property. New subdivisions must be reviewed by the County Planning Board and approved by the Board of Commissioners.

Dune Protection Ordinance (1971)

The ordinance requires a permit from County or Town Building Inspectors before altering any sand dune or the vegetation thereon and requires a setback of 150' from mean high water of the Atlantic Ocean.

Building Permits

The County Building Inspector enforces the N. C. Building Code in Dare County.

Improvements (Septic Tank) Permits

Septic tank permits are issued by the County Health Department. A Sanitarian checks the soil characteristics, water table and drainage of each lot before a permit is issued. Septic tanks, distribution boxes and drain lines are inspected in place before they are covered.

SECTION II

PUBLIC PARTICIPATION ACTIVITIES

Alternatives Considered in the Development of Objectives Policies and Standards

The Coastal Area Management Act of 1974 requires that land use plans be adopted for each of the twenty coastal counties named in the Act. If any county fails to develop its own plan, it is to be done for that county by an agency of the State. The Dare County Commissioners notified the State that the citizens of Dare intended to develop their own plan. Immediately, Dare residents became aware that they were going to be required to face the future squarely by planning not only for the very near future but for generations to come.

A questionnaire was used as a basis to offer planning alternatives as to how Dare should grow and develop, identify issues which were seen as problems by citizens, and determine objectives of the Land Use Plan.

Citizens were asked to indicate the degree of encouragement or discouragement which they felt should be given to the following topics: agriculture; fishing industry; tourism; forestry; construction; research/development industry; light industry (warehousing assembly etc.); heavy industry; residential development; single family residences; high rise residences; low rise multi-family residences; preservation of open space; new and improved cultural facilities (libraries, art galleries, theaters etc.); increased accessibility to Dare County; improved tourist facilities (convention centers, etc.); urban growth; protection of residential areas from encroachment by co-mercial or industrial enterprise; preservation of wildlife habitat; regulation of dunes and shoreline; and soil conservation.

In responding to the questionnaire, citizens were asked to indicate their degree of concern with such problem areas as water supply, traffic congestion,

sewage disposal, solid waste disposal, high rise construction, lack of medical services, limitations on building height, pollution of oceans and sounds, overpopulation, commercialization, small lots, lack of open space, lack of recreational facilities, destruction of dunes and beaches, lack of job diversification, lack of comforts and conveniences, lack of drainage, erosion by wind and water, lack of economic development, lack of industry, lack of planning, infringement upon individual rights, lack of county services, controlled growth, and control of natural resources.

The interests and concerns expressed by the citizens of Dare during this process became the basis for the goals and policies which will guide future growth in Dare County. Appendix A contains a copy of the citizen survey questionnaire and a summary of the results.

IDENTIFICATION AND ANALYSIS OF MAJOR LAND USE ISSUES

The citizens of Dare County have identified some major problems which directly affect the quality of living in the County. These issues are interrelated but will be treated in separate categories for the purpose of stating the objectives of this plan.

A. Population and Economic Trends.

Dare County is faced with an expansion of its population at a rate which is beyond the present capacity for utilities and services to accommodate. The population of Dare County is increasingly older which reflects a declining birth rate and the influx of retirees. The Outer Banks of the County are its major attraction and it is there that the growth is occurring. The Outer Banks are also among the most fragile areas of the County and therefore the impact of any improper development is most apparent.

The heavy dependence upon tourism as the economic base for Dare County places the County in an unstable position with regard to employment and income from sales and services which reflect the seasonal nature of tourism. Historically, Dare County residents earned their living from the sea, sounds, and forests. It is only in recent years that these stabilizing influences have declined in relative importance.

B. Housing and Community Services

Development in Dare County is presently dependent largely upon individual wells for water supply and septic tanks for sewage tanks for sewage disposal. As long as population density is low, the well and septic tank system is acceptable.

When the number of wells and septic tanks increase on the predominantly sandy soils found in Dare County, the quality of the ground water supply drops to an unacceptable level and the quality of water in the sounds is affected so that vital shellfish producing areas are endangered. An adequate water supply and a safe method of sewage dieposal are the keys to thoughtful development.

The health and social services needs of Dare County become more critical as the population increases. The lack of readily available medical treatment is a major concern to Dare County residents.

Other services which are necessary for orderly growth include the sanitary disposal of trash and garbage, adequate law enforcement, and fire protection, a balanced education system to meet the needs of youth and the increasing numbers of residents who seek education beyond high school, and expanded cultural and recreation facilities to serve permanent residents.

Residential neighborhood characteristics important to the people of Dare County are those which typify the existing communities with single family residences set in quiet areas free from the encroachment of commercial or industrial development. Structures which are not in scale with the low profile of vegetation and land features of Dare County have an undesirable affect on the community character and life-style traditional to the Outer Banks.

C. Productive Natural Resources

The waters surrounding Dare County are among the most productive in the world. The breeding grounds for shellfish and fin fish in the sounds yield impressive catches which are sought not only in the sounds but by the commercial fisheries of other nations in the Atlantic within sight of the Outer

Banks. The land area of Dare County is also richly productive. Forestry and agriculture contribute to the natural wealth of the County. The use of the land as a base for recreational activities has recently overshadowed fishing, forestry, and farming however.

The land and water are so closely related in Dare County that the use of the one directly affects the other. In order to conserve the productivity of both the land and the water it is necessary to examine these effects carefully and determine the best way to manage their use.

D. The Natural Environment

Man is a part of the natural environment of the Outer Banks. Historically, man's impact on the Outer Banks has been small. In few numbers, man has been able to live in balance with nature along a coast which is ever changing in reaction to the forces of wind and wave. As the numbers increase, so does the impact. We are now in a critical period of the development of Dare County when the adverse impact of human activity is becoming apparent in the closing of shellfish waters because of pollution, the loss of valuable wildlife habitat to accommodate construction and other detrimental activities.

The citizens of Dare County seek to encourage wise development of their land and water environment but not at the cost of destroying the natural things that attract people to the area.

E. Cultural and Historic Resources

"The Land of Beginnings" is an appropriate motto for the County that saw the first English colony in America and man's first powered flight. Dare County has played an important part in the development of this country and has a rich cultural heritage that is one of her greatest assets.

The recognition of the significance of the County's more recent past may point the way to the kind of development and growth which could stabilize the economic base of the County and instill a sense of community among the residents. The tradition of villages located in stable, sheltered areas along the Outer Banks, on Roanoke Island, and on the mainland is characteristic of that breed of Dare County residents who fished her waters and saved lives on her shores during the past two hundred years. This village tradition should be encouraged and reinforced through development standards.

F. Transportation

The rapid growth of tourism is already causing transportation problems in the County. Further, continued development of the Currituck Outer Banks will pose the growing threat of a transportation corridor to the north of Dare County. Unlimited access to and from the tidewater cities in Virginia would create a north-south thoroughfare along the Dare Banks with devestating impact on the natural environment and on the qualities of living in the area.

DEVELOPMENT OBJECTIVES

The intent of this policy statement is to set the framework for a balanced plan to protect and preserve those cultural and physical features unique to the coastal environment and guide the orderly development of the land and water resources of the County in a manner which will insure their continued enjoyment by future generations of Dare County residents and visitors.

In the Public Participation Program, the citizens of Dare County expressed their concern with the qualities of living in Dare County which seem to them most important and most endangered by present trends. These qualities are:

1. The freedom from pollution and population pressures enjoyed by Dare County today.
2. The natural environment of the County and the various recreational activities associated with it.
3. The slow pace of living in Dare County.
4. The privacy available in Dare County.

The preservation and enhancement of these qualities which make Dare County attractive to its permanent residents and visitors alike will be the major objectives sought in the Dare County Land Use Plan.

POLICIES FOR DEVELOPMENT

In keeping with the expressed desires of its citizens, the following policies have been adopted to guide the physical, cultural and economic development of the County:

a. To undertake a pattern of land use which places high importance on the protection and conservation of Dare County's unique environment.

b. To undertake a pattern of land use which will provide a broad range of living, working and recreational opportunities for permanent and seasonal residents.

c. To undertake a pattern of balanced residential and commercial land use based on the availability of adequate utilities and services.

d. To undertake a pattern of land use to provide for the concentration of commercial services and facilities in suitable growth centers such as the established towns and areas permitting such development.

e. To maintain tourism and the recreation industry as a major contributor to the economic well being of the County.

f. To maintain Dare County's heritage as a fishing center and to encourage the provision of modern seafood processing facilities in the County to help insure its viability and growth.

g. To encourage the County's tradition of independent craftsmen and of trades such as boatbuilding and netmaking, to more fully utilize labor resources available in the area.

h. To encourage the establishment of a center for wholesaling, warehousing and distribution of goods and services in support of the tourist industry in a suitable location in Dare County.

i. To encourage intergovernmental cooperation and coordination in Dare County in the interest of working jointly toward the accomplishment of goals.

j. To undertake to work with neighboring Counties and with State and Federal agencies toward the objective of making the Outer Banks a destination area instead of a major traffic throughway.

k. Community services and facilities will be established only in suitable areas.

l. The towns of Kill Devil Hills, Manteo and Nags Head are designated as growth centers and will provide a nucleus of the services and utilities necessary to support desirable development. Within each town detailed land use categories will be assigned through the development codes of each jurisdiction.

The County has adopted and will continue to enforce regulations to control the subdivision of land, to prevent the destruction of barrier dunes along the ocean, to control the quality of water supplies, to control the installation and maintenance of sewage disposal systems, to control construction of flood-prone areas, and to control the use of land where the intensity of development is greatest.

DEVELOPMENT STANDARDS

The development of land and water areas within Dare County should be undertaken in accordance with sound resource management principles in order to make the most economic use of public funds invested in services and to enhance private investment in the long term future of Dare County. The following standards will guide the location of development in appropriate areas and identify certain measures necessary to insure safety and convenience for residents of and visitors to Dare County.

A. General Standards -

(1) Development should be located on stable, well-drained soils with a relatively low water table.

(2) Structures should be located on the development site to avoid the destruction of natural vegetation wherever possible.

(3) Structures should be located on site to avoid the alteration of natural land form and drainage where possible.

(4) Development should be located to minimize interference with established patterns of surrounding land use and to prevent conflict between incompatible uses of land and water.

(5) Development should be located to avoid the destruction or irretrievable alteration of fragile or valuable natural or cultural resources.

(6) Development should not occur in areas where there is a demonstrated danger of the loss of life or property due to natural or man-made processes.

(7) Development in areas subject to coastal flooding should be designed and located to minimize the damage caused by such flooding.

(8) Development should be located and timed to make the most efficient and economical use of existing or proposed public services including water, sewer, solid waste disposal, public safety, schools, libraries and social services.

B. Residential Standards -

(1) Permanent neighborhoods should be located in sheltered areas protected from encroachment by major transportation routes and incompatible commercial development.

(2) Permanent neighborhoods should maintain low density levels and large amounts of useable open space to preserve the privacy and aesthetic appeal which characterize the traditional settlements in Dare County.

(3) Seasonal and vacation residences should be located with convenient access to transportation routes and recreational activities.

(4) Residential development which requires septic tanks for sewage disposal should follow current health requirements as to soil type, height of water table and area to prevent pollution of ground water supply, aquifer recharge areas or estuarine waters.

(5) Development which results in residential densities over 3 families per acre should be served by public or community sewage disposal systems.

C. Commercial Standards

(1) General commercial activities, business and tourist services require locations adjacent to major thoroughfares. The uncontrolled development of commercial sites at scattered locations along highways does not promote good business, is inconvenient for shoppers (especially tourists unfamiliar with the area), promotes inefficient

use of valuable developable land, creates dangerous traffic conflicts at each driveway entrance, and seriously impairs the capacity and function of the highway. Therefore, commercial development should be concentrated in groups of complementary uses where possible.

(2) Small commercial enterprises of less than one acre are encouraged to locate where suitable sites exist among existing commercial uses in order to take advantage of combined drawing power and to increase customer convenience.

(3) Large scale commercial developments involving one acre or more are encouraged to concentrate complementary uses on sites large enough to provide ample parking, controlled access to highways, and suitable buffering for adjacent residential use.

(4) Convenience retail facilities designed and limited to serve neighborhood level trade areas only may be appropriate adjacent to some residential neighborhoods if properly buffered to minimize impact on adjacent residences.

(5) Since the natural beauty of Dare County is one of her greatest attractions to tourists and permanent residents, advertising structures should be located only where they do not obscure or detract from that natural beauty. Suitably located tourist information centers will provide the travelling public with an opportunity to sample the hospitality of Dare County and provide the necessary information as to accommodations, rates, availability, services, entertainment, and points of scenic, historic and cultural interest without distracting motor vehicle operators and detracting from the scenery.

(6) Water related commercial activity such as marinas and piers should be located in naturally protected areas as near deep water as possible where the least amount of alteration of vital marsh and estuarine bottom is required.

D. Industrial Standards -

(1) Industries locating in Dare County will be required to provide an assessment of the impact of primary and secondary development caused by the industry and should use the best available technology to avoid pollution of the water or air during construction and in production.

(2) Industries which are not entirely dependent upon waterfront locations should be located elsewhere.

(3) The development of the Port of Wanchese will set standards for the control of processing waste, site drainage and other industrial parameters which should be met by other industrial development.

PROCESS USED TO DETERMINE PUBLIC PARTICIPATION

The Dare County Commissioners assigned the task of overseeing the preparation of a CAMA Land Use Plan to the Dare County Planning Board. The County Planning Board consists of five members who represent the five major geographic divisions of the county; the mainland, Roanoke Island, Kitty Hawk and the North end of the Outer Banks, Bodie Island, and Hatteras Island.

In October of 1974 the Chairman of the Dare County Planning Board called a meeting between the County Planning Board and the Planning Boards of the three municipalities in the county, Kill Devil Hills, Nags Head and Manteo, to review and to make recommendations on the proposed Guidelines for Local Planning that had been published by the Coastal Resources Commission. A steering committee was appointed to determine how the public participation requirements of the guidelines could be met in Dare County.

The steering committee proposed that an individual from each of the recognized communities in the county be appointed to serve as a contact person for that community. Each community contact person had a knowledge of his area and its residents. The contact person was responsible for disseminating information to the citizens about CAMA and for gathering their input to the Land Use Plan.

The steering committee prepared a questionnaire and a slide presentation for citizens' groups such as civic clubs, fraternal organizations, garden clubs, and any other organized gathering.

The questionnaires were used to identify issues which are seen as problems by the citizens and to provide a basis for defining the goals for the Land Use Plan.

No formal group structure was suggested for the community contact people due to the diverse nature of the communities and the need for an approach which was flexible enough to do the job as well in a tourist center like Nags Head as in the fishing village of Wanchese or one of the retirement communities on the Banks. A list of existing organizations within the county was compiled and each was contacted with the offer of a program consisting of one of the members of the steering committee as a speaker and the slide show/questionnaire package.

Over 18% of the population of Dare County responded to the questionnaire and the majority of them included thoughtful additional comments concerning the development of this County. The interest and concern of local residents is reflected in their desire to participate in the continuation of the planning program.

The success of this program in Dare County represents the personal involvement by many citizens and the local news media. An article appeared in almost every issue of the Coastland Times since January, 1975, concerning some aspect of the CAMA. A weekly broadcast on radio station WOBR featured local officials and citizens speaking on the CAMA and Land Use Planning in Dare County. In addition, television appearances by county officials, bulletins, leaflets and newsletters were used to inform the public.

The interests and concerns expressed by the citizens of Dare County during this process became the basis for the goals and policies which will guide future growth in Dare County.

SECTION III

CONSTRAINTS ON DEVELOPMENT

DARE COUNTY CONSTRAINTS ON DEVELOPMENT

The following outline and discussion identify the areas within Dare County which could be recognized as constraints on undeveloped land as required in the State Guidelines under the Coastal Area Management Act of 1974.

I. Physical Limitations for Development

- A. Hazard Areas
  - 1. Man-made
  - 2. Natural
    - a. Ocean Erodible Areas
      - 1. Location and Extent of Dare County Beaches
      - 2. Shoreline Changes
      - 3. Littoral Drift
      - 4. Inlet Changes
      - 5. Storm Recession Forecasts
    - b. Estuarine Erodible Areas
- B. Areas with Soil Limitations
  - 1. Soil Associations in Dare County
  - 2. County Soil Map and Soil Interpretation Chart
- C. Sources of Water Supply
  - 1. Groundwater
  - 2. Surface Water
- D. Areas With Steep Slopes

II. Fragile Areas

- A. Coastal Wetlands
- B. Sand Dunes Along the Outer Banks
- C. Ocean Beaches and Shorelines
- D. Estuarine Waters
- E. Public Trust Waters
- F. Complex Natural Areas
  - 1. Natural Areas Designations in "Potential for Outdoor Recreation in Dare County, N.C."
  - 2. Maritime Forests and Fresh Water Ponds
    - a. Nags Head Woods
      - 1. Flora
      - 2. Fauna
  - 3. Durant Island
  - 4. Dare County Pocosin
- G. Areas that Sustain Remnant Species
  - 1. Rare and Endangered Animals
  - 2. Rare and Unique Plant Species
- H. Registered Natural Landmarks
- I. Historic Areas

III. Areas With Resource Potential

- A. Productive Agricultural Lands
- B. Potentially Valuable Mineral Sites
- C. Publicly Owned Parks
- D. Wildlife Sanctuaries

I. PHYSICAL LIMITATIONS ON DEVELOPMENT

Physical Limitations on Development are areas likely to have conditions making development costly or causing undesirable consequences if developed. As seen in the preceeding outline, a discussion on physical limitations should include Hazard Areas, Areas with Soil Limitations, and Sources of Water Supply.

A. Both Man-made and Natural Hazard Areas should be considered. Man-made hazard areas within Dare County include the airport located in Manteo, the airstrips located in Kill Devil Hills and Hatteras, as well as the bombing range located on the mainland. Natural hazard areas include Ocean Erodible Areas and Estuarine Erodible Areas which are discussed in the following paragraphs.

Ocean Erodible Areas

These areas are defined in the State Guidelines as the area above mean high water where excessive erosion has a high probability of occurring. Ocean erodible areas are extremely dynamic lands highly susceptible to becoming completely displaced by water.

The active beach area consists of the beach and the outer barrier dune. During normal wind and tide conditions, the beach front absorbs the energy of the waves, and it is regularly inundated by tides. During extreme weather conditions, the outer barrier dune serves as the island's first line of defense against the sea.

Two important processes occur in the active beach area--one is the normal process of deposition and erosion of sand by winds and waves, and the other is the occasional breaching of the barrier dune and the resulting overwash caused by storms. Studies have shown that the combination of erosion and overwash produce a slow westward movement of the island. Under natural conditions, the beach is eroding inland, and the soundside shore is extending into the sound at approximately the same rate.

An article on the Outer Banks by Collier Cobb of UNC in the National Geographic Magazine stated that at one time the area was thickly forested up to the water's edge. After the Civil War, Bodie and Hatteras Islands were deforested for ship timbers, hence, initiating the erosion that has affected the area up to the present.

Alteration through improper development in the active beach area appears to produce an acceleration of the natural processes. Development in the active beach area must be considered from the standpoint of high potential loss of life and property, the destruction of the natural landscape, and destruction of the island's barrier against the forces of the sea. Both forms of destruction will have major economic consequences.

Location and Extent of the Dare County Beaches

Bodie Island - The island is lined on the ocean side with a 33-mile stretch of beach from Dare-Currituck County line to Oregon Inlet. The island varies in width from about one-half to two miles. The area from the southern boundary of Nags Head to Oregon Inlet is under the care of the Cape Hatteras National Seashore Recreation Area and the National Park Service. The principal communities in the island are Nags Head, Kill Devil Hills and Kitty Hawk.

Hatteras Island - The shoreline west of Cape Hatteras is a 13-mile stretch which is rather straight towards to the west to Hatteras Inlet with a small concave portion close to the Cape. To the north of the Cape is a 39-mile stretch of coastline consisting mainly of two straight sections and a convex section towards the Atlantic Ocean in the vicinity of Rodanthe. The island is very narrow except in the area near the Cape.

The principal towns or communities are Rodanthe, Waves, Salvo, Avon, and Buxton north of Cape Hatteras, and Frisco and Hatteras in the western segment. The resident population live within the limits of these communities; the remainder of the island in the Cape Hatteras National Seashore Recreational Area is practically uninhabited except for the Coast Guard Stations located therein.

Shoreline Changes*

Two changes in the ocean shoreline of the area have been determined by comparing surveys made by the U.S. Coast and Geodetic Survey until 1860, aerial photographs of the area, and a survey made by the Corps of Engineers in 1958. Findings gathered by Langfelder et. al. (1968) and Whals (1973) on the coastal erosion of the N. C. Coastline were also employed.

Athearn and Ronne (1963) in their study of shoreline changes in the vicinity of Cape Hatteras, pointed out that erosion of the south beach at the Cape was quite impressive. At the southwest section, the loss between 1945 and 1953 amounted to 1,500 feet measured roughly along the high water line. The orientation of the beach changed substantially. The former trend was west-northwest to east-southeast; since 1953, the trend has been west to east. Most of the erosion was said to be confined to a pie-shaped wedge near the point, apparently with little change occurring farther west. Another 300 feet was lost between 1953 and 1958; however, the dune stabilization program of the National Park Service somewhat stabilized with some accretion observed.

House Document No. 763, 80th Congress (1948) reported from data gathered between 1848 and 1934 an average annual accretion of 0.8 foot over the 56 miles of shoreline from the Virginia State line southward. The area of erosion was noted at a section where the coast changes direction between 50 and 80 miles from the Virginia State line. Between Cape Hatteras to Ocracoke Inlet, an average erosion of 2.2 feet per year was observed. At Cape Hatteras itself, a progressive erosion has been experienced from 1848 to 1934 with the eastern face averaging 21 feet per year. The southwestern face of the Cape has accreted at an average of 24.2 feet per year. The net change indicated a loss of 127 acres for the immediate vicinity of the Cape.

* From Coastal Erosion by Jerry Machemehl.

The study made in 1947 by the Corps of Engineers of shoreline changes in the Nags Head area from 32 to 66 miles from the Virginia State line showed a mixed pattern of erosion and accretion. Erosion occurred at most stations prior to 1935. From 1935 to 1937 accretion prevailed. Likewise, from 1937 to 1939 more sections experienced accretion than erosion. However, the net result for all the area except for that close to inlets was erosion of from 5 to 95 feet, or a maximum rate of nearly 12 feet per year. From 1931 to 1939, there was a recession of 1,020 feet at the area near the north side of Oregon Inlet, but an accretion of 165 feet at the south side. The area north of New Inlet accreted 35 feet during the same period. An examination of figures 1 and 2 reveals the amount of erosion or accretion which has occurred during the period 1949-1971 along the Dare County barrier chain.

Littoral Drift

The predominant littoral drift was as expected in the shoreline north of Cape Hatteras, would be southward. Wave action accounts mostly for the marked predominance of the southward drift. The predominance of the southward drift has been further confirmed by southward migration of inlets and southward trailing of underwater spits at Cape Hatteras. The closure of most of the breaches through the barrier beach early in their development could also explain the fact that the volume of littoral material being moved is quite large.

The direction of the littoral drift is easterly from Hatteras Inlet to Cape Hatteras per the findings of Langfelder et. al. (1968). This accounts for the considerable accretion of material around Cape Hatteras where this easterly drift meets the southerly drift coming from the north of the Cape. The amount of accretion in this portion ranges from 80,000 to 400,00 cubic yards, increasing in the direction of the Cape.

Inlet Changes

The north tip of Ocracoke Island receded southwesterly covering a distance of 8,100 feet, an average annual rate of about 80 feet. The south tip of Hatteras Island advanced southwesterly about 3,200 feet, an average annual rate of 30 feet. The width of Hatteras Inlet increased from 3,500 feet in 1852 to about 8,400 feet in 1958. Welch (1885) did some research work on the account of the cutting through of Hatteras Inlet where he found that there is substantial evidence from many reliable sources that this inlet was opened during a great gale on September 7, 1846.

From available records, Oregon Inlet is the other inlet besides Ocracoke and Hatteras that has remained open at all times in the area. Numerous other inlets along the coast have closed, or opened and closed during this time. New Inlet was artificially opened in 1924, closed and then opened alternately and finally closed again in 1947 joining up Pea Island with Hatteras Island. Oregon Inlet is an opening in the barrier beach 40 miles north of Cape Hatteras and 80 miles by ocean from Ocracoke Inlet.

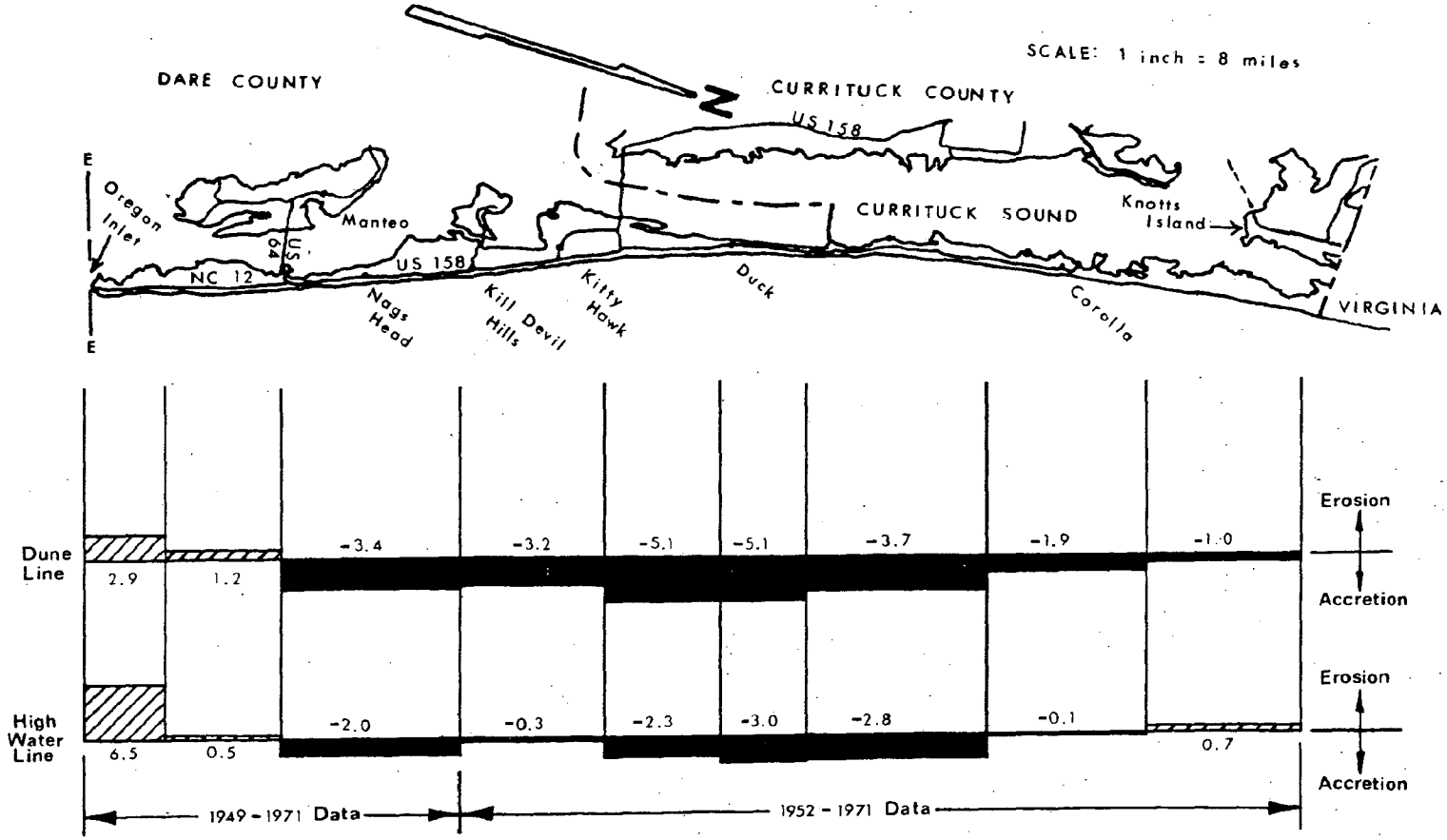


FIGURE 1

COMPOSITE MEAN ANNUAL RATES OF CHANGE (FEET PER YEAR) FOR DUNE LINE AND HIGH WATER LINE IN CURRITUCK AND NORTHERN DARE COS. FOR 1949-1971

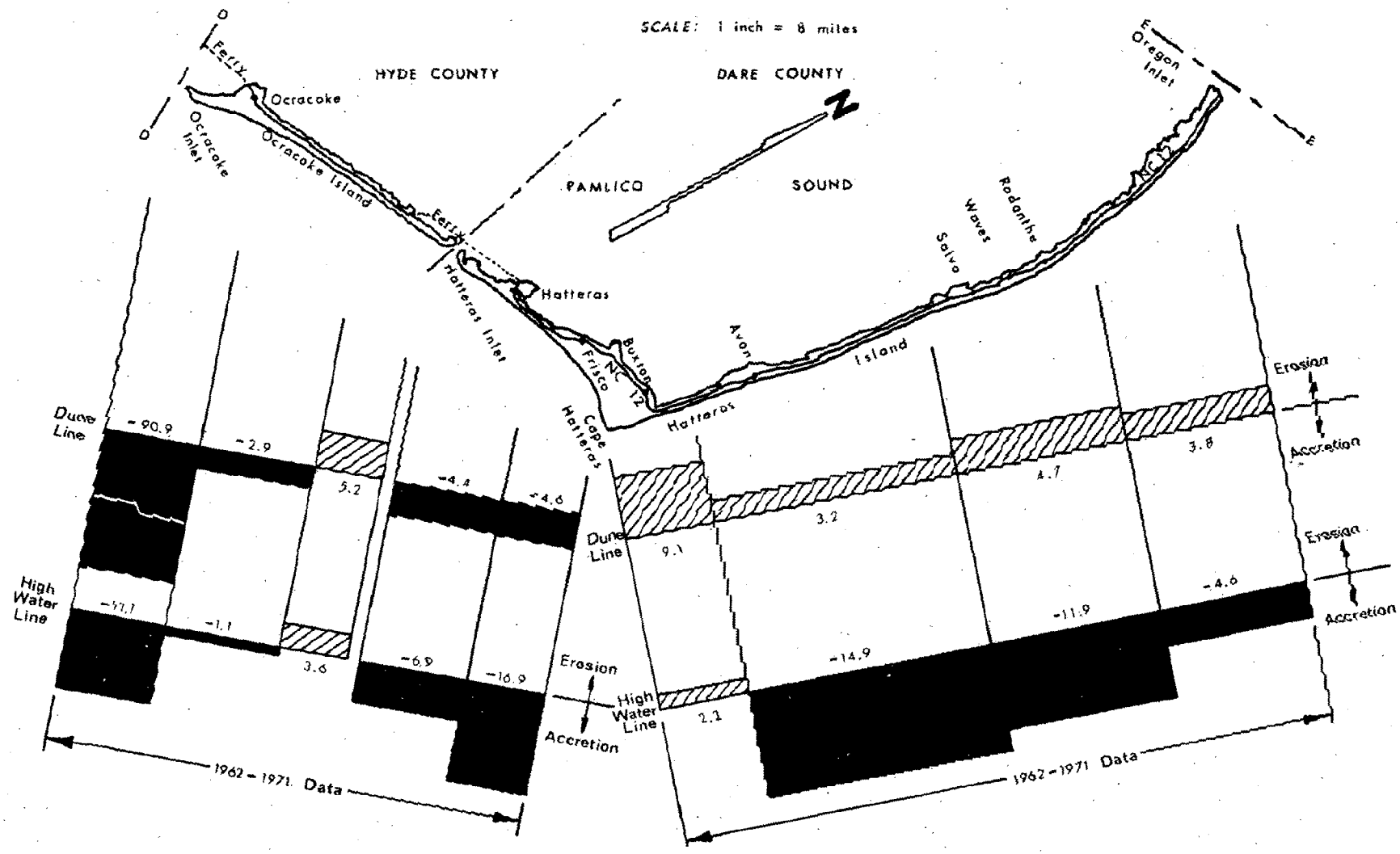


FIGURE 2

COMPOSITE MEAN ANNUAL RATES OF CHANGE (FEET PER YEAR) FOR DUNE LINE AND HIGH WATER LINE IN HYDE AND SOUTHERN DARE COS. FOR 1962-1971

Records have shown that the width of Oregon Inlet was 2,770 feet at the baseline sometime in 1931. It had widened to 4,300 feet in 1935 and varied in width from 4,000 feet in 1936, 4,300 feet in 1937, and 4,350 feet in 1939. The increase in width was nearly equal on both sides of the inlet during the period, so it was concluded it has no tendency to migrate except for its previous history, that it moved southward about 1-1/2 miles in 65 years prior to this period.

The existence and histories of inlets in the area were determined from maps, surveys, charts and reports previously made. The oldest reliable record is a map of the coastal section from the Virginia State line to Cape Fear entitled "Chart of his Majesty's Province of North Carolina," signed by James Wimble in 1738. It has been shown that since that time both Ocracoke and Hatteras Inlets migrated in a southwesterly direction.

Storm Recession Forecasts

Storm erosion of beaches and dunes of the Dare County coast has always occurred, but it has not been a serious economic problem until recently when increased development of beachfront property has taken place. In some locations, structures have been built seaward of the beach storm recession line and have sustained considerable damage. In 1973, Knowles et. al, presented the results of a study to determine the expected storm induced beach erosion for storm occurrency of one in twenty-five, one in fifty, and one in a hundred year frequencies. This erosion study provides preliminary information needed for coastal land management. The calculated storm recessions for each of the piers analyzed in Dare County are presented in Table .

The storm induced recession prediction presented here is considered to be useful for determining the distance from the toe of the primary dune in which any structures might be considered to be in danger. However, if a building setback line is to be established, additional factors such as long time erosion, continuity of the dunes, size and shape of the dunes, potential for overwash and other existing features should be considered.

RESULTS OF BEACH RECESSION STUDY FOR NORTH CAROLINA COASTLINE

County and Pier Name	Dune Height (ft. above MSL)	Toe of Dune Height(ft) from MSL	Toe of Dune Dist. from MHW(ft)	Recession from toe of dune (ft) for three storms with specific return frequencies in years		
Dare County				1/25	1/50	1/100
Kitty Hawk	19.6	12.1	215	11	34	54
Avalon	18.5	9.3	150	40	70	94
Nags Head	22.9	7.6	112	94	107	126
Outer Banks*	30.0	4.1	75	69	73	78
Hatteras Island	21.7	2.2	102	99	104	108
Cape Hatteras*	24.0	8.8	61	57	66	74

Source: "A Preliminary Study of Storm Induced Beach Erosion For N. C."

Estuarine, Sound Erodible Areas

These areas are defined as the area above ordinary high water where excessive erosion has a high probability of occurring. The estuarine and sound and river erodible areas are natural hazard areas especially vulnerable to erosion. Development within this type land is subjected to the damaging process of erosion unless special development standards and preventive measures are employed.

In determining the landward extent of this area, 25 and 100 year recession figures are projected for certain reaches of the Dare County mainland. This inventory was undertaken by the State Soil Conservation Service and is available at the present time only for the Dare mainlands.

The reaches identified on Page 75, Fig. 3 represent segments of shore which have similar erosive characteristics. The average width loss to erosion was established by observing aerial photos over a twenty-two year period. This figure represents the total loss to erosion during that time. Estuarine recession figures for Roanoke Island and the west portions of the barrier islands will be available when further information is supplied by the State Geologist.

ESTUARINE, SOUND AND RIVER EROSION IN DARE COUNTY

Reach No. 1	
Average width lost to erosion	44.4 feet
Total length of shoreline	3.3 miles
Average width lost to erosion per year	2.0 feet
25-year shore recession forecast	50 feet
100-year shore recession forecast	200 feet
Reach No. 2	
Average width lost to erosion	44.0 feet
Total length of shoreline	4.1 miles
Average width lost to erosion per year	2.0 feet
25-year shore recession forecast	50 feet
100-year shore recession forecast	200 feet
Reach No. 3	
Average width lost to erosion	44.0 feet
Total length of shoreline	22.6 miles
Average width lost to erosion per year	2.0 feet
25-year shore recession forecast	50 feet
100-year shore recession forecast	200 feet

Reach No. 4

Average width lost to erosion	44.0 feet
Total length of shoreline	10.8 miles
Average width lost to erosion per year	2.0 feet
25-year shore recession forecast	50 feet
100-year shore recession forecast	200 feet

Reach No. 5

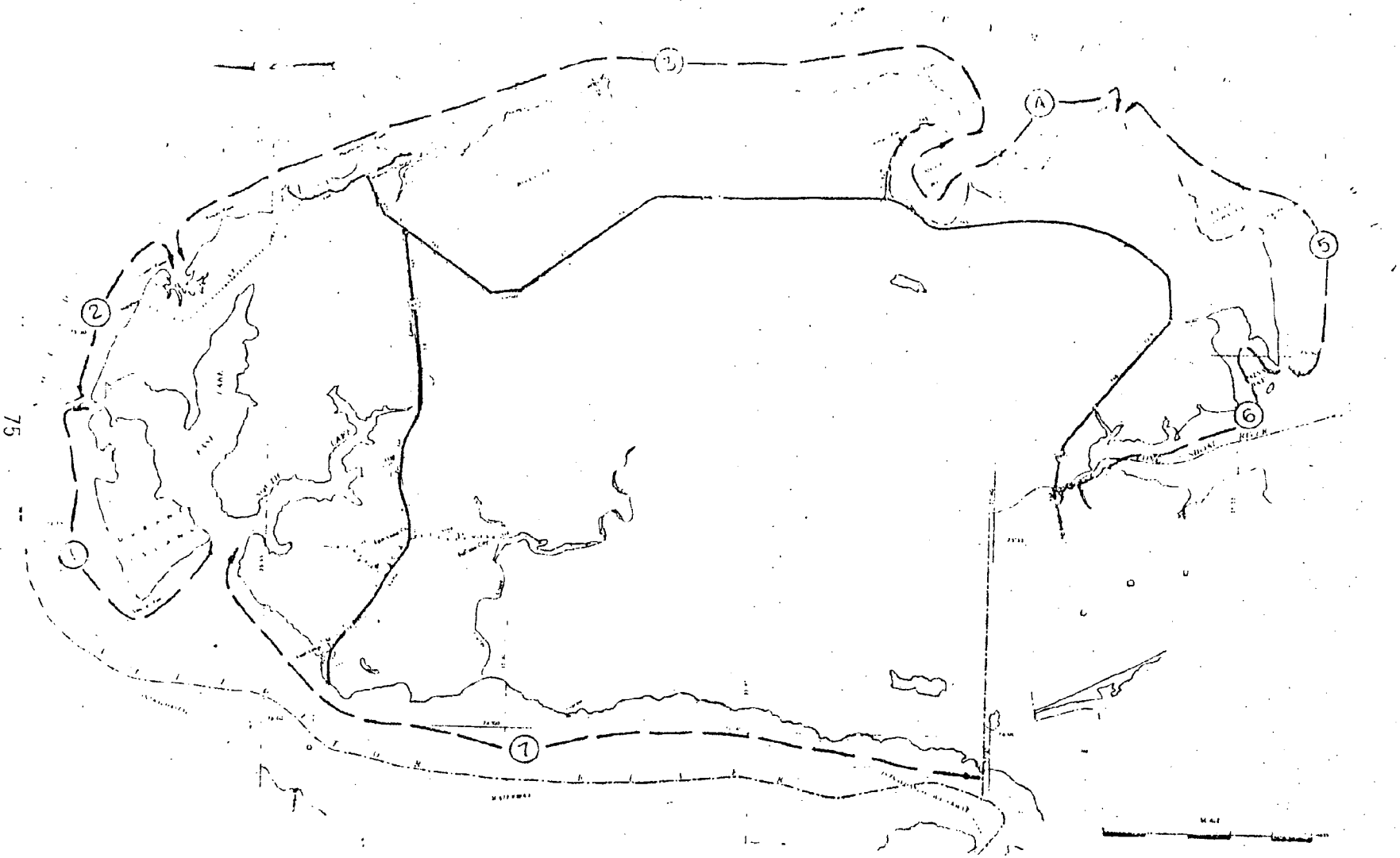
Average width lost to erosion	44.0 feet
Total length of shoreline	8.7 miles
Average width lost to erosion per year	2.0 feet
25-year shore recession forecast	50 feet
100-year shore recession forecast	200 feet

Reach No. 6

Average width lost to erosion	44.0 feet
Total length of shoreline	9.3 miles
Average width lost to erosion per year	2.0 feet
25-year shore recession forecast	50 feet
100-year shore recession forecast	200 feet

Reach No. 7

Average width lost to erosion	44.0 feet
Total length of shoreline	23.2 miles
Average width lost to erosion per year	2.0 feet
25-year shore recession forecast	50.0 feet
100-year shore recession forecast	200.0 feet



LEGEND

① REACH

FIGURE 3

ESTUARINE EROSION FOR DARE COUNTY

DARE COUNTY

NORTH CAROLINA

B. Areas with Soil Limitations*

Areas with soil limitations are also considered as physical limitations on development. Soils which occur together in a characteristic and repeating pattern on the landscape constitute a general soil area or a Soil Association. Soil Associations are named for two or more of the most extensive soil types found on a particular landscape. The less extensive soil types may not be included in the Association name.

A generalized soils map showing the locations and extent of six associations in Dare County has been prepared. This map, along with the accompanying text and interpretations, provides the general soils data necessary for planning and efficient use and orderly development of the county's land resources. This map will be useful to those who are interested in the location and extent of soil types in the county, as well as to those who seek the locations of areas suitable for agricultural, industrial, or other broad land use potentials within the county.

It should be emphasized that this general soils map has been prepared for broad planning purposes only. It does not accurately depict specific soil types on individual tracts of land and is not suitable for detailed planning of such tracts. A more detailed soil survey is necessary for detailed planning.

The accompanying soil interpretations table gives limitations of the main soil types for dwellings, recreational areas, light industries, and highway development, as well as suitability for general agriculture, woodland, and pasture development.

The six soil associations in Dare County are discussed in the following pages. (The accompanying maps, legends and tables were prepared by the Soil Conservation Service assisting the Pamlico Soil and Water Conservation District.)

1. PACTOLUS-WAKULA-WAGRAM ASSOCIATION:

Moderately well and well drained soils with gray to dark gray loamy sand surface layers and loamy sand to sandy clay loam subsoils.

This association comprises about one percent (1%) of the county's total area. It occurs as a small isolated area around Mann's Harbor on the mainland and as larger acreages on Roanoke Island around Wanchese and Manteo. Large acreages of the association are also located on the northern end of the Outer Banks around Kitty Hawk, Sound Landing, and Collington.

The majority of the acreage in this association is devoted to recreational enterprises and urbanization. Agriculture is limited to small acreages and, generally, is devoted to small garden plots.

*From "Soil Map and Interpretations, Dare County, N. C."

2. NEWHAN-COROLLA-DUCK ASSOCIATION:

Excessively drained moderately well and poorly drained gray sandy soils that contain marine shells.

This association comprises about thirteen percent (13%) of the county's total acreage. Soils of the association are found exclusively on the Outer Banks and primarily on the eastern side of the chain from the Currituck line to Hatteras in the South.

Soils of this association are unsuited for agriculture or forestry. They generally have severe limitations for most potential uses and should be considered as "high risk" areas for housing and industrial development. This rating is based on soil characteristics as well as on their close proximity to the ocean and susceptibility to wind and water damage resulting from storms and hurricanes.

3. DARE-PUNGO-PONZER ASSOCIATION:

Very poorly drained soils with thick to moderately thick organic surface over mineral subsurface layers ranging from sand to clays.

Soils of this association, along with other closely related organic and mineral soils, comprise approximately seventy percent (70%) of the county's total area. This association represents even a larger percentage of the total acreage of the Dare County mainland.

Organic soils, as differentiated from mineral soils, are those in which 16 inches or more of the surface layer is composed predominantly of organic materials. In Date County these organic soils represent a large cross-section of surface and subsurface conditions. Along with the unique nature of these organic soils comes a large variety of associated and complex management problems.

The soils of this association are extremely wet year around, are extremely acid unless limed, have large amounts of wood throughout the profile, contain high percentages of unstable organic materials and are extremely susceptable to fire when dry. The characteristics for organic soils of this association indicate a limited potential for agriculture and forestry and essentially no potential for industrial development. Agricultural development is taking place on these soils but sound management practices and large capital investments are required. Although corn, soybeans and small grains are potential crops for these soils, indications are that these acreages may be best utilized for pasture or forage crop production.

4. WASDA-BLADEN ASSOCIATION:

Very poorly and poorly drained soils with thin organic loam to silt loam surface layers over firm clay loam or clay subsurface layers.

This association comprises approximately ten percent (10%) of the county's total acreage. It occurs as two large fairly homogenous areas on the mainland of Dare County. One large area is located in the west-central portion of the county and the other area extends from East Lake community along Highway 64 and runs in a northeast-southeast band to highway 264.

Only a very small percentage of this association is now under cultivation; this acreage is located in the East Lake Community. However, plans for development of tremendous acreages of this association are in progress. These soils respond well to applications of lime and fertilizer but a complete drainage system must be installed and maintained in order to off-set the high water table and periodic flooding. Potential uses of soils in this association are, therefore, limited to agriculture and forestry.

5. CAPERS ASSOCIATION:

Very poorly drained soils with dark gray silty clay loam surface layers over silty clay subsoils.

This association comprises about five percent (5%) of the county's total acreage. Capers soils make up approximately ninety percent (90%) of the association. The Capers soils are associated almost exclusively with level tidal flats and estuaries bordering the Pamlico, Croatan, Currituck, and Albemarle Sounds. These soils are flooded by saline or brackish water at least once per month and in many areas, twice daily. Elevations for these soils range from sea level to approximately three feet above sea level. Their chief use is that of a natural habitat for shore and water birds and animals. They are also chief nutrient source for shellfish and other important estuary marine life. Vegetation consists chiefly of smooth cordgrass, black rush, glass wort, seashore saltgrass, sea-oxeye, and other marsh related grass and shrub species.

6. DUNE SAND ASSOCIATION:

Unstabilized and partially stabilized sand dunes.

This association comprises about one percent of the county's total acreage and is found exclusively on Roanoke Island and the Outer Banks from Nags Head to the Currituck County line. Jockey's Ridge is included in the association.

The Duneland areas are highly susceptible to wind erosion and in their natural state are continually being shifted generally in a westward direction. Because of the unstable character of these dunes, they generally support little or no vegetation. Occasional clumps of bitter panicgrass and bayberry may be found on the lower slopes. Slopes generally range from 8 to 35 percent.

C. Sources of Water Supply*

Areas which contain the sources of water supply for the County could be considered as physical limitations on development. The following discussion is concerned with the County's groundwater and surface water supplies.

Groundwater

Information on the subsurface geology of Dare County is primarily limited to the study of well cuttings made throughout the area. It is generally accepted that the area was submerged during the Tertiary and Pleistocene periods. Generally sandy materials of the Pleistocene-Pliocene Periods are encountered to varying depths of approximately 180 feet. The materials are underlain by sediments from the Miocene Period to depths of about 1600 feet.

Water bearing formations are found in both the surficial sands and deeper units such as the Yorktown formation found in the upper miocene sediments. This non-artesian aquifer is the principal source of water supply in Dare County. Most wells on the mainland yield water from this aquifer. Test data indicate that the area south of Mann's Harbor is ideal for the development of large water supplies. This area includes or is adjacent to the center of recharge and also the greatest thickness of the aquifer.

The principal aquifer extends beneath all of Roanoke Island and has been the source of water supplies for many years. Test wells show the southern half of the island to be very favorable for the development of relatively large water supplies.

All fresh groundwater in the Dare Beaches area at least to the depth penetrated by test wells, is derived from precipitation falling on the area. According to data collected by the U. S. Geological Survey, aquifers that crop out on the mainland to the west and extend beneath the Outer Banks contain saline water. Present groundwater supplies on the "Banks" are obtained from shallow wells, most of which are less than 40 feet deep.

Surface Water

The obvious surface water features in the County are the Alligator River and the tidal waters of Roanoke Sound, Croatan, Albemarle and Pamlico Sound at the Atlantic Ocean, which is close enough to have a definite salt spray effect on the front line beach vegetation, and obviously affects weather conditions. The numerous but peculiar freshwater ponds have a significant if not total effect on the water supply in the Nags Head and Kill Devil Hills area. These lakes occur in the Nags Head Woods area and are water-table lakes believed to be the product of wind-scooped depressions in this ancient dune section.

The lakes have large storage capacities. The volume of the largest lake (Fresh Water Lake) was measured at a time when the lake surface was at 9.4 feet above mean sea level and the average maximum depth of the lake was 15 feet. At that time, Fresh Water Lake contained approximately 90 million gallons of water and its surface covered approximately 35 acres. The other unnamed fresh water lakes in this area are smaller than Fresh Water Lake but their aggregate water volume would be sizeable. The lakes are recharged by rainfall and by inflow from the upper aquifer.

*From Van Oesen Regional Water System

D. Areas Which Exceed 12% Slope

The incidence of areas which exceed 12% slope comprise a very small percentage of total acreage within the county. With the exception of the live dune areas of Jockey's Ridge and certain sectors of the frontal dune system, the steep slopes within the county are stabilized with natural vegetation. Areas which exceed 12% slope within the County are:

(1) The relict dune system facing Roanoke Sound on the Northeast section of Roanoke Island. The dunes are stabilized with vegetation. This area is subdivided and most of the land is in residential use;

(2) The Jockey's Ridge live dune system;

(3) The maritime forest areas of Buxton Woods and Nags Head Woods;

(4) The Wright Memorial at Kill Devil Hills;

(5) A small area of inland dunes south of Frisco; and

(6) The frontal dune system within the County.

Previously, it was emphasized that the soils map and text found in this Land Use Plan were prepared for broad planning purposes only and of the need for a more detailed soil survey for more detailed planning. This detailed survey is presently being prepared by the Soil Conservation Service. The Service has evaluated soil characteristics and related grading slope features of property for development potentials in Dare County.

The texture of all soils types in areas which exceed 12% slope is sand. There are two major distinguishing features of these sandy beach soils which relate directly to their potential for quality urban development. These two features are degree of wetness and degree of stabilization. Duneland, Newham Fine Sand, and Fripp are the soil types found in steeply sloping areas within the County.

Duneland is defined as areas of well drained, sparsely vegetated (less than 15%) and rapidly shifting sands. Therefore, the major consideration of this soil is the lack of stabilizing vegetation. The high potential of shifting sand can undermine or cover up structures and roads.

Newhan Fine Sand are deep, well drained and excessively drained sands. The permanent water table or seasonal high water table is well below 36 inches and is generally greater than six feet. These soils are considered to be fairly well stabilized as they have more than 40% of the surface vegetated. The soil has good potential for development and a graded angle can be steeper than on Duneland due to natural vegetation.

Fripp soils are found in areas of 25 to 60% slopes on undulating to rolling dunes commonly adjoining beaches and waterways along the coast. Most sites are 5 feet to 50 feet above mean sea level. Flooding is rare and only on the lower slopes. This soil is excessively drained with rapid permeability. Native vegetation for this soil consists of wax myrtle, live oak, slash pine, loblolly and longleaf pine, sand pine, sea oats, sea coast bluestem and beach grass. In Dare County, this soil type is found in the Nags Head Woods area, with steep slopes up to 60%, but covered with what appears to be virgin timber.

II. FRAGILE AREAS

Fragile areas are those areas which could easily be destroyed by inappropriate or poorly planned development. The following discussion involves areas which could be considered as fragile within Dare County.

A. Coastal Wetlands

Coastal wetlands are defined as any salt marsh or other marsh subject to regular or occasional flooding by tides, including wind tides (not to include hurricane or tropical storm tides). Salt marshland or other marsh shall be those areas upon which grow some, but not necessarily all of the following salt marsh and marsh plant species. Smooth or salt water Cordgrass (Spartine alterniflora); Black Needlerush (Juncus romerianus); Glaswort (Salicornia spp.); Salt grass (Distichlis spicata); Sea Lavender (Limonium spp.); Bulrush (Scirpus spp.); Saw Grass (Cladium Jamaicense); Cat-Tail (Typha spp.); Salt-Meadow Grass (Spartina patens); and Salt Reed Grass (Spartina cynosuroides).

South of Chesapeake Bay salt marshes typical of those along the entire South Atlantic and Gulf Coasts occur. These represent, in general, the best development of salt marshes in the United States. In the southeastern states, salt marshes are formed primarily in estuaries where major rivers, draining large expanses of upland, deposit heavy silt burdens. They also form behind barrier beaches (as along the North Carolina coast north of Cape Lookout), and up bays and tributary rivers as far as there is an influence of salt water.

In Dare County, the soundside shore is generally covered by marshgrass. The importance of these productive marsh areas has been emphasized and re-emphasized over the past several years. Many species of fish and wildlife which are an intricate part of the Dare economy are tied to these soundside marsh areas for at least a part of their life cycles. Within the County there are approximately 15,500 acres of irregularly flooded salt marshes and 500 acres of regularly flooded marshes.

Development on land continguous with marsh areas also presents problems. Presently the only means of treatment is septic tanks. Seepage of wastewater into the marsh areas could endanger the continued support of many fish and wildlife species.

B. Sand Dunes Along the Outer Banks*

Sand dunes along the Outer Banks are considered fragile areas and defined as sand deposits of windblown (eolian) origin, whether or partly or wholly vegetated with grasses, herbs, vines or woody plants.

The dunes comprise a major portion of the Outer Banks and represent a protective barrier for the sounds, estuaries, and the mainland. These sand deposits represent a dynamic system that does not afford long term protection for incompatible development. Development with inadequate design or construction may be subject to substantial damage due to the adverse effects of wind and water.

The stabilizing factor in the beach environment is vegetation. The grasses, shrubs, and trees common the Outer Banks area tend to capture the moving sand, while the roots of these plants tend to hold the sand in place, preserving the protective dune system.

There is a zonal distribution of vegetation on the barrier islands, owing to variations in wind exposure, water supply, soil salinity and soil nutrients. The primary dune system is covered by hardy dune grasses which are able to survive the typically harsh conditions of the active beach area. The presence of these dune grasses is essential to maintenance of the primary dune system and its protective function. It is significant to note that these dune grasses are able to withstand adverse wind and salt conditions, but like many plants, they are unable to withstand trampling.

The secondary or inland dune system, is covered with mixed grasses and trees with the backdune area primarily in forest cover. Like the dune grasses, the vegetation on the secondary dune is highly important to the beaches. First, the vegetation covering this dune system is responsible for its stability. Second, although the relationship between the vegetation and the secondary dune system and the groundwater supply has not been quantified, it is clear that the two are interrelated.

The forests of the Outer Banks utilize a significant quantity of water, but they prevent a much greater loss of water through evaporation from the bare sand. Also, depletion of the ground water supply through withdrawal or diversion would have the effect of destroying the forests by robbing them of water. Thus, the vegetated secondary dunes of the Dare beaches are a fragile and important resource for the continued development of the area.

* From the Dare Beaches Sketch Development Plan and Chapter 10, Coastal Erosion.

On the Bodie Island sector of the Dare County Outer Banks, the area from the southern boundary of Nags Head to Oregon Inlet is under the care of the Cape Hatteras National Seashore Recreation Area and the National Park Service where extensive sand dune stabilization projects with the use of sand fences and beachgrass planting programs are in progress. Dunes 15 to 20 feet in height are continually built in the seashore under this program which tends to make the area somewhat stable in spite of the continuous action by natural erosion processes. Extensive commercial and residential developments are found in the area north of Whalebone outside the park area. Continuous dunes about 15 to 20 feet high protect this area northward up to Nags Head. Natural dunes are not existing in the vicinity of Nags Head, Kill Devil Hills, and Kitty Hawk. These were probably leveled by erosion or in course of the development of the area. Many structures were built close to the shoreline with no apparent protection from encroachment of the ocean in the event of storms or inclement conditions. Further north in the vicinity of Duck, little beach development exists. The beach is bounded by continuous dunes about 15 feet high, up to the Dare-Currituck County line. The area is rather low with the road showing evidence of being flooded at times making it difficult to travel. All these areas are sparsely developed with isolated areas of residential developments.

The shoreline from Oregon Inlet to the area north of the Cape Hatteras lighthouse is relatively uniform with fairly wide beaches and artificial dunes built with the aid of sand fences. The dunes are continuous, about eleven feet high. Changes in the shoreline have occurred in the area north of the lighthouse where heavy erosion is continuing in spite of protective measures. Dunes were overtopped and eroded while damaging floods were experienced behind the dune line. The beach at the southwest end of the island is wide with adequate dunes back from the ocean about 8 to 12 feet high and covered with vegetation. The beaches become more narrow toward the Cape with dunes closer to the ocean.

Beach dunes north of Duck and the Jockey Ridge sand dunes are of statewide significance. The Duck dunes contain a variety of salt spray grasses including several species at their southern limit. These dunes are threatened by commercial-residential development. Jockey Ridge was designated a National Landmark in 1974.

C. <u>Ocean Beaches and Shorelines (see Ocean Erodible Areas</u>, p. 66)

D. ESTUARINE WATERS*

The State of North Carolina, in its Dredge and Fill Law of 1970 (G. S. 113-229 (n) (2)), defined estuarine waters as "all waters of the bays, sounds, rivers, and tributaries thereto seaward of the dividing line between coastal fishing waters and inland waters, as set forth in an agreement adopted by the Wildlife Resources Commission and the Department of Conservation and Development filed with the Secretary of State, entitled 'Boundary Lines, North Carolina Commercial Fishing-Inland Fishing Waters, revised March 1, 1965'." In other words, estuaries are semi-enclosed coastal water bodies having free connection with the open sea and within which seawater is measurably diluted with fresh water drained from the adjacent land.

According to the National Estuarine Pollution Study, there are 10 distinct estuarine regions of the United States which contain 884 separate estuarine systems encompassing 29.3 million surface acres of water (Chapman 1973). The South Atlantic Estuarine Region, stretching approximately 800 miles from Cape Hatteras to Fort Lauderdale, contains 83 separate estuarine systems (9% of the total) and 4 million surface acres (14% of the total). Of this, North Carolina has an estuarine area of roughly 2.2 million acres or approximately 55% of that in the South Atlantic Estuarine Region (Shalowitz 1964); and in size it is exceeded only by the systems of Alaska and Louisiana.

Estuaries have developed and evolved over geological time, and the plant and animal communities dependent upon these systems have evolved to high levels of productivity and diversity in response to the relatively large changes in the natural environment. Man is a newcomer, geolocially, to estuaries, and since our country was first settled the Nation's estuaries have served him well. Man has placed a multiplicity of demands upon estuarine and coastal environment as producers of food, as avenues of transportation, as receptacles of wastes, as living space, and as sources of recreational or esthetic pleasure.

Because of the multiplicity of demands made by both man and the organisms dependent upon these systems, it is imperative that we evaluate properly the respective roles of the various parts of the system so that we can manage this environment wisely and derive the maximum user benefits from each of the component parts.

In the state of North Carolina the 1973 commercial fishery harvest brought a dockside value to fishermen of about $16 million. Since less than one-half of the dockside landings were processed in the State, the economic value was about $50 million while the potential was over $100 million.

Recreational activities in and around estuarine areas also provide a significant revenue to coastal regions. For example, in 1968 an estimated 112 million people spent approximately $14 billion seeking recreation in the coastal strand. In 1975 it has been projected that approximately $5.4 billion will be spent on sport fishing alone. About 16 million people will engage in sport fishing in 1975 and this numger is growing at a rate of one-half million per year (Teal, Jameson and Bader 1972).

*From "The Estuary - An Area of Environmental Concern" by Thayer.

Seasonal visitors to the estuarine zone also include waterfowl hunters and vacationers; those who come for boating, canoeing, water skiing, and swimming. Many business enterprises, large and small, cater to all of these recreational seekers, such as hotels, beach cottages, restaurants, sporting goods shops, marinas, bait and tackle dealers, and others. And, many seasonal visitors, entranced with the beauty and loneliness of the estuarine area, buy property there and build upon it.

What makes these estuaries so important? The most important biological characteristic of estuaries, which forms a basis for much of our economy, is the high productivity. High plant production has resulted in a very diverse estuarine animal assemblage. The plants and animals die and during their decomposition nutrient elements and dead tissue fragments are liberated into the water. Tidal action and currents spread the nutrients which in turn are utilized by the plants. Other organisms feed upon the plants and dead debris and in turn are consumed by still larger species. This is a self-sustaining process but one which is very susceptible to intervention by man.

Thus, our estuaries and their associated transition zones-salt marshes, sounds, intertidal areas, etc. form a valuable natural resource. These estuaries, which play an important life-support function have lost more than 7% of their fish and wildlife habitat to commercial and housing development over the past few decades (Tihansky and Meade 1974), and are being lost for fishery production at a rate of about 1% per year. Because these estuaries are located between the oceans and the land and because a high percentage of our population lives near the coast, a majority of the estuarine destruction is a direct result of man's activities. Pollution, land-fill and dredging, building, draining of marshes, and increasing use of fresh water have all taken their toll of estuarine areas.

Estuarine waters located in Dare County are the Roanoke, Croatan, Currituck, Albemarle, and Pamlico Sounds.

E. Public Trust Waters

Public trust waters are described as all waters of the Atlantic Ocean from the mean high water mark to the seaward limit of state jurisdiction; all coastal waters subject to the ebb and flow of lunar tides shoreward to their mean high water mark; all navigable rivers, lakes and streams, sounds and artificially created water bodies to their ordinary high water mark provided that any artificially created navigable water bodies must have navigable connections to navigable natural water bodies or must have public areas or must be publicly owned. The public has rights in these waters including navigation, fishing and recreation. The protection and maintenance of the area is necessary in order to preserve the public rights therein. (see list of surface waters in Dare County)

INVENTORY OF SURFACE WATERS, DARE CO.

Identity of Area		Location		
Name	Type of Area	Township (Name)	Highway No. and Miles or Other Landmark	Description of Area
Atlantic Ocean	Scenic (Water and Shores)	Not Applicable	Eastern and Southeastern boundary of county	Ocean side of Outer Banks (barrier islands). Present use, recreation, swimming, fishing, bathing. Southern section of Bodie Island and Hatteras Island are in the Cape Hatteras National Seashore Area.
Albemarle, Croatan, Currituck, Pamlico and Roanoke Sounds	Scenic (Water and Shores)	Not Applicable	Northern, Eastern, and Southern sections of county.	Coastal waters and shores protected from Atlantic Ocean by the Outer Banks (barrier islands).

INVENTORY OF SURFACE WATERS, DARE CO.

Name	Location	Description
Long Shoal River	From U.S. 264 to the Pamlico Sound.	1.3 miles long to .3 miles wide, 3' deep. Brackish waters. Excellent fishing, trout, mullet bluefish, flounder. Fair duck hunting. Good boating.
Deep Creek	11.2 miles south of Lake Worth. Opening into Long Shoal River.	1.2 miles long to .1 mile wide 6' deep. Surrounded by marsh. Good fishing, some hunting.
Pains Bay	4.7 miles south of Stumpy Point. Opening into Pamlico Sound.	4.6 miles long, to 1.2 miles wide, 6' deep. Surrounded by marsh. Good fishing. Good access.
Parched Corn Bay	East of Long Shoal River	Small bay. Good fishing, trout bluefish, mullet. Excellent boating. Limited hunting.
Whipping Creek Lake	4 miles southeast of Stumpy Point. Off Alligator River.	1.3 miles long. Surrounded by marsh. Shallow waters. Limited access.
Back Lake	1 mile west of Stumpy Point.	1 mile long, .3 miles wide, surrounded by marsh. Limited fishing. Good duck hunting.

INVENTORY OF SURFACE WATER, DARE CO.

Name	Location	Description
Stumpy Point Bay	South of Stumpy Point. Opening Pamlico Sound. East of Lake Worth.	2 miles long and 2 miles wide. 7' deep. Good fishing, shad, rock, trout, perch, bass. Good boating. Great potential for development.
Sawyer Lake	East of Buffalo City site. Off Milltail Creek.	1 mile long, to 300' wide. Surrounded by marsh. Limited fishing. Ideal hunting, bear and deer. Limited access.
Callaghan Creek	3 miles south of Manns Harbor. Opening into Spencer's Creek.	3.3 miles long, to 100' wide. Marshy areas. Excellent fishing, white perch, rock, and bass. Some duck hunting.
Spencer Creek	1.3 miles south of Manns Harbor	3 miles long, to 300' wide. Good fishing, rock, bass and perch. Some duck hunting.
Long Wretch Creek	5 miles south of Manns Harbor. Bordering Croatan Sound.	.5 mile long, 4.1 miles wide. Surrounded b y marsh. Good fishing, bass, bream, perch. Good crabbing. Limited access.
South Lake	Southern branch of East Lake	4.5 miles long, to 8' deep. Good fishing, bass, rock and perch. Good hunting, ducks, bear, deer.

INVENTORY OF SURFACE WATER, DARE CO.

Name	Location	Description
East Lake	Northern point of Dare County. peninsula. Between Alligator River and Albemarle Sound.	7.7 miles long, to 10' deep. Surrounded by marsh. Excellent fishing, bass, rock and perch. Good hunting, bear, deer, duck.
Tom Mann Creek	Bay on North side of Durant Island. Opens into Albemarle Sound.	.4 miles long, 1.9 miles wide, to 4' deep. Surrounded by marsh. Good fishing, rock, bass, perch. Some duck hunting.
Peter Mashoes Creek	2.1 miles north of Manns Harbor bridge. Junction Albemarle and Croatan sounds.	1.9 miles long, .4 mile wide and to 5' deep. Good fishing, bass, rock, and perch. Private boat ramp.
Billy's Ditch	From highway 64 to South Lake	1.5 miles long. Surrounded by marsh. Limited fishing. Good hunting, deer, bear. Access for outboards to South Lake.
Hidden Lake	1/2 mile east of Alligator River. 1 mile south of East Lake Landing.	500' wide, 1500' long. Surrounded by marsh. Limited fishing. Limited access.
Spence Creek	Part of Peter Mashoes Creek	1.8 miles long, to 300' wide. Surrounded by marsh. Good fishing.
Milltail Creek	1.8 miles south of Bay Point off Alligator River	15 miles long, deep water for large boats for 12 miles. Limited fishing bream and jacks. Limited access.
Shallowbag Bay	East of Manteo	Good fishing, boating. Channel and harbor. Limited duck hunting. Good potential for development.

INVENTORY OF SURFACE WATERS, DARE CO.

Name	Location	Description
Broad Creek	2.6 miles south of Manteo. Opening to Roanoke Sound.	2.2 miles long, .3 mile wide, 4' deep. Good fishing, crabbing, boating. Limited duck hunting.
Mill Creek	South of Wanchese. Off Roanoke Sound.	.5 mile long, 200'wide. Deep waters to accommodate fishing trawlers. Good fishing, boating, access to Mill Landing Docks.
Baum Creek	.3 mile west of Baumtown. Off Croatan Sound.	.2 mile long, 50' wide. Limited fishing and crabbing. Good boating, duck and goose hunting. Great potential for development.
Oyster Creek	.5 mile west of Wanchese. Off Croatan Sound.	.3 mile long, 50' wide. Surrounded by marsh. Good fishing, trout bass, perch. Some duck and goose hunting.
Cedar Bush Bay	.5 mile southwest of Wanchese. Off Croatan Sound.	.5 mile wide, .8 mile long. Marshy area. Good fishing, bass, perch, trout, croakers.
Kitty Hawk Bay	North of Collington Island, and Wright Memorial Bridge.	Excellent Bass fishing. Good duck hunting. Marina, boat ramp. Large residential development.
Collington Creek	From Kill Devil Hills Bridge to Buzzard Bay.	.4 mile long, .2 wide. Good fishing, duck hunting.
Lighthouse Bay	.2 mile south of Bodie Island Lighthouse.	.4 mile long, .2 wide. Good fishing. Excellent hunting.

INVENTORY OF SURFACE WATERS, DARE CO.

Name	Location	Description
Motts Creek	South end of Bodie Island. West side of Bonner Bridge.	.2 mile long, .1 wide. Good fishing. Excellent boating. Boat landing, Oregon Inlet Marina.
Eagle Nest Bay	North of Pea Island in National Seashore Park.	.7 mile long. .5 mile wide. Surrounded by swamp and shifting sand dunes. Good boating and fishing.
Goat Island Bay	North of Pea Island, in National Seashore Park	.3 mile long, to .3 wide. Good fishing of all types. Good boating.
The Trench	In Pea Island Refuge, off Pamlico Sound	.3 mile long, to .4 wide. Good boating and fishing.
Pea Island Bay	In Pea Island Refuge, off Pamlico Sound.	.5 mile long, to .2 wide. Good boating and fishing.
Terrapin Creek Bay	1.2 mile northwest of Pea Island Coast Guard Station.	.4 mile long, to 1.4 wide. Good fishing and boating.
Beach Slue	.9 mile southwest of Pea Island Coast Guard Station.	.8 mile long, to .4 wide. Good boating and fishing.
Wreck Creek	1.5 miles southwest of Pea Island Coast Guard Station	.6 mile long, to .1 wide. Surrounded by marsh. Good fishing and boating.
Brooks Creek	4 miles southwest of Buxton, in Pamlico Sound.	.8 mile long, to .2 wide. Good fishing, boating, and crabbing. Good duck and goose hunting.

INVENTORY OF SURFACE WATERS, DARE CO.

Name	Location	Description
Joe Saur Creek	3 miles north of Hatteras Village. Off Pamlico Sound	.5 mile long, .3 wide. Limited fishing. Good boating. Fair development potential.
Sandy Bay	Northwest of Hatteras Village. Off Pamlico Sound	.3 mile long, 1 mile wide. Brackish water. Good fishing, bass, flounder, trout.
Duck Pond	.5 mile south of Hatteras Village.	.4 mile long, 200' wide, 2' deep. Limited fishing, boating. Good development potential.
Isaac Pond	South of Duck Pond	.2 mile long, 200' wide, 2' deep. Good development potential.
Clubhouse Creek	South of Isaac Pond	.3 mile long, 10' to 800' wide. Limited fishing, good boating, Good area for development.
Hatteras Inlet	Inlet between Dare County and Hyde County on the southern end of the Outer Banks	3 miles long, .8 mile wide. Excellent fishing. Opens to Atlantic. Accommodates large boats.

F. Complex Natural Areas

Complex natural areas are defined as lands that support native plant and animal communities and provide habitat conditions or characteristics that have remained essentially unchanged by human activity. Such areas are surrounded by landscapes that have been modified but do not drastically alter the conditions within the natural areas of their scientific or educational value.

Complex natural areas provide the few remaining examples of conditions that existed within the coastal area prior to settlement by Western man. Often these natural areas provide habitat conditions suitable for rare or endangered species or they support plant and animal communities representative of presettlement conditions.

(1) The following areas in Dare County were suggested as natural areas in "Potential for Outdoor Recreation in Dare County, N. C., 1974." (see following list, pages 97 & 98)

Additional Dare County areas which may be considered as complex natural areas:*

(2) Maritime Forest and Fresh Water Ponds

Forests develop where there is elevation for protection from flooding salt waters and where distance from the surf reduces wind-blown salt spray. Scattered, small wooded areas occur sporadically along the Outer Banks, usually on the soundside of the islands in the vicinity of villages, but the Nags Head Woods contains approximately 50 acres and is located near Kill Devil Hills west of Rt. 158. The Nags Head Woods-Jockey's Ridge area is a characteristic system of active and inactive dunes in various stages of migration and plant succession. By far the most prominent feature or features are the twin sand dunes, reputed to be the highest in the eastern United States, which are referred to collectively as Jockey's Ridge. These huge piles of sand, reaching heights up to 140' are active and considered to be live dunes, yet their physical appearance and location has not changed drastically since 1949 (based on aerial photographic interpretation). This is not to say that a state of equilibrium has been reached as the peaks themselves shift their position on the main body of the dunes in response to wind variations. This apparent stability is in direct contrast with other active (live) dunes which gradually migrate soundward.

This section receives heavy use from the public, who have not been denied access as they continuously climb up and over the dunes. The moving sands nightly erase the thousands of daily footprints.

*From "Environmental Assessment - Jockey's Ridge State Park"

INVENTORY OF NATURAL AREAS

Identity of Area		Location		
Name	Type of Area	Township (Name)	Highway No. and Miles or Other Landmark	Description of Area
Alligator River Swamp	Natural (Swamp)	East Lake	Western section of county, adjacent to Alligator River	1/2 to 1 mi. wide and 20 miles long. River swamp of Southern baldcyresss, tupelo gum, pond pine and other wet-site species. Present use, woodland, hunting.
East Lake	Natural (Water and Swamp)	East Lake	Northwestern section of county, adjacent to Alligator River.	100' to 1 1/2 mi. wide and 6 miles long. Open fresh coastal water with Southern baldcypress, Atlantic whitecedar, tupelo gum, pond pine growing along shores. Present use, fishing, hunting.
Lake Worth (Black Lake)	Natural (Water and Bog)	Stumpy Point	Southeastern section of county 3.5 miles west of Stumpy Point, N. C.	1 mi. long, 1/8 mi.wide. Inland fresh water lake with pond pine, Southern baldcypress, switchcane wax myrtle, and other bog vegetation. Present use, fishing and wildlife sanctuary.
Pamlico Sound Marsh	Natural (Marsh)	Stumpy Point	Western shore of Pamlico Sound.	5 mi. long, 100' to 1/2 mi. wide; Irregularly flooded salt marsh. Vegetation-black needlerush, salt meadow cordgrass and sawgrass. Present use, waterfowl habitat.

INVENTORY OF NATURAL AREAS

Identify of Area		Location		
Name	Type of Area	Township (Name)	Highway No. and Miles or Other Landmark	Description of Area
Roanoke Marshes	Natural (Marshes)	Manns Harbor	Northeastern section of county. Western shore of Croatan Sound.	7 mi. long, 100' to 2-1/2 mi. wide Irregularly flooded salt marsh. Vegetation-black needlerush, salt meadow cordgrass and sawgrass. Present use, wildlife habitat.
South Lake	Natural (Water and Swamp)	East Lake	Northwestern section of county, S. of Albemarle Sound.	6 mi. long 100' to 1/2 mi. wide. Coastal open fresh water with Southern baldcypress. Atlantic whitecedar, tupelo gum, and pond pine growing along shores. Present use, fishing and wildlife habitat.
Whipping Creek Lake	Natural (Lake and Swamp)	East Lake	Southwestern section of county about 2 mi. E. of Alligator River.	3/4 mi.long100' to 1/4 mi. wide. Inland fresh water lake with Southern baldcypress, tupelo gum and Atlantic whitecedar growing along shores. Present use, fishing and wildlife habitat.
Milltail Lake	Natural (Lake and Swamp)	Manns Harbor	About 10 miles Southwest of Manns Harbor	7 mi. long. 20' to 400' wide. Fresh water lake with Southern baldcypress, tupelo gum and pond pine growing along shores. Present use fishing and wildlife habitat.

Nags Head Woods is a prime example of relict dunes which have been stabilized by forest cover. This cover forms a peculiar type of forest which appears to be a combination of maritime and mixed hardwood-pine inland forest. The forest type of loblolly pine, sweet gum, hickory, sour gum, beech, oak, and holly is not represented in the present public lands of the National Seashore. Within them occur many plants which are very near their northern limits including live oak, Spanish moss, resurrection fern, and wild olive, to name a few.

As would be expected, the topography within the woods is undulating with elevations ranging from 10' to 60' above sea level. The depressions in this area contain dozens of unique freshwater ponds which were possibly created by rainwater collecting in non-porous, wind scoured basins. These ponds are of varying productivity and chemical composition and are the subject of much ongoing scientific investigation and research. The smaller dune east of the woods, and the large active dune at the northern end (near the Wright Brothers Memorial) are slowly and persistently marching toward the remnant woods, and in some sections have overrun the forest and are beginning to slough off into the Roanoke Sound, creating interesting sand bluffs.

This area presents an interesting and fairly uncommon admixture of saltwater ocean, tidal water sound, and freshwater pond. Add to the water and atmospheric mix, the peculiar dune establishment and you have a truly unique site.

The botanical results of this association or mixture are apparent in a wide range of plant communities such as;

(1) salt-spray tolerant dune grasses and herbs;

(2) tangles of salt-spray tolerant shrubs, vines, and small trees;

(3) a peculiar maritime forest of magnificent loblolly pine, sweet gum, hickory, sour gum, beech, oak and holly;

(4) a peculiar aquatic population within the many freshwater ponds, and

(5) tidal marshlands.

Many plants found here are very near their northern limits. Among these are live oak, Spanish moss, resurrection fern, and wild olive.

The abundance of plant species indicates diverse habitat which should house a diverse fauna. No research has been uncovered regarding animal populations but there is plenty of evidence to indicate large populations. Song birds should be plentiful in the woods and thickets, while great numbers of water fowl and wading birds can be seen along the sound. Kingfishers, hawks, owls and possibly ospreys could find nesting agreeable in and around the vast Nags Head Woods. While few animals were seen, it is probable that there are large populations of small and medium sized rodents (mice and squirrels), rabbits, opossum, racoon, and possibly that a fox or bobcat is roaming around the woods. No evidence was seen of any large mammals such as deer. The reptilian and amphibian populations should also have good representation due to the abundance of ponds and shoreline. It is a known fact that there is some good fishing for bass and bream in many of the ponds.

A large stand of forest trees on the Dare County barrier islands occurs in the Buxton Woods. The woods covers about 3,000 acres, 1,000 of which is within the boundaries of Cape Hatteras National Seashore. It covers the slopes and crests of old dunes that rise to nearly 60 feet in several places. Narrow interdunal areas are occupied by swampy woods, vine jungles, shrub thickets and blackwater ponds. Wider interdunal areas are fresh marshes with ponds included. These are discussed with the forest habitat because of their close association. Dominant tree species include Loblolly pine, live oaks, laurel oaks, hollies, dogwood, hornbean and red bay. Common shrubs comprise youpon wax myrtle, blueberry, American beautyberry, southern prickly ash, Devil's walking stick and palmettos. The latter may be the northernmost wild palms in the eastern United States. Near them grow the northernmost Carolina laurel-cherries. The woods have been drastically exploited by man; lumbering pasturage and wild fires have taken their toll; as have storms with their blistering salt winds.

Animals are abundant but hard to see in dense cover. The woods contribute greatly to the variety of the fauna. Five mammals, about two dozen birds (mostly songbirds) and about a dozen reptiles and amphibians are known in the park only from Buxton Woods and vicinity. The opossum, once believed extinct on Hatteras Island, appears to be returning. The gray fox may have already invaded by crossing Oregon Inlet Bridge. The eastern mole, deer mouse and cotton mouse might continue if the forest were largely removed, but the gray squirrel and white-tailed deer will depend on preservation of the park forest for survival.

Ospreys have recently been declining rapidly throughout the eastern states, but several still nest each year in the Buxton Woods. Cottonmouths are abundant in much of Buxton Woods and environs; canebrake rattlers are much more scarce and local.

(3) Durant Island

Durant Island is a 3500-acre island at the mouth of the Alligator River. Located in the area is an extensive fresh-water marsh and cypress swamp. No development exists on the island except for a hunting club lodge on the northeast point of Tom Mann Creek. Access is limited to boat. The isolation of the island would possibly lend itself to natural area protection.

(4) Dare County Pocosin

Dare County Pocosin is a vast bog-like area of stunted pines, wax myrtle, evergreen shrubs, pitcher plants and numerous grasses which grow on a floating mass of peatmoss. It has been suggested that several thousand acres should be set aside. The Pocosin occupies the area lying west and northwest of U. S. 264 from the Dare County line to Mann's Harbor.

G. Areas That Sustain Remnant Species

Areas that sustain remnant species are those places that support native plants or animals, rare or endangered, within the coastal area. Such places provide habitat conditions necessary for the survival of existing populations or communities of rare or endangered species within the county. The continued survival of certain native plant and animals cannot be assured unless the relatively few well-defined areas providing necessary habitat conditions are protected from development or land uses that might alter these conditions.

Rare and Endangered Species*

Endangered species which occur include the bald eagle, peregrine falcon, and American alligator. The red-cockaded woodpecker and the Atlantic sturgeon could occur but current records do not substantiate this assumption. Similarly, more definite information is needed concerning occurrence and nesting of the loggerhead turtle which is known to occur in coastal waters in the Oregon Inlet area. The endangered Outer Banks king snake is reported to occur on Hatteras Island.

Rare plant species were referred to in the Nags Head Woods and Buxton Woods discussion.

H. Registered Natural Landmarks

Registered natural landmarks are so designated by the Secretary of Interior. They are true, accurate, essentially unspoiled examples of natural areas which posses exceptional value or quality in illustrating or interpreting the natural heritage of our nation. Examples in Dare County are Jockey's Ridge and Nags Head Woods which have previously been discussed.

*From Wildlife and Land Use Planning with Particular Reference to Coastal Counties.

I. Historic Sites*

As authorized by the General Assembly, historic sites are among the categories of fragile properties which the Coastal Resources Commission could designate as interim areas of environmental concern. In defining the categories of historic sites, three already established programs were used: the National Register of Historic Places; National Historic Landmarks; and the state historic site and grant-in-aid programs.

The National Historic Preservation Act of 1966 established the National Register of Historic Places. The National Register is the official list of the nation's irreplaceable cultural resources. It is maintained by the National Park Service, Department of the Interior. Following is a listing of the historic properties located in Dare County.

*From "Historic Sites" by Seapker.

HISTORIC SITES

DARE COUNTY

Historic places that are listed (NR), or have been approved for listing by the North Carolina Historical Commission (ANR) in the National Register of Historic Places pursuant to the National Historic Preservation Act of 1966.

Historical, archaeological, and other places and properties owned, managed or assisted by the State of North Carolina pursuant to G.S. Chapter 121;

Properties or areas that are or may be designated by the Sec. of the Interior as Registered Natural Landmarks (NL) or as National Historic Landmarks (NHL):

Name	Location	Category	Ownership
Wright Brothers National Memorial	Kitty Hawk	*NR	Federal
Nags Head Woods	Between Nags Head and Kill Devil Hills	***N L	Unknown
Fort Raleigh National Historic Site	4 miles N. of Manteo on U. S. 158	*NR	Federal
Jockey's Ridge	On W. side of U.S. 158 by-pass at 12.5 mi. post, Nags Head	***N L	State
Caffey's Inlet Life Saving Station	Duck vicinity	***ANR	
Kitty Hawk Life Saving Station	Kitty Hawk	***ANR	
Kill Devil Hills Life Saving Station	Kill Devil Hills	***ANR	
Chicamacomico Life Saving Station	Rodanthe	***ANR	
Creeds Hill Life Saving Station	Frisco vicinity	***ANR	

HISTORIC SITES (Continued)

Name	Location	Category	Ownership
Durants Life Saving Station	Hatteras vicinity	***ANR	
Drinkwater's folly	Manteo vicinity	***ANR	
Fearing House	Nags Head	***ANR	
Beach Cottage Row	Nags Head	***ANR	
First Colony House	Nags Head	***ANR	

III. AREAS WITH RESOURCE POTENTIAL

(A) Productive Agricultural Lands

Some productive agricultural soils are being identified on the Dare County Mainland by First Colony Farms, Inc. Most of these soils require extensive drainage and clearing to make them productive, however, so they are presently more valuable for the timber and pulpwood they support.

(B) Potentially Valuable Mineral Sites

Dare County contains some commercially valuable deposits of sand, clay and marl. However, mineral resources are not at this time a significant factor in the economy of the County. There have been numerous exploratory attempts to locate oil and gas resources within the county in the past but these have yielded no positive results.

There are trace amounts of potentially valuable minerals present in well cores from the Dare County Area but none have been identified as being available in economically feasible quantities with currently available technology.

(C) Publicly Owned Parks

Cape Hatteras National Seashore Recreation Area is one of the 181 areas in the country administered by the National Park Service under the Department of the Interior, which comprise outstanding scenic, scientific and historical areas of the United States. Cape Hatteras was the first National Seashore Park in the National Park System. Extending from Whalebone Junction at the southern boundary of Nags Head about 70 miles southward through Ocracoke Island, the National Seashore preserves 45 square miles of beach land. It is divided into three sections: Bodie Island, Hatteras Island, and Ocracoke Island. It covers the entire area of the Outer Banks, except for the eight unincorporated towns and villages. The park area is included in the National Park Plan known as "Mission 66." Museums have been established at Cape Hatteras and Bodie Island. The National Park has constructed various recreational and community improvements in the area in addition to the extensive erosion and sand dune rehabilitation projects.

(D) Pea Island Wildlife Refuge is a part of Cape Hatteras National Seashore on the Outer Banks. The refuge was established in 1938 as a refuge and breeding ground for migratory birds and other wildlife. It is located on the northern most 13.5 miles of Hatteras Island. Refuge lands also include several small islands immediately off the main part of the refuge in Pamlico Sound.

We need to consider wildlife in land use planning because:

(1) wildlife serves as an "environmental barometer" and constitutes an early warning system against environmental contamination hazardous to human health;

(2) the observation of wildlife and its pursuit through hunting and fishing constitute a form of highly therapeutic outdoor recreation for a substantial portion of our population;

(3) the recreational pursuit of fish and game generates expenditures that contribute in a substantial way to local and state economies;

(4) the study of wildlife in its natural setting provides insight on man's place in the natural order and valuable clues to analysis of human behavior and social organization, as well as derivation of medical and industrial products of value to human welfare; and

Deer occur throughout the county in moderate numbers. Most of the county is considered to be occupied range for the black bear, however, fewer than 100 are thought to exist. Their numbers are considerably reduced from the population of two decades ago. Bear hunting is prohibited by law. All small game species occur; however, due to limited agricultural operations, populations of certain species are considered below average for the Coastal Plains area. Marsh rabbits, woodcock, raccoon and wildcat are plentiful; cottontail rabbits, opossum, foxes, snipe and rails occur in moderate numbers; quail, dove and squirrel are uncommon. Furbearers, including muskrat, mink, raccoon, otter and nutria, are in plantiful supply. Waterfowl, including most species which occur in the State, are present in ample numbers. The coastal marshlands, and the shallow coastal waters of Currituck, Roanoke, Croatan and Pamlico sounds provide great diversity of habitat to support ti-ping, diving, and sea ducks; mergansers; Canada and greater snow geese; whistling swan and American brant.

CAPACITY OF COMMUNITY FACILITIES

Information in this section is based on previously published engineering reports by Henry Von Oeson and Associates, Inc. and by Moore-Gardner and Associates, Inc. as well as interviews with municipal and county officials.

I. WATER AND SEWER SERVICE AREAS

(A) The Cape Hatteras Water Association is a private company which provides water to about 823 customers in the village of Hatteras, Frisco, and Buxton. The system is designed to deliver 1 MGD and at present peak load in August of 1975 delivered 400,000 gallons of water on the peak day. The permanent resident demand is approximately .19 MGD while seasonal loads increase the figure by about .21 MGD. Main sizes in the system are 6" and 8" and are sufficient for fire protection.

(B) The Towns of Nags Head and Kill Devil Hills both constructed and began operation of their systems in 1964. The Nags Head system began operation with approximately 555 customers and currently has around 850 customers. The Kill Devil Hills system went into operation with about 500 customers and currently serves slightly over 1000 customers. This total of approximately 1850 customers represents service to slightly less than fifty percent of the potential customers in the service area, not including another 1100 or more trailer park and campground sites that are not being served.

The source of supply for these systems is a fresh water lake which is located on the boundary between the towns about 3200 feet westward to the ocean and which is surrounded on the southwest and north by vacant lands owned by the municipalities. This lake is recharged by rainfall

in the area and has provided ample supply until 1969 when an apparent drop in the lake water level indicated the rate of withdrawal was greater than the area's recharge capacity. Since that time a growing demand for water has caused greater water level drops and increasing concern. Some shallow wells have been installed to supplement the lake supply. They have increased the supply by about 110,000 gallons per day. A second group of wells was recommended and is now being contemplated that would increase this augmentation supply to 300,000 gpd. The lake was dredged in the spring of 1975 to increase its storage capacity. Peak demand on these systems comes during the tourist season when rainfall is least. The peak service day for Kill Devil Hills in 1975 was on July 5 when 833,000 gallons were pumped. For Nags Head the 1975 peak day was July 6 with 866,000 gallons pumped.

(C) The Town of Manteo currently has three deep wells producing not less than 100,000 gpd. The plant capacity is 225,000 gpd with ground storage for 225,000 gallons and elevated storage for 75,000 gallons. Their average daily usage is 90,000 gpd and the town's peak demand was about 175,000 gpd in the summer of 1975. The town's system provides water to customers within the town limits and in some areas outside the town. They have sufficient capacity to provide the demands of domestic users at the present time. The sewage treatment plant has a design capacity of about 300,000 gallons per day and a normal load of 90,000 to 100,000 gallons per day. The peak day during the 1975 tourist season was 225,000 gallons. This plant is operating well within its design capacity and should be sufficient to serve expected growth.

In the spring of 1975 the citizens of Dare County approved a $5.5 million bond referendum for the construction of a central water system to serve all of Roanoke Island and the Dare Beaches Complex from Oregon Inlet North to Duck. This system is in the design phase at the present time but it should be sufficient to serve the expected growth of the service area for a fifteen to twenty year period.

A sewage treatment facilities plan under the Environmental Protection Agency 201 Planning Program is underway for the same service area. The resulting system should serve the needs of the area adequately for the same time period.

An additional 201 Wastewater Facilities is being undertaken for the portion of the county from Oregon Inlet, South to Hatteras Inlet which is the potential service area for the Hatteras Water Association.

The Village of Avon is presently in a critical position with regard to water supply due to salt water contamination of wells as a result of recent storms. Avon was included in the preliminary study for the Cape Hatteras Water Association System and could be served from that source. Extension of a water line from Buxton to Avon has been given a high priority by the Dare County Commissioners.

(D) OTHER SEWAGE TREATMENT PLANTS

Ocean Acres Utilities - operates a 0.06 mgd contact stabilization type waste treatment facility that discharges to Buzzard Bay, a class "SC" water. This facility is being properly operated and maintained. The company plans to expand the existing facility to a total design capacity of 0.265 mgd with subsurface disposal. Assimilative capacity calculations indicate that if this facility maintains the minimum requirements for secondary type treatment, as defined by EPA, it should protect water quality in the receiving water.

The Villas - operates a 0.08 mgd extended aeration type waste treatment facility that discharges to Buzzard Bay, a class "SC" waters. This facility is being properly operated and maintained. Assimilative capacity calculations indicate that if this facility maintains the minimum requirements for secondary type treatment, as defined by EPA, it should protect water quality in the receiving waters.

Wash Basket Laundromat - operates a 0.0075 mgd primary type waste treatment facility that discharges to Cape Creek, a class "SA" stream. This facility is presently being upgraded to provide tertiary type treatment which will be attained by February, 1976. Assimilative capacity calculations indicate that if this facility is upgraded to maintain the minimum requirements for BPCT type treatment, as defined by EPA, it should protect water quality in the receiving stream. An NPDES Permit for this discharge was issued January, 1974

Cape Hatteras Naval Facility - operates a 0.018 mgd septic tank sand filter type waste treatment facility that discharges to a drainage ditch. This facility is being properly operated and maintained. Assimilative capacity calculations indicate that if this facility maintains the minimum requirements for secondary type treatment, as defined by EPA, it should protect water quality in the receiving stream. An NPDES Permit for this discharge is scheduled for issuance in July, 1976.

Hatteras Inlet Coast Guard Station discharges untreated bilge water intermittantly to the Pamlico Sound, a class "SA" water. Assimilative capacity calculations indicate that the Coast Guard Station should implement sufficient treatment to maintain the minimum requirements for BPCT type treatment, as defined by EPA, in order to protect water quality in the receiving waters.

Ocracoke Coast Guard Station discharges untreated bilge water to Silver Lake, a class "SC" water. The Ocracoke Guard Station should implement sufficient treatment to maintain the minimum requirements for BPCT type treatment, as defined by EPA, in order to protect water quality in the receiving waters.

Oregon Inlet Coast Guard Station discharges untreated bilge water to Oregon Inlet, a class "SA" stream. Assimilative capacity calculations indicate that the Coast Guard Station should implement treatment sufficient to meet the minimum requirements for BPCT type treatment, as defined by EPA, in order to protect water quality in the receiving waters.

II. SCHOOLS

The Dare County Board of Education operates all public schools within the county. All facilities are in excellent condition and all sites are adequate for necessary expansion with the exception of the Manteo High School site. It is anticipated that within 10-15 years a new Junior High School site must be located somewhere on Roanoke Island to accommodate grades 7 through 9.

(A) Hatteras: The site consists of around 17.8 acres with the Elementary School built in 1960 accommodating 350 pupils and the High School built in 1965 with about 150 pupils. The service area for these schools is from Oregon Inlet to Hatteras Inlet.

(B) Kitty Hawk: The site consists of 15.3 acres with an Elementary School K-8 serving 280 pupils on the North Outer Banks area. The school was built in 1960 with 5 additional classrooms added in 1975.

(C) Manteo: The Manteo Elementary School was built in 1965 on a 10 acre site and serves 540 pupils K-6 from the Nags Head area, Roanoke Island and the Mainland communities. Manteo High School was originally constructed in 1960 with additional classrooms added in 1965. It serves 600 students in grades 7 through 12 from Roanoke Island, the Mainland and from Oregon Inlet, north.

III. PRIMARY ROADS

The only project within Dare County included in the Statewide Seven Year Highway Improvement Program is the widening and straightening of U.S. 64 from the Alligator River Bridge to Manns Harbor.

1975 peak traffic counts indicate a deterioration of the capacity and design speed of the U.S. 158 bypass in the Nags Head and Kill Devil Hills area and on N.C. 12 toward Hatteras from Whalebone Junction. The State Department of Transportation uses average annual daily traffic counts as a basis for design and improvement requirements which cannot take into account the tremendous load put on the system by tourist traffic from June through September. The most recent peak figures for these highways indicate that they are sometimes dangerously overloaded.

N. C. 12 especially carried the majority of an estimated 1,525,000 visitors to Cape Hatteras National Seashore through September of 1975. This highway is in need of widening to a standard width of 24 feet and resurfacing.

IV. SOLID WASTE DISPOSAL

Dare County operates a sanitary landfill for the disposal of all solid waste within the county including the Towns of Manteo, Kill Devil Hills and Nags Head, all waste generated by the more than 1.5 million annual visitors to National Park Service facilities and Solid Waste from Ocracoke Island in Hyde County.

The present nine acre site is being filled at a rate of about 1.25 acres per year and has about two years capacity left. The county is now seeking appropriate sites for expansion. The search could be

eased considerably if it were possible to use land within the boundaries of the Cape Hatteras National Seashore. It is ironic that federal law requires the disposal of refuse in an approved sanitary landfill yet prohibits its disposal on the property which generates the major load.

The residents of Southern Shores and Kitty Hawk have voted a tax to cover door-to-door solid waste collection by the county in their communities. The county maintains bulk solid waste containers in the Roanoke Island and Mainland areas and a private contractor holds the franchise for collection on Hatteras Island.

Dare County owns a TD-175 front-end loader and a TD-15 bulldozer packer for maintaining the landfill. The county has three hand loaded packer trucks for door-to-door pick-up and two container trucks to service the bulk container sites.

V. FIRE PROTECTION

Dare County outside the municipalities of Kill Devil Hills and Nags Head is served by six volunteer fire departments.

(A) Roanoke Island, including the Town of Manteo and Wanchese, and on a call basis, the mainland communities of Mann's Harbor, East Lake and Stumpy Point, are served by the Roanoke Island Volunteer Fire Department with stations at Manteo and Wanchese. The department consists of 52 men and holds a fire insurance rating of 10 which will be reduced to 9AA upon delivery of two 1,000 GPM pumpers which are on order. Present equipment includes a 1955 750 GPM pumper, a 1965 750 GPM pumper, two equipment trucks and a 4,000 gallon tanker. The volunteers are on a telephone alert system. The community of Stumpy

Point has recently organized a volunteer department but until they are manned and equipped will continue to rely on assistance from the Roanoke Island Department or the N. C. Forest Service.

(B) The area on the Outer Banks north of Kill Devil Hills is served by a volunteer department of 50 members with stations at Collington Island, Southern Shores, and a newly completed headquarters in Kitty Hawk. There is a 1972 750 GPM pumper and a 1500 gallon tanker at Southern Shores, a 1973 750 GPM pumper and maintenance truck at Kitty Hawk and a 1973 750 GPM pumper at Collington Island. The department relies on a telephone alert system.

(C) The Town of Kill Devil Hills is served by a 32 man Volunteer Fire Department with a station at the Town Hall. The town has an excellent fire insurance rating of 8. Their equipment consists of a 1970 American La France pumper, a 1964 Ford pumper and two half-ton equipment trucks. The volunteers are on a telephone alert system.

(D) The Nags Head Volunteer Fire Department is composed of 39 certified volunteers who operate from two stations. One station is located near the center of town and the other in South Nags Head. The town also owns a lot near Whalebone Junction for construction of an additional station when this becomes necessary. The department has a 1974 Ford 1,000 GPM pumper and three 1962 Ford 500 GPM pumpers. The town has an excellent fire rating of 8.

(E) The area South of Oregon Inlet is served by four volunteer fire departments with a telephone alert system in each community. The Salvo Department of 22 members has a 1975 Bean 750 GPM pumper and a 1954 Chevrolet 750 GPM pumper.

The Avon Department with 30 members has a 1948 American La France pumper. The Buxton Department has 15 members with a 1964 American La France 500 GPM four-wheel drive pumper.

In Hatteras the 37-man department has a 1960 Dodge 500 GPM pumper with four-wheel drive, a 1971 equipment van and has a new pumper on order.

VI. LAW ENFORCEMENT AND RESCUE

The Dare County Sheriff's Department maintains a 24-hour radio dispatch center which links Law Enforcement, Emergency and Rescue Services throughout this county and in the towns. The Department is manned by ten deputies and three Certified Emergency Medical Services technicians. The county has two fully-equipped ambulances and six station wagons equipped as ambulances. The Department has a helicopter based at Manteo Airport for use in air-evacuation and for search and rescue operations.

There are also three N. C. State Highway Patrolmen stationed in Dare County.

SECTION IV

ESTIMATED DEMAND

ECONOMIC FORECASTS

Forecasts of Dare County's future economic growth and ultimately its population growth, are an important derivative of the study of its economic base and employment projections. Since economic factors are closely related to population growth, economic forecasts are widely accepted as the most accurate basis for making population projections. By making appropriate employment/population ratio assumptions, employment projections can be converted to forecasts of total population.

Economic Growth Factors

A broad range of techniques are available for forecasting growth in Dare's basic employment. The simplest of these involve projections based upon historic growth trends. However, these techniques are most applicable in very stable growth situations where past trends will likely mirror the future, not in very dynamic counties like Dare where recent growth has been rapid and where future growth is more directly related to external demand factors. Therefore, the kdy to forecasting the county's future economy is to determine those external factors which are relevant to future basic employment levels.

Since the majority of Dare's basic employment is in recreationally-oriented industries, visitors are the most important factor in the growth of the county's basic sector. However, techniques for forecasting growth in visitation are poorly developed.

Envirotek Incorporated, in their publication, Dare County Planning Program, identified certain national trends which will have an impact on Dare's future economy:

(1) Increasing Affluence. By 1980, the experts expect median family income to increase to $10,400 and per capita disposable income to increase to $3600

(2) Economic Stabilization. It is predicted that the economy will stabilize and that unemployment will fluctuate in a narrow range between 3 and 4.5 percent

(3) Changing Attitudes Toward Work and Leisure. Total leisure will increase. The four-day week will become the norm indicating a dramatic increase in the demand for recreational activities.

Stephens and Associates, in their 1974 publication, Dare County Economic Development Plan, forecasted increases in Dare County's basic employment. These forecasts were made by assuming that increased visitation in Dare is a function of population and income growth in the recreation market area.

Recreation Market Area Growth Rates

As previously discussed on page 29, the county's recreational market area extends approximately 350 miles to the north, including most of the New York Metropolitan area, conforming roughly to the eastern "Megalopolic Corridor", extending to the west in Pennsylvania and Virginia and to the south in North Carolina. This market area comprises 15% of the total population of the United States or approximately 35,000,000 people. Sophisticated population and income projections from the Bureau of Economic Analysis in the Department of Commerce permit development of projections for Dare's market area. The BEA projections are based on functional economic areas which have been defined for the entire United States. Dare's market area includes the following seven economic areas:

New York
Philadelphia
Baltimore
Washington
Richmond
Norfolk-Portsmouth
Raleigh

MARKET AREA POPULATION AND INCOME PROJECTIONS

Economic Area	1970 Actual	1980 Projection	1970-80 Growth Rate	1990 Projection	1980-90 Growth Rate	2000 Projection	1900-2000 Growth Rate
			Population Growth (000)				
New York	18,151.5	21,004.8	--	23,935.2	--	27,025.7	--
Philadelphia	7,229.4	8,334.3		9,426.3	--	10,516.9	--
Baltimore	2,673.2	3,107.3	--	3,581.7	--	4,032.9	--
Washington	3,029.9	3,750.4	--	4,559.7	--	5,385.8	--
Richmond	1,009.6	1,196.4	--	1,370.5	--	1,597.6	--
Norfolk-Portsmouth	1,227.3	1,327.9	--	1,424.2	--	1,549.1	--
Raleigh	1,611.9	1,733.5	--	1,904.9	--	2,109.7	--
Total Market Area	34,932.8	40,454.6	15.8%	46,202.5	14.2%	52,217.7	13.0%
			Personal Income (000)				
New York	80,814.4	125,418.5	--	180,487.8	--	266,694.7	--
Philadelphia	26,292.8	42,256.4	--	61,642.5	--	91,980.0	--
Baltimore	9,462.9	15,303.0	--	22,799.2	--	34,535.8	--
Washington	12,054.2	21,086.3	--	32,654.5	--	51,163.4	--
Richmond	3,195.0	5,313.5	--	8,037.2	--	12,397.3	--
Norfolk-Portsmouth	3,661.6	5,591.5	--	7,984.0	--	11,560.9	--
Raleigh	3,960.8	6,283.8	--	9,360.9	--	14,373.1	--
Total Mkt. Area	139,441.7	221,253.0	58.7%	322,966.1	46.0%	482,705.2	49.5%

Source: Bureau of Economic Analysis, Department of Commerce, 1972.

A detailed explanation of the BEA projection techniques would be quite lengthy; however, in concept, they utilize a "stepdown" technique to determine each economic area's share of projected national economic growth. The "stepdown" projection is widely recognized as one of the most accurate forecasting methodologies.

Composite Growth Factor

Stephen's Associates derived a composite growth factor for Dare County's basic employment from the market area's population and income growth rates for each decade between 1970 and 2000. The basic assumption is that growth in basic employment in Dare County is a function of the growth of population and income in its market area and that income is a more important determinant than population.

The composite factor is actually a weighted average of the two growth rates. In calculating the growth factor, a weight of 3.0 is assigned to the market area's income growth and a weight of 1.0 to its population growth rate.

Dare County Basic Employment Growth Factors 1970-2000

Decade	Market Income Growth	Market Population Growth	Growth Factor
1970-1980	58.7%	15.8%	.480
1980-1990	46.0%	14.2%	.381
1990-2000	49.5%	13.0%	.404

Source: Stephens Associates

Employment Forecasts

The composite growth factors for the market area were used to forecast the growth of employment in Dare County's basic sector. Using these estimates of future basic employment, the county's non-basic employment was derived from

the basic/non-basic ratio which was calculated from the analysis of the economic base.

The estimates of Dare's future employment are found below.

Dare County Average Annual Employment Forecasts--1970-2000[a]

Year	Basic Employment	Growth Factor	Basic/Non-Basic Ratio	Non-Basic Employment	Total Average Annual Employment
1970[b]	968	.480	1.89	1,832	2,800
1980	1,433	.381	1.90	2,723	4,156
1990	1,979	.404	1.90	3,760	5,739
2000	2,779	-	-	5,280	8,059

[a]Source: Stephens Associates

[b]1970 Census employment figures corrected upward to reflect average annual employment.

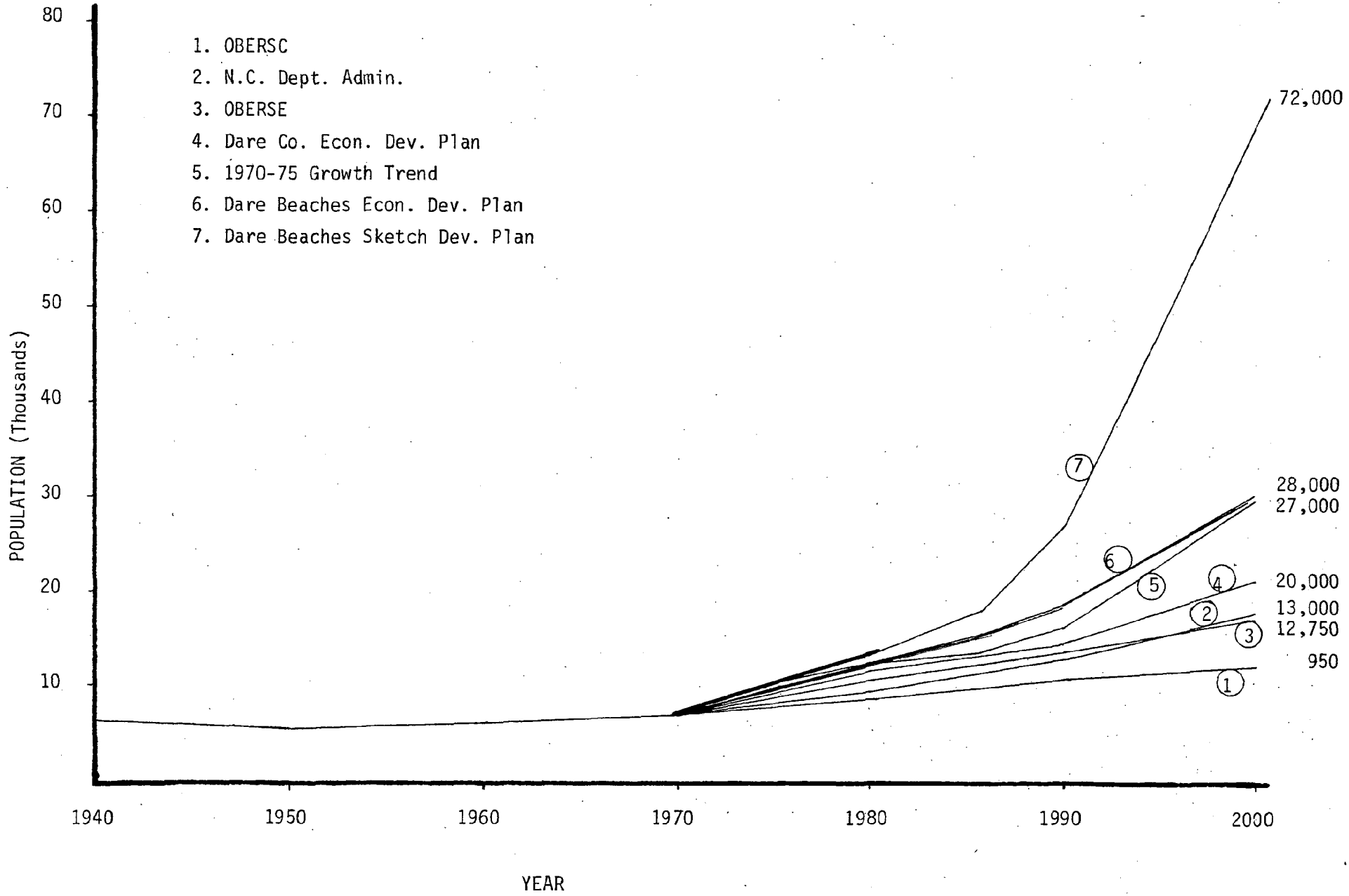
POPULATION FORECASTS

Many sophisticated techniques have been devised for population studies. None of these, however, are particularly suited for small, dynamic areas such as Dare County. Forecasting the population of a resort area is quite different from working with other areas. The main source of population increase in Dare County is migration, which is less predictable than the natural increase factor. Also, the employment is based on tourism, one of the least predictable industries.

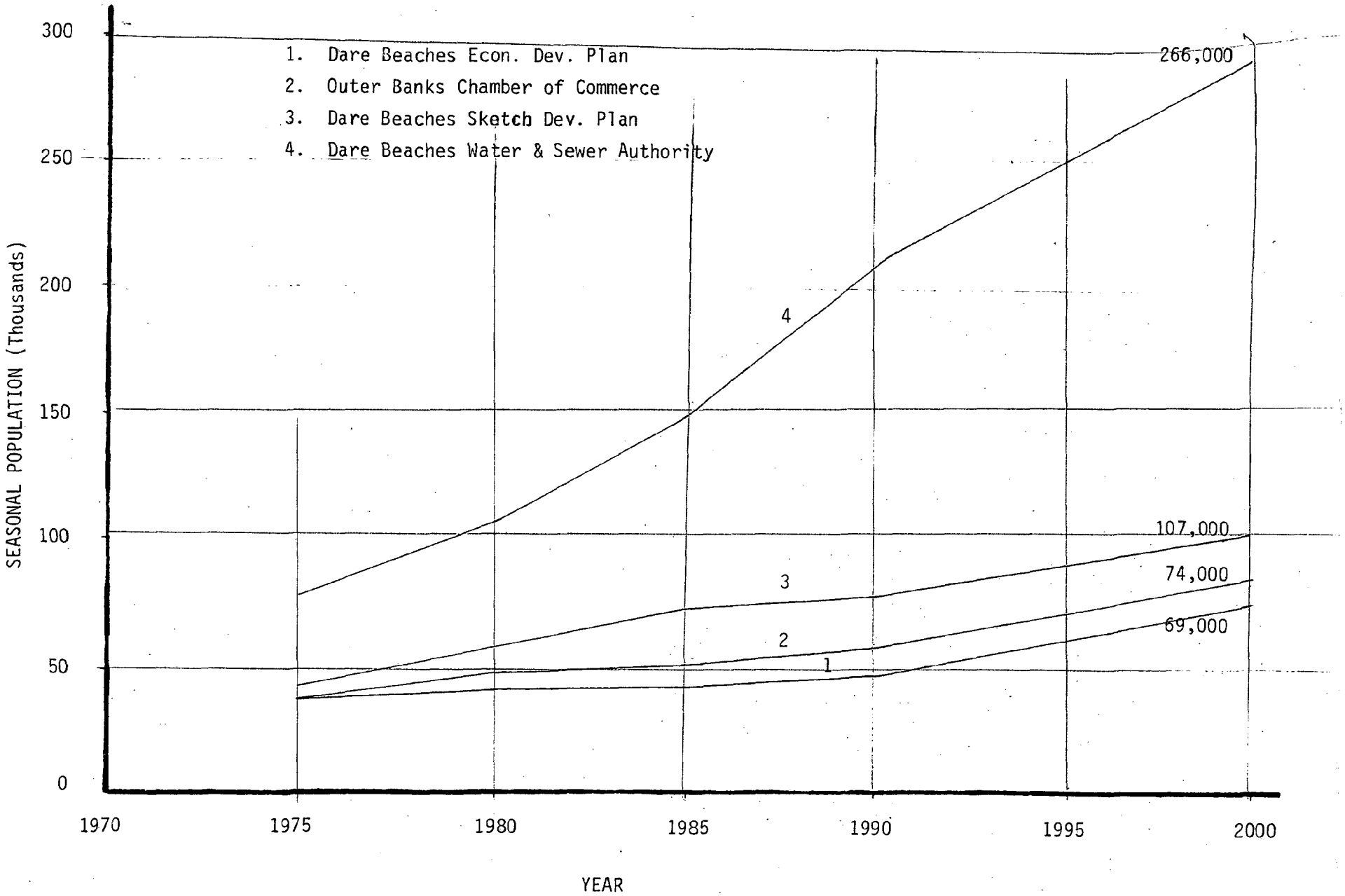
An examination of charts A and B reveals recent population projections for Dare County. These population figures were either projected specifically for Dare County or for the Dare Beaches Planning Area and then applied to the entire county. The tremendous ranges between the high and low projections are readily apparent. The dissimilarities in the various projections magnify the problem of realistically forecasting both resident and non-resident population figures which should take into account certain variables such as Dare's recent, dynamic growth trend; local economic trends and projections; economic and population growth trends in Dare's market area; and housing capacities. Also, the county's physical constraints on development and the desires and needs of the citizens as they relate to population growth must be carefully considered.

A detailed explanation concerning the methodology of each projection is not within the scope of this Land Use Plan. However, it is felt that the resident projection done by Stephen's and Associates in the Dare County Economic Development Plan (Forecast #4, chart A) accurately reflects all the necessary factors discussed in the previous paragraph. The following resident population discussion is based on the Stephen's findings.

DARE COUNTY PERMANENT POPULATION PROJECTIONS-Chart A



DARE COUNTY SEASONAL POPULATION PROJECTIONS-Chart B



Resident Population Forecasts

Dare's total employment forecasts provide the basis for further estimates of the county's resident population. The estimation technique using employment forecasts is simple. It assumes that the relationship between employment and total population in a base year will remain fairly stable throughout the forecase period and that, therefore, the ratio of employment to population can be used to relate employment forecasts to population.

In 1970 the ratio of Dare's average annual employment to total resident population was 0.40. National and state trends, however, show this ratio increasing. In North Carolina, for example, the employment/population ratio increased from 0.32 in 1940 to 0.39 in 1970. To account for a probable increase in labor force participation, the county's employment/population ratio has been increased .005 per decade.

The table below contains estimates of Dare County's resident population for 1970-2000 (also see Chart A, Forecast #2).

Estimated Resident Population - 1970 to 2000

Year	Average Annual Employment	Employment/Population Ratio	Total Resident Population
1970	2800	.40	7,000
1975	3478	.4025	8,625
1980	4156	.405	10,262
1985	4948	.4075	12,370
1990	5739	.41	13,998
2000	8059	.415	19,419

Non-Resident Forecasts

The year-round population is not the most relevant figure in a tourist economy. Dare's seasonal visitors are an important aspect of the county's total population because they place demands on the county's services and resources similar to those of the resident population. Therefore, forecasts of Dare's future population levels must include estimates of the magnitude of the non-resident seasonal population.

A technique devised by Stephen's Associates in projecting Dare's non-resident population will be employed in conjunction with updated transient housing figures supplied by the Outer Banks Chamber of Commerce. Resident population projections and estimated day visitors are added to seasonal population projections to produce a total peak capacity in Dare County. The underlying assumptions are: (1) that the county's peak population in the base year (1975) is a function of its transient housing capacity and (2) that increases in this visitor base can be forecast from the growth of income and population in the county's recreation market area.

Transient housing capacity consists of three major elements: motel and hotel units, campsites, and rental cottages. A 1975 survey by the Outer Banks Chamber of Commerce provides a fairly accurate enumeration of the county's motel, hotel, and campsite accommodations; however, the number of rental cottages must be derived from housing data published in the 1970 Census.

The Bureau of the Census classifies housing in two categories--year-round and seasonal or migratory. In 1970, the Census recorded a total of 4,728 housing units (does not include motel and hotel units) of which 1,526 were classified as seasonal. Of the 3,202 year-round units, only 2,452 were occupied--a vacancy rate of over 30 percent. This high vacancy rate reveals that some of the units classified as year-round are actually rental cottages.

Allowing for a more normal vacancy rate of 6 percent, there are an additional 600 units which can be classified as tourist-oriented housing.

These 600 units, in addition to the 1,526 units classified as seasonal by the Census, indicate a total of 2,126 rental cottages in Dare County. The list below which contains this rental cottage estimate as well as the results of the motel, hotel, and campsite survey, provides an estimate of the 1975 transient housing capacity in Dare County.

1975 Dare County Transient Housing Capacity and Non-Resident Population Projection

Type	No. Units	Assumed Party Size	Non-Resident Population
Motel/Hotel	3380	3.0	10,140
Rental Cottage	2126	7.0	14,882
Campsite	1970	3.8	5,141
TOTAL	7476		30,163

Source: Outer Banks Chamber of Commerce; Stephen's Associates

Surveys in Dare County, as well as other resort areas, have established the average size of parties utilizing the various types of transient housing accommodations. These estimates of party size, also found ablve, have been utilized to convert Dare's total supply of transient housing to an estimate of the county's 1975 non-resident population.

Based on this 1975 non-resident population projection, the composite growth factor for the county's market area has been used to forecast the population in 5 year intervals to 1990 and for the year 2000. These forecasts along with permanent population forecasts and day visitors produce the total peak capacity figures found on page 129.

Non-Resident and Total Peak Capacity Forecasts
Dare County -- 1975 to 2025

Year	Growth Factor	Non-Resident Population	Permanent Population	Day Visitors	Total Peak Capacity
1975		30,000	9,000	7,500	46,500
1980	.24	37,200	10,200	10,000	57,400
1985	.190	44,270	12,130	12,250	68,650*
1990	.191	52,725	14,000	15,000	81,725
2000	.404	74,000	20,000	20,000	114,000
2025	.236	92,000	24,000	25,000	141,000

*It should be noted that Dare County will attain a non-resident population of approximately 95,000 if it experiences a growth rate similar to those of Myrtle Beach, Virginia Beach, or Ocean City.

Source: Stephen's Associates; Outer Banks Chamber of Commerce.

FUTURE LAND NEEDS

It is estimated that approximately 36,200 acres of land or roughly 15% of the total land area of Dare County is suitable for development as indicated on the Land Classification Map which accompanies this report. Under the free market economic system which still prevails in this country it is impossible to predict with any degree of accuracy where development capital will be invested within the bounds of legal governmental constraints. However, for the purposes of this report the following allocations are made.

Of this acreage approximately 900 acres (less than one half of 1%) are considered to be in the Developed Classification. Even though water and sewer services are available in that area, the present population density is around one family per acre. The area should be able to accommodate the desired population growth with existing utilities. The Developed Classification includes many previously platted under-sized lots which have not been built upon despite the availability of utilities. Some of those small lots have been combined to make more desirable properties for development and some were required to be combined in order to meet minimum acreage requirements for the County Health or Zoning Codes.

It is anticipated that the developed areas on Roanoke Island will attract more permanent population than seasonal visitors.

Around 18,000 acres of developable land are included in the Transitional category which represents less than 8% of the total land area of the County. If this area is developed at the desired rate over the ten year period, the resulting gross density for both permanent and seasonal residents and day visitors would be around 2.66 people per acre. Since most of the Transitional lands are located in the most desirable areas of the county an even greater

rate of growth might be experienced. However, even if all of the desired population increase for the entire county were to locate in the Transitional lands, the resulting load on the peak day during the tourist season with all available accommodations filled would yield a gross density of around 3.75 people per acre.

The Transitional lands also contain some previously platted lots which are smaller than present regulations would permit. The Dare County septic tank regulations prohibit the development of those lots on which a septic tank cannot be safely located until the necessary utilities are available to serve it. The density at which development occurs within the Transitional land will therefore be controlled to achieve the goal of preventing the pollution of estuarine and ground waters.

The Transitional lands are located in those areas of the County where soil conditions and depth of water table are most suitable for development without degradation of the environment. Within those areas, however, each individual site must be evaluated and approved before it can be developed. The towns of Nags Head and Kill Devil Hills are designated growth centers for the county and comprise approximately 7500 acres of Transitional land.

The Community Land Classification includes about 17,000 acres of land which comprises less than 7% of the total land area of the County. On the Mainland, the Community Classification encompasses only the existing small communities of East Lake, Stumpy Point, Mann's Harbor and Mashoes. These areas are not expected to attract additional population and should remain fairly stable for the planning period. Present overall density in these Mainland areas is around 0.14 people/acre.

The lands in the Community Classification north of Kill Devil Hills to the Currituck County line contain considerable development and some

private water systems which could serve as a nucleus for necessary utilities beyond the ten year planning period. Until that time, however, the available land area should be developed at a low density under existing development controls. The existing under-sized lots in the area will not be developed until such time as the necessary utilities are available beyond the ten year planning period. These areas will continue to accommodate primarily seasonal population on roughly 10,000 acres of land. This would amount to almost one quarter of the projected non-resident population of the County by 1985 at a gross density of around 1.09 people per acre.

No population density is assigned to the 85,000 acres of land in the Rural Classification. Any residential development which might occur within those areas would be required to comply with Dare County Subdivision and Septic Tank Permit Regulations which will determine lot size based on soil type and depth to water table.

COMMUNITY FACILITY DEMAND

Dare County and the incorporated municipalities are currently undertaking studies to determine the cost of the major utility systems and other services which will be required to support the desired population growth which is projected by this Land Use Plan. The details of those requirements will be published as a Community Facilities Plan and Public Improvements Program which will become an integral part of the comprehensive plan for the development of Dare County. Without this kind of systematic examination of needs and resources, it is impossible to give a meaningful estimate of the cost of growth or to evaluate the potential methods of paying the cost.

At this time it is known that 5 million dollars worth of bonds for a water system for the northern area of the County have been authorized by the voters. An engineering report has estimated the cost of a sewage treatment system for the same area to be in excess of 11 million dollars. Recent storms have caused salt water to contaminate wells in the Village of Avon. But the federal funds which were available to help defray the cost of a water line from a safe source of supply in Buxton have been detained because of pressure from a non-resident special interest group. This will result in an unexpected increase in the local cost of providing the urgently needed water. These needs and others must be given priorities and balanced against resources which are available or anticipated to be available before elected officials and voters can make rational choices from among the alternatives.

The private sector is required to participate in the cost of providing services required by new development through existing County ordinances and policies. Developers are required to bear the cost of streets and water distribution lines at this time and will be required to install sewage collection systems for new developments when a central sewage treatment facility is

available. It is County policy to provide other services such as solid waste collection and fire protection on a service district basis. This means that those who receive the services are taxed to pay for them.

Upon completion of the Community Facilities Study and the establishment of a Public Improvements Program, the County and the municipalities will be able to prepare a Capital Improvements Budget. The Capital Improvements Budget is a means through which the local government can most economically relate public expenditures to its long-range plan for necessary and desirable public improvements while making the most effective use of the fiscal resources available to it, whether from local, State, or Federal sources.

Facilities in addition to water and sewer systems which are known to be required during the next ten years are:

A. Additional acreage for sanitary landfill.

B. Site for the construction of a new Junior High School.

C. Expanded volunteer fire fighting services for the mainland communities.

D. Expansion of U.S. Highway 158 By-Pass and upgrading of N. C. 12.

SECTION V

PLAN DESCRIPTION

LAND CLASSIFICATION

The land area of Dare County is divided into five categories for the purposes of guiding development into the most appropriate areas.

A. Developed Land

Description -

Developed lands, delineated in rust color on the Land Classification Map, range from incorporated larger communities that contain sizeable permanent, seasonal, and transient populations with a diversity of residential, commercial, tourist and light industrial development and a high level of public services and facilities, to smaller, less varied communities with a lesser intensity and diversity of development and a lower level of public services and facilities.

Function and Standards -

Developed lands will provide the service and growth centers for Dare County. They are intended to accommodate the greater portion of the necessary and natural expansion of residential, commercial, and industrial activities. The needs of Dare County's permanent, seasonal and transient population for housing, recreation, commercial activity, social and professional services will be met in these areas. The building intensity in the developed areas will allow the economic feasibility of a high level of public and institutional services. These areas will discourage the dispersion of development in the conservation areas of the County because they are concentrated in character and are located in areas where existing development patterns indicate the demand for and viability of growth centers.

B. Transition Land

Description -

Transition lands, delineated in hatched rust color on the Land Classification Map, are those areas of Dare County where the capability of the natural resources and the anticipated need for future development indicate that relatively intense development of primarily residential character is suitable. The areas are located near or adjacent to developed lands, along highways or in areas where the soils and accessibility of services indicate a high development potential.

Function and Standards -

Transition lands will provide for moderate intensity development in areas where development will not significantly harm relatively tolerant natural resources. These areas are designed to provide for residential expansion and growth and to accommodate uses related to and compatible with residential uses in the vicinity of developed lands where utilities and community services can be most economically and readily provided. Development and the required services and utilities will be at a generally less intense level than in developed lands.

C. Community Land

Description -

Community lands, delineated in cross hatched rust color on the Development Guide Map, are those areas of Dare County characterized by existing clusters of one or more different land uses in readily accessible locations within reasonable proximity to a developed area where the natural resources are fairly tolerant to development at a low intensity.

Function and Standards -

The community lands will provide for low intensity development opportunities at levels that will protect the natural resources of Dare County and still allow orderly growth and development. These areas will primarily provide residential opportunities for permanent residents as well as seasonal residents. Public services and utilities will not be available in these areas at as high a level as in the developed and transitional areas.

D. Rural Land

Description -

Rural lands, delineated in white on the Land Classification Map, are those areas of Dare County with little or no urban development in relatively remote locations where there are natural resources in tolerant to intensive development. These areas are characterized by forested or open, low-lying lands which would be suited for carefully managed resource utilization programs such as forestry, agriculture or passive recreation.

Function and Standards -

Rural lands will provide areas for the long term management of productive resources within the county which will help to stabilize the seasonal fluctuations of the economy. The potential economic importance of these areas and their general unsuitability to support intensive development makes the protection of these lands essential to the county. Building construction, residential and related supporting development should occur only on large lots in relatively

small clusters on carefully selected sites. Public services and utilities in these areas will be limited to support only those uses which are compatible with the concept of conservative resource utilization. The rural classification will also provide large open areas within the county to serve as a buffer against incompatible uses of land and to serve future land needs which cannot be anticipated.

E. Conservation Land

Description -

Conservation lands are delineated in dotted green on the Land Classification Map. These are land areas within Dare County where development must be restricted because of an inherent incapability of the land to support development because of fragility or hazardous conditions or because the natural resources represent a greater value than the value of development.

Function and Standards -

There is sufficient land suitable for development in Dare County to accommodate projected and desirable growth without infringing upon areas which are unsuited for development. The classification of conservation lands will direct development away from areas which cannot support intensive development, where public services are not and should not be made available, and direct it instead to more to tolerant areas where services can be supplied more economically. These areas are also designated to identify characteristics which represent a potential hazard to development such as flood and erosion.

These hazard factors increase the public and private cost required to support development. If considered against the useful life of the private investment and against the less apparent public cost through provision of services and potential disaster assistance, the return for development in these areas would be marginal. Management of forestry and agricultural resources is a permitted use within Conservation Areas where suitable soils are found. Conservation Lands will protect areas identified as potential sources for public water supply on the Outer Banks or as recharge areas for principal aquifers on Roanoke Island and the mainland.

Privately owned wildlife refuges, wilderness areas and passive recreation areas will be classified as Conservation Land.

Large publically owned or controlled tracts will be included in the conservation classification to further identify and protect historic, cultural and natural resource areas. Development or alteration of land is appropriate within conservation areas where it can be shown that:

(1) The proposed development will not destroy or irretrievably alter:

A. Wetlands

B. Frontal Dunes

C. Beaches

D. Estuarine or Impounded Surface Waters

E. Prime Wildlife Habitat

F. Unique natural areas, historic or archeological sites

(2) The proposed development will not encroach upon or be endangered by:

A. Areas of special flood hazard

B. Ocean front erosive areas

C. Inlets and areas within range of their migration

D. Estuarine erosive areas

(3) The proposed development will not significantly affect the quality or reduce the value of:

A. Public or privately owned forest, park, game lands, sanctuaries or other non-intensive recreation areas.

B. Aquifers, or aquifer recharge areas, or public water supply watersheds or water supply areas.

(4) The proposed development will not require an increase in public utilities or services beyond that provided by the developer.

Potential Areas of Environmental Concern

In addition to those areas included in the conservation land classification, there are some areas of the county which, because of their over-riding importance, their fragility, or the hazard they represent, should either be protected from development or developed only with special precautions. Those areas in Dare County which might be designated as A.E.C.'s by the Coastal Resources Commission are:

A. Coastal Wetlands:

1. Description

The marsh areas located along the shoreline of Roanoke, Croatan, Pamlico and Albemarle Sounds.

2. Permissible Uses

Erosion Control, fishing piers, docks, bulkheads (on upland side), utility easements, dredging for access to navigable waters and such other development requiring water access which do not significantly alter the natural function of the marsh.

B. Estuarine Waters:

1. Description

Those Sound waters which are classified S-A for the taking of shellfish.

2. Permissible Uses

Propogation of marine life, navigation, fishing, swimming, skiing, boating, fishing piers and docks.

C. Resource Areas - Watersheds or Aquifers:

1. Description

The water impoundment and immediate area around the Fresh Pond serving Nags Head and Kill Devil Hills, and the well fields of the Hatteras Water Association and the Dare County Water System.

2. Permissible Uses

Public water supply, recreation, and other development only when provided with public waste water disposal system.

D. Fragile, Historic or Natural Resource Areas:

1. Jockey's Ridge State Park, Nags Head Woods, the Cape Hatteras National Seashore, Fort Raleigh National Historic Site, and Wright Brothers National Memorial.

2. Permissible Uses

On publicly owned land only these uses consistent with the objectives for which the area was established. On privately owned land only such limited development as would preserve areas susceptible to environmental damage from more intensive development should be undertaken only after approval of a complete development plan which shows that the proposed development will not destroy or significantly alter the natural topography, vegetation, surface waters or other unique natural features.

E. Areas Subject to Public Rights:

1. Description

The waters of the Atlantic Ocean, Croatan, Pamlico, Albemarle and Roanoke Sound under the jurisdiction of the Corps of Engineers.

2. Permissible Uses

Propogration of marine life navigation, fishing, swimming, boating, fishing piers, docks, bulkheads for erosion control.

F. Natural Hazard Areas:

1. Description

The ocean front and barrier dunes within one hundred and fifty feet (150') of the mean high water mark of the Atlantic Ocean, the portions of Sound shoreline with a recent history of erosion problems, those areas of the county that have an identified special flood hazard with velocity as designated by the Department of H.U.D. Flood Insurance Administration, and the area within five hundred (500) feet of Oregon and Hatteras Inlets.

2. Permissible Uses

(a) Ocean front and barrier dunes;

Erosion and storm protection, beach and ocean access.

(b) Erodible areas of Sound Shoreline;

erosion prevention devices, piers, docks, bulkheads.

(c) Flood hazard areas;

residential, commercial, industrial, public and semi-public uses which are developed according to the standards of the Federal Insurance Administration.

(d) Ocean inlet areas;

erosion and storm protection, beach and ocean access.

MANTEO

The Town of Manteo (1970 population 547) is located on the northwest end of Roanoke Island and serves as the County Seat of Dare County. The governmental functions of the County are primarily conducted in Manteo. From past growth trends and characteristics it appears that Manteo has been and will continue to be the primary "service center" of Dare County, particularly in terms of medical, educational and other public or government services. It is this urban atmosphere that has provided for and is expected to continue to provide for year-round residential, commercial, and other urban development in the vicinity of the Town of Manteo.

In recent years the frings areas of Manteo have grown at a much greater rate than has the town itself. This is due primarily to the fact that land for residential and commercial development is not available within the present town limits of Manteo. As a result of the growth which has taken place, much of the fringe area of the Town is now developed at urban densities and is in need of municipal services. Many, if not most, of the people living in the fringe areas work, trade and otherwise identify with the Town of Manteo. The fact that the people in these areas have chosen locations of such close proximity to the Town of Manteo to build homes and businesses demonstrates their dependence on the existence of the Town of Manteo.

The future growth of the Town of Manteo will depend upon its annexation policy which, in turn, depends upon the ability of this Town to except municipal services to the developed areas surrounding its present Town limits. Those areas which could potentially be annexed could expand Manteo's population by approximately 430 people and increase its total area by about 150 acres.

KILL DEVIL HILLS

The Town of Kill Devil Hills (1970 pop. 357) is located on the Outer Banks of Dare County. The town has experienced a steady population growth since its incorporation in 1953 and now has an estimated population of almost 500 permanent residents. The Town experiences the additional impact of seasonal population which was estimated for 1975 to be over 10,000 people on the peak day. Less than thirty percent of the available land in the Town is developed with seasonal and vacation cottages interspersed among permanent residences. Motels, tourist accommodations and commercial enterprises are predominantly located along the ocean beach and along the by-pass highway. The center of Kill Devil Hills is dominated by National Park Service land surrounding the Wright Brothers Memorial.

Kill Devil Hills participated in the building and development expansion which occurred during the early 1970's. Over 3 million dollars worth of building permits were issued by the town in 1972 but as the national economy began a recession this figure dropped to about one million dollars worth in 1975. Building activity has again increased since the beginning of 1976 with the lowering of interest rates and indications are that development will return to the rate of the early 1970's.

The most severe constraints to development in Kill Devil Hills at this time are the lack of a sufficient water supply and a sewage disposal system. Kill Devil Hills joined Dare County and Nags Head in approving a bond referendum to install a fresh water supply adequate for the needs of the desired population growth projected by this report. The water system is scheduled to be completed by 1977 and until that time the town will supplement its water supply with shallow wells which have recently been approved by State Health Officials.

A central sewage treatment system to serve Kill Devil Hills, the developed areas of the northern Dare County Beaches and Roanoke Island is presently under study by engineering consultants. A central sewage system is necessary to solve existing problems with septic tanks and to accommodate desired future growth without endangering valuable estuarine waters or groundwater supplies. Until a central sewage system is available for the Town, the County septic tank regulations will maintain a control on residential density. These regulations set minimum lot sizes for new subdivisions and will prevent building on previously platted sub-standard lots until the necessary utilities are available.

The Kill Devil Hills Planning Board has adopted the following policy objectives to guide development within the Planning Jurisdiction of Kill Devil Hills consistent with the goals of the Dare County Land Use Plan.

Economic Policy Objectives:

1. To promote tourism as the major industry of the community.
2. To encourage extension of the tourist season into the spring and fall months.
3. To encourage permanent residential development which will attract more year-round residents.
4. To promote wise development which will protect the unique and fragile environment of Kill Devil Hills.

Urban Growth Policy Objectives:

1. To insure planned, orderly development for the most efficient utilization of suitable land within the Town.
2. To provide for the separation of incompatible uses such as commercial and residential areas by the use of natural barriers and open spaces.

3. To identify and consolidate centralized and compact business areas.
4. To encourage future residential development which will provide more useable open space and more cost effective utilization of municipal services through clustered growth.
5. To encourage the location of a suitable site for non-polluting service industries to support the tourist and development sector.
6. To encourage the development of a community-wide recreation program which will provide community parks, bike trails, ocean-front access and other appropriate facilities.
7. To encourage and reinforce the family beach atmosphere that makes Kill Devil Hills a pleasant place to live and to visit.

Institutional Policy Objectives:

1. To work for closer cooperation with Dare County and with adjacent municipalities.
2. To improve municipal services and governmental organization for better responsiveness to public needs.

SECTION VI

SUMMARY AND MAJOR CONCLUSIONS

DATA ASSEMBLY AND ANALYSIS

The assembly of data for the preparation of the Dare County Land Use Plan was initiated upon the completion of a comprehensive bibliography for Dare County specifically and the coastal plain area of North Carolina in general. The County bibliography included all previously published reports and studies involving such subjects as water and sewer, economy, demography, tourism, geology and groundwater, natural and historic areas, indigenous flora and fauna, erosion, climate, fishing, soils, legal restraints, aerial photo interpretation, coastal wetlands, recreation and planning to name but a few. (See list of references.)

Data was assembled and subsequently organized into general topics as required in the State Planning Guidelines which includes: population and economy; current plans policies and regulations; physical limitations; fragile areas, areas with resources potential, community facility capacities; population and economic projections; future land needs; and future community facility demands. The required data was then analyzed and, in conjunction with results obtained from the citizen survey questionnaires, was utilized in formulating the Dare County Land Use Plan. The following discussion and summary represents major conclusions which were derived from the Land Use Plan.

SUMMARY AND MAJOR CONCLUSIONS

I. Introduction

The Dare County Land Use Plan spells out guidelines for the future physical, cultural and economic development of the County.

The Plan was developed under the provisions of the North Carolina Coastal Area Management Act of 1974 which requires the local governments of the coastal counties to prepare blueprints for their growth and development. Private citizens in Dare County worked closely with local government in the determination of County goals. The Plan, therefore, sets forth an expression of what the local citizens want the County to be like, along with policies and standards to be used in achieving the County goals.

The Plan encourages the development of suitable land in a manner which would achieve a balance between desirable growth, long range expansion of the County's economic base, and the preservation of the County's natural and cultural resources. While tourism and the service industry supporting it are recognized as the major economic activity of the County, the Plan is mindful of the need for stabilizing seasonal fluctuations by the further development of other enterprises which are compatible with the County's environment, heritage and traditions.

The County Commissioners have adopted the planning objectives, policies and standards encompassing the Plan. The land use planning process is recognized as a useful tool for evaluating changing future conditions against desired long-range objectives if it is properly implemented.

II. DARE COUNTY NOW

Population and Economy

Dare County had a resident population of 6,995 in the 1970 census which represented an increase of over 18% from 1960. The largest growth in the County occurred on the Dare Beaches, while the mainland experienced a population decline. In-migration of new residents was the major cause of the population growth. Most of these new residents were in an older age group which caused a rise in the average age of the population.

The Dare economy has become increasingly dependent upon the tourist industry since 1960 while employment in agriculture, forestry and fisheries declined to less than 10% of the total. In response to recreational demand, the retail trade industries--food stores, restaurants, motels and hotels--became one fo the leading employers, increasing from about 16% in 1960 to over 25% in 1970. The service industry which is the largest employer in the County, increased its share of total employment from 23% to nearly 28%.

Land Use

Existing uses of the land within Dare County are shown on the accompanying land use map.

Two areas in Dare County are expected to undergo major changes in land use. These are the Dare mainland, where First Colony Farms plans to convert approximately 100,000 acres from forestry to pasture and row crops, and Wanchese, where a major fishing port with dock facilities and seafood processing plants are to be developed.

Compatibility of neighboring land uses is an important factor in planning new additions to communities. Many areas are now an uncontrolled mixture of permanent residences, vacation homes and commercial enterprises. This often results in the original land users leaving the area due to undesirable conditions.

The unsuitability of the land to support a desired land use also presents problems. The destruction of natural vegetation can be costly, particularly in a dune area, where the exposed sand becomes subject to the hazards of wind erosion.

Sub-standard building lots and improper development of a marsh area can cause serious health problems. Improperly installed septic tank systems can pollute ground water supplies and lead to the closing of shell fish waters.

Currently, the following plans, policies and regulations are in effect: Dare County General Development Plan (1974), Engineering Report on Water and Sewer Facilities (1973), Zoning Ordinance (1975), Subdivision Regulations (1972), Flood Insurance Regulations (1972), Dune Protection Ordinance (1971), N. C. Building Code and County Health Department regulations governing septic tank permits.

III. DEVELOPMENT OF OBJECTIVES, POLICIES AND STANDARDS

Public Participation

Substantial citizen involvement in the Land Use Plan was achieved through the coordinated efforts of the Commissioners, members of the Planning Boards, and community contact individuals in the County and the Municipalities. In addition to widespread publicity in the local press and on radio and TV, and to direct presentations to the general public, questionnaires were distributed throughout the County to secure broad local input on County goals and to identify problem areas relating to them.

Broad Objectives

As a result of this inquiry, it was clear that Dare County citizens placed highest value on the following qualities of living in Dare County:

Enjoyment of the natural environment
Freedom from pollution and population pressures
Slow pace of living and privacy

The preservation and enhancement of these qualities were held paramount in the development of the Plan.

Problem Areas

The County citizens identified a number of problem areas which will require resolution if the County is to develop in a sound and progressive manner. They are:

a. Population and economic trends. The County is faced with a potential population growth rate greater than its existing utilities and services can handle. Furthermore, most of the growth will take place on the Outer Banks, which is among the most fragile areas of the County where improper development would be felt most keenly. Continued dependence on tourism as the predominant economic base for the County indicates an inherently unstable character for the County economy.

b. Housing and community services. Uncontrolled growth in the County will result in the development of neighborhoods incompatible with the quiet low-density community living tradition of the region. Increasing demands for Health and social services will accompany population growth. A prerequisite for orderly growth will be the orderly expansion of all community services.

c. Productive natural resources. Fisheries, forestry and farming all contribute to the natural wealth of the County. The land and water resources are closely related, and the use of one affects the other. Conservation of these resources requires not only the monitoring of their interaction but the continual review of their management.

d. The natural environment. Dare County is already in a critical period of growth with the closing of shellfish waters because of pollution and with the loss of wildlife habitat in some areas because of unwise development. Dare County citizens seek to encourage the sound development of the County, but not at undue loss to the natural environment.

e. Cultural and historic resources. Dare County has played a unique role in the development of this country, and a rich cultural heritage is one of its most valuable assets. The recognition of this heritage may point the way to a kind of growth which could help stabilize the economic base of the County and at the same time instill a sense of community pride among residents.

f. Transportation. The increasing numbers of automobiles, buses, trucks, and recreational vehicles will increase transportation problems in the County in the future. The problems will be experienced principally on the Outer Banks during the summer months. Continuing development of the Currituck Outer Banks will give rise to a growing threat of a transportation corridor to the north of Dare County. Unlimited access to and from the tidewater cities in Virginia would create a north-south thoroughfare along the Dare Banks with devastating impact on the natural environment and on the qualities of living in the area.

IV. POLICIES FOR DEVELOPMENT

In keeping with the expressed desires of its citizens, the following policies have been adopted to guide the physical, cultural and economic development of the County:

a. To undertake a pattern of land use which places high importance on the protection and conservation of Dare County's unique environment.

b. To undertake a pattern of land use which will provide a broad range of living, working and recreational opportunities for permanent and seasonal residents.

c. To undertake a pattern of balanced residential and commercial land use based on the availability of adequate utilities and services.

d. To undertake a pattern of land use to provide for the concentration of commercial services and facilities in suitable growth centers such as the established towns and areas permitting such development.

e. To maintain tourism and the recreation industry as a major contributor to the economic well being of the County.

f. To maintain Dare County's heritage as a fishing center and to encourage the provision of modern seafood processing facilities in the County to help insure its viability and growth.

g. To encourage the County's tradition of independent craftsmen and of trades such as boatbuilding and netmaking, to more fully utilize labor resources available in the area.

h. To encourage the establishment of a center for wholesaling, warehousing and distribution of goods and services in support of the tourist industry in a suitable location in Dare County.

i. To encourage intergovernmental cooperation and coordination in Dare County in the interest of working jointly toward the accomplishment of goals.

j. To undertake to work with neighboring Counties and with State and Federal agencies toward the objective of making the Outer Banks a destination area instead of a major traffic throughway.

k. Community services and facilities will be established only in suitable areas.

l. The Towns of Kill Devil Hills, Manteo and Nags Head are designated as growth centers and will provide a nucleus of the services and utilities necessary to support desirable development. Within each town detailed land use categories will be assigned through the development codes of each jurisdiction.

The County has adopted and will continue to enforce regulations to control the subdivision of land, to prevent the destruction of barrier dunes along the ocean, to control the quality of water supplies, to control the installation and maintenance of sewage disposal systems, to control construction of flood-prone areas, and to control the use of land where the intensity of development is greatest.

Standards

New land and water uses within the County will be developed in accord with the objectives and policies established for the Land Use Plan and with sound resource management principles. To assure that safe and fitting practices are employed certain standards have been developed and incorporated in the Plan. They are set forth under headings of general, residential, commercial and industrial standards.

The general standards include basic engineering, ecological and planning principles which apply to all new development. The residential standards are those fundamental principles applicable to housing and neighborhood development. The commercial and industrial standards, respectively, comprise the principles basic to the reasonable and orderly development of commercial and industrial enterprises. Industrial development in the County, however, will further require an assessment of its impact on the local environment.

V. CONSTRAINTS

The development of some areas of Dare County will be inhibited by natural, physical and legal constraints; some other areas will be inhibited by economics and lack of essential services. Some of these areas and constraints have been identified and are considered below.

POTENTIAL AREAS OF ENVIRONMENTAL CONCERN

These areas of the county because of their overriding importance, their fragility, or the potential hazard to development should either be protected from development or developed with special precautions. Areas in Dare County which may be in this category are:

Coastal Wetlands: The marsh areas located along the shoreline of Roanoke, Croatan, Currituck, Pamlico and Albemarle Sounds. These areas may be developed for erosion control, piers, or access to navigable waters.

Estuarine Waters: Those sound waters which are classified SA for the taking of shellfish. These waters may be used for the propogation of marine life, navigation, water sports, piers and docks.

Resource Areas - Watersheds or Aquifers: The water impoundment and immediate area surrounding the Fresh Pond serving Nags Head and Kill Devil Hills and the well fields of the Hatteras Water Association and the Dare County Water System. These areas may be used for suitable development provided, however, that it contains adequate public waste water disposal facilities.

Fragile, Historic or Natural Resource Areas: Jockey's Ridge State Park, Nags Head Woods, the Cape Hatteras National Seashore, Fort Raleigh National Historic Site and the Wright Brothers Memorial. These areas may be used for limited development compatible with the area and to preserve areas susceptible to environmental damage.

Areas Subject to Public Rights: The waters of the Atlantic Ocean, Croatan, Currituck, Pamlico, Albemarle and Roanoke Sound under the jurisdiction of the Army Corps of Engineers. These waters may be used for propogation of marine life, navigation, water sports, piers and erosion control.

Natural Hazard Areas: The ocean front and barrier dunes within one hundred and fifty feet (150') of the mean high water mark of the Atlantic Ocean, the portions of the Sound shoreline with a recent history of erosion problems, those areas of the county that have an identified special flood hazard with velocity as designated by the Department of Housing and Urban Development, Flood Insurance Administration, and the area within five hundred feet (500') of Oregon and Hatteras Inlets. These areas may be used for erosion and storm protection, beach and water access or developed according to the standards of the Federal Insurance Administration.

Capacity of Community Facilities

Further constraints are placed on development by the capability of public services to encompass new demands. Some of these services which are in need of immediate improvement and expansion include:

Transportation: The primary roads are inadequate for the summer tourist load. Bypass U.S. 158 has deteriorated in capacity and design speed. N. C. 12 needs immediate widening and resurfacing.

Solid Waste Disposal: There is one 9-acre sanitary landfill for the entire County, which has a two-year capacity left. New sites for expansion and improved collection are needed.

Water and Sewer Services: A water bond referendum was passed in 1975 which will answer the need for freshwater supply on the northern beaches. New sewage treatment facilities are presently undergoing engineering study.

Education: It is expected that a new junior high school will be needed in the near future.

Fire Protection: Services need to be expanded for the communities on the Dare Mainland.

VI. LAND CLASSIFICATION

The designation of areas suitable for development is an essential element of the Land Use Plan. The accompanying map was prepared according to the uniform land classification system developed under the Coastal Area Management Act for the North Carolina coastal area. It must be updated every five years. The system contains five classes of land:

Developed lands: Which can range from small communities to large incorporated cities, where population density is moderate to high and where there are a variety of land uses which have the necessary public services and utilities.

Transition lands: Which comprise areas suitable for moderately intensive development and expansion of predominantly residential character. These areas are also capable of accommodating other uses compatible with such development. The level of public services and utilities in these areas is less intense than in developed lands.

Community lands: Which include areas capable of low intensity residential development. Public serv ices and utilities in these areas will be available at a lower level than in the developed and transition lands.

Rural lands: Which comprise areas with little or no urban development. They are characterized by low-lying lands suited primarily for carefully managed programs such as forestry, agriculture or passive recreation. The lands used for these purposes will help stabilize the seasonal fluctuations of the County's economy. Public services and utilities in these areas will be limited. Rural lands could also provide open spaces to serve as buffer zones or to be held in reserve for future uses as yet unanticipated.

Conservation lands: Which are areas where development must be restricted. These lands are incapable of supporting urban development because of their fragility or hazardous nature or because the natural or agricultural or forestry resources hold a higher value than their value for development. Conservation lands will protect areas representing potential sources of public water supply or as water supply recharge areas. Privately owned wildlife refuges, wilderness areas and passive recreation areas are classified conserv ation lands. In addition, large publically owned or controlled tracts are classified as conservation lands to protect historic, cultural, and natural resources.

VII. ESTIMATED DEMAND

The following table depicts the desired population changes for Dare County based on the stated objectives of orderly growth and development:

Year	Non-Resident Population	Permanent Population	Day Visitors	Total Peak Day
1975	30,000	9,000	7,500	46,500
1980	37,200	10,200	10,000	57,400
1985	44,270	12,130	12,250	68,650
1990	52,725	14,000	15,000	81,725
2000	74,000	20,000	20,000	114,000
2025	92,000	24,000	25,000	141,000

The rate of population growth in Dare County is based on the projected economic growth in the major market area of the central Atlantic States. This means that the projected increase will, as past experience has shown, be a function of the availability of disposable income in the market area for the purchase of second homes and for vacation trip expenditures.

Since the present water supply for the Dare Beaches is inadequate, the voters of Dare County and the Towns of Kill Devil Hills, Manteo, and Nags Head have taken the first step to accommodate this growth by passing a Bond Referendum to provide a dependable water supply. With that supply the growth which is expected to occur during the next ten year period can be accommodated in the Transitional and Community classification areas established by this Plan which comprise less than 15% of the total land area of the County. This growth will of necessity be at a low density because it will be governed by the Dare County Septic Tank Regulations in order to prevent pollution of estuarine waters and to prevent contamination of the ground water supply. The desired growth for Dare County will yield an effective population density of less than two people per acre in the Developed, Transitional and Community land classes, on that peak tourist weekend in July or August of 1985 when

all the motel rooms and rental cottages and camp and trailer spaces are full. If that entire population load were allocated to the Transitional lands alone, the density would be 3.75 people or around one family per acre. The effect of previously platted sub-standard lots on the population growth desired for Dare County will be minimized by the Dare County Septic Tank Regulations which prohibit the development of such lots until such time as an approved community water supply or sewage disposal system is available. The Dare County Subdivision Regulations require developers to install the necessary utilities and streets so that the cost of these additional services should not increase the general tax burden within the growth period.

To achieve the goals of protecting the vital shellfish waters and shallow ground water supply of the County a central sewage collection and treatment system is required. Dare County and the municipalities have joined together to examine this problem and to propose a solution to it. The cost of the system which results from that study will again require a Bond Referendum and a commitment from the voters of the County. Regional engineering studies indicate that such a system might cost in excess of $11 million. Due to the fact that it is impossible to accurately predict future changes in Federal and State guidelines regarding loan and grant programs for sewage systems it would be unwise to anticipate State or Federal assistance for such a project. Any available assistance would, of course, reduce the cost of the facilities to the local governments. The expenditures for treatment plants, pumping stations and major collection lines may be covered by Bond Referendum and such additional funding that may be available. But collection lines for municipalities or individual subdivisions and unincorporated areas must be justified by the need and willingness to finance such service by the ultimate users.

The intent of this Plan and the regulatory ordinances based on it is to control the growth of the County to the level acceptable to its citizens and within the limits of their willingness to support it.

This means that the tremendous population increases experienced by other resort communities will not be felt by Dare County because of the restrictions the County has placed on development with individual septic tanks and eventually with central sewage treatment. The population densities are keyed to the availability of a central sewage treatment system and until such a system is available the density will remain very low.

Over 50% of the total land area of Dare County is in the conservation category which is preserved from urban development.

Less than 15% of the total land area of Dare County has been classified as suitable for urban development. Within this area there will be individual sites which cannot be developed due to the constraints mentioned in this Synopsis. The complete development of this land would result in a population density of one family per acre during the ten year period.

The continued development of the County will require careful monitoring to insure that the standards and policies of this Plan are maintained and that the most economic use is made of public funds to supply the required services.

VIII. STEPS REQUIRED FOR IMPLEMENTATION

A. Land Use Policy

The publication of this document can have the desired influence on the way the community develops in the future provided that it is well publicized and understood by the citizens. For the Plan to have a significant impact on development, however, it must be recognized as a formally adopted statement of public policy -- a public commitment to the goals which are considered to be the most desirable goals for the future of the county.

The Land Use Plan must become a factor in the decisions made by Federal, State, and local government. It must influence choices between alternative courses of action which occur daily in the governmental management. The Land Use Plan must also generate other programs which will be necessary in order to achieve the goals outlined in it.

B. Regulatory Ordinances

Dare County has adopted a zoning ordinance to regulate the use of land in those areas of the county where development pressure is most intense. In the legislation passed by the N. C. General Assembly to enable counties to enact zoning ordinances (N.C. G.S. 153A-341) is the requirement that "such regulations shall be made in accordance with a comprehensive plan...". Thus, it is mandatory that the zoning ordinance and the Land Use Plan be in harmony and lead to the achievement of the stated goals for community development. Interpretations of the zoning ordinance by the building inspector and Boards of Adjustment should also reflect the influence of the Land Use Plan as the ultimate statement of public policy on land use.

The regulation of new subdivisions provides an opportunity to insure that development taking place within the county occurs in an orderly manner in accordance with the goals of the Land Use Plan. The provision for review of subdivision plats by the county planning board should insure that such development is coordinated with the appropriate utility and thoroughfare systems and that the development is of a quality and at a density that will further the goals of the Land Use Plan.

The North Carolina Building Code, the Dare County Dune Protection Ordinance and the Flood Hazard Ordinance are important regulatory tools to implement the Land Use Plan. Also, Dare County intends to act as a permit-letting agency for minor developments as authorized by the CAMA.

C. Public Investment

The most direct means of implementing the Land Use Plan is through the preparation of a Public Improvements Program and Capital Budget. This process is a commitment of public resources and facilities to the goals of the Land Use Plan which will ultimately affect the private sector of development and encourage growth and development of the type and in the direction indicated by the plan. A thorough examination of each county department is necessary to determine the projects and facilities which will be required over the planning period to accomplish the stated objectives. Careful consideration of needs as related to objectives should result in a priority listing of the major items of expense. Then, with a review of the fiscal resources available through general review, bonding capacity,

taxation, and possible state and federal assistance, a specific budget for a program of public expenditure may be prepared. The capital budget process is intended to provide a vehicle through which the county can most economically relate public expenditures to the Land Use Plan in order to make those necessary and desirable public improvements with the most effective utilization of the available fiscal resources.

IX. RELATIONSHIP BETWEEN COUNTY AND TOWNS

The development of this Land Use Plan represents a joint effort between the Dare County Planning Board, the Planning Boards of Kill Devil Hills, Manteo, and Nags Head, and includes the opinions and ideas of citizens of every community in the County. It is the intent of the Commissioners of Dare County to continue to use this joint forum or responsible citizens to provide for periodic review and revision of these policies as changes become necessary and to insure the role of the citizens of the County in guiding future development. The towns will continue to control development within their jurisdictions according to the policies and standards of this plan.

X. SUMMARY

The Dare County Land Use Plan, made up of the goals, policies, standards and maps outlined above, provides guidelines for the physical, cultural and economic development of the County. It was prepared with substantial citizen involvement and reflects their desires to the fullest degree.

The Plan has been adopted by the County Commissioners and will be used as a basis for future planning in the County as well as a vehicle for evaluating changing future conditions against desired long-range objectives.

The unique history of the County, along with its singular setting of sea and sound, dunes and forest, make it particularly fitting in this Bicentennial Year for the County to rededicate itself to the preservation of its exceptional environment for enjoyment by present and future generations of residents and visitors.

IMPLEMENTATION TECHNIQUES REQUIRING STATE LEGISLATION

The North Carolina General Statutes permit local governments to adopt ordinances to regulate development in a variety of ways through ordinances and utility extension policies. These methods are mostly negative in their effect in that development is either prohibited or restricted in certain areas.

Other states[1] are using incentives programs such as preferential tax structure for land remaining undeveloped, scenic easements for critical property, and transfer of development rights which allows suitable property to be more intensely developed while preserving valuable or fragile natural resources.

These techniques make use of the economic leverage that determines the mythological "highest and best use" for land to accomplish the same goal of the restrictive ordinances. They have the added advantage of requiring no additional permit system or enforcement agency and are much less expensive than outright acquisition.

North Carolina has taken a step in this direction with N.C. G.S. 105-277 which provides for preferential tax assessment for farm land. This program should be more widely publicized and perhaps expanded to include other types of land. The other incentive techniques should be examined by the Coastal Resources Commission for the applicability in North Carolina.

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[1] State of Maine Title 33, Chapter 667.
State of New Hampshire H.B. 747, Chapter 391.

SECTION VII

REFERENCES AND APPENDICES

REFERENCES

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The Coastal Area Management Act of 1974 requires that a Land Use Plan be adopted for each of the 20 coastal counties named in the Act.

If any county fails to develop a plan it will be done for that county by an agency of the State.

The Dare County Commissioners have notified the State that the citizens of Dare County intend to develop our own plan. This will give us the greatest voice possible in the future of Dare County.

Doubtless you would like to see the county plan reflect your views of how Dare County should grow and develop. Your voice will have the greatest impact during the early stages of developing the plan. That time is now.

This questionnaire is one way to be heard. Please answer the questions carefully since your answers will serve as an important foundation for the writing of the plan.

Please remember that a Land Use Plan is not a zoning ordinance but a broad statement of our goals for growth and development and broad allocation of our land resources to meet those goals. The Land Use Plan will furnish guidelines for development and will serve as the basis for future detailed planning.

This questionnaire will be divided into three areas:

(1) Personal profile questions asked for statistical purposes.

(2) Questions related to Dare County today.

(3) Questions related to Dare County tomorrow.

SECTION I: PERSONAL PROFILE

1. Check the area primarily through which you are associated with Dare County (normally the area of residence or of property holdings if nonresident. If strong association with more than one area makes it impossible to choose, check each and describe association to right of each area checked.)

____Duck & North

____Kill Devil Hills

____Manns Harbor, Stumpy Point, East Lake & Other Mainland areas.

____Nags Head

____Wanchese

____Hatteras (Oregon Inlet South)

____Kitty Hawk (Includes area outside limits of Kill Devil Hills and North to Duck)

____Manteo (City)

____Manteo (Outside city limits)

____North End Roanoke Island

2. Your age group. Circle one letter.

A. Below 18

B. 18-24

C. 25-34

D. 35-44

E. 45-54

F. 55-64

G. 65 or Over

SECTION I: PERSONAL PROFILE (Cont'd)

3. Are you a Dare County resident (includes communities located within Dare County)?

Circle one letter.

A. Yes, and I own or am purchasing a home.

B. Yes, and I rent my home.

C. I am a nonresident who owns or is purchasing property in Dare County.

D. I am a nonresident who does not hold property in Dare County.

4. What is your primary economic relationship with Dare County (circle one letter

A. No income derived from Dare County.

B. Agriculture and related business or service.

C. Fishing and related business or service

D. Tourism and related business or service.

E. Forestry and related business or service.

F. Construction and related business or service.

G. Business or service used by general public and not [illegible] related to any of above.

H. Retirement income (if from one of above, indicate which _____).

I. Other (Please Specify)_____

_____

_____

_____

SECTION II - DARE COUNTY TODAY

5. If you were born in Dare County, check here_____.

If not born in Dare County, check here_____.

If you were born in Dare County, which of the following keep you here, or if you were not born in Dare County which of the following attracted you (select three most important to you and number them in order of importance).

_____A. Slow pace of living.

_____B. Privacy (inaccessibility)

_____C. Freedom from pollution and population pressures.

_____D. The natural environment and associated recreational activities.

_____E. My job or business or property holdings.

_____F. Belief that there will be future economic expansion which will provide great personal opportunity.

_____G. Family

_____H. Other (Please Specify) _____

_____

_____

_____

_____

6. Of those things which attracted you to or keep you in Dare County, which two do you believe we are most likely to lose?

_____Most Likely

_____Next most likely

COMMENTS:

SECTION II - DARE COUNTY TODAY (Cont'd)

7. Indicate your degree of concern with the following which have been cited as problems or potential problems in Dare County:

PROBLEM	Most urgent Concern	Urgent Concern	Not a problem
A. An adequate water supply			
B. Traffic Congestion			
C. Sewage Disposal			
D. Trash & Garbage Disposal (not collection)			
E. High rise construction			
F. Lack of medical services			
G. Limitation on building height			
H. Pollution of ocean & sounds			
I. Over Population			
J. Commercialization			
K. Lack of access to beaches, sounds, inlets and ocean			
L. Unattractive buildings			
M. Small lots and crowded developments			
N. Lack of reserved open space			
O. Lack of community recreational facilities			
P. Destruction of dunes & beaches			
Q. Lack of job diversification			
R. Lack of usable land to accommodate growth			
S. Lack of comforts or conveniences available in more urban areas (such as TV & radio, supermarkets, shopping centers, etc.)			
T. Lack of surface & subsurface drainage			
U. Erosion by wind and water			
V. Other (Please Specify)			

SECTION III - DARE COUNTY TOMORROW

8. Have you previously heard of the Coastal Zone Management Act of 1974?

(Circle letter beside all that apply)

A. No

B. Yes, through newspaper

C. Yes, through radio

D. Yes, through TV

E. Yes, by word of mouth

F. Yes, by other means (Please Specify)_____

_____

9. Indicate the degree of encouragement or discouragement you believe should be given the following, assuming that any change will affect the existing balance (that is, encouraging one probably will discourage at least one of the others). Check only one column beside each item.

DARE COUNTY AS A PLACE TO WORK	Encourage Strongly	Encourage Moderately	No Change	Discourage Moderately	Discourage Strongly
A. Agriculture & Related					
B. Fishing Industry & Related					
C. Tourism & Related					
D. Forestry & Related					
E. Construction & Related					
F. Research/Development Industry					
G. Light Industry (warehousing, assembly, etc.)					
H. Heavy Industry (conversion of raw materials					

SECTION III - DARE COUNTY TOMORROW (9 Cont'd)

DARE COUNTY AS A PLACE TO LIVE OR VISIT	Encourage Strongly	Encourage Moderately	No Changes	Discourage Moderately	Discourage Strongly
I. Residential Development					
J. Single family residences					
K. High rise residences					
L. Low rise multi-family residences					
M. Preservation of open space					
N. New & Improved cultural facilities (libraries, art gallaries, theatres, etc.)					
O. Increased accessibility to Dare County					
P. Improved tourist facilities (convention centers, etc.)					
Q. Urban growth					
R. Protection of residential areas from encroachment by commercial or industrial enterprise					
S. Preservation of wildlife habitat					
T. Regulation of dunes & shoreline					
U. Soil Conservation					
V. Other (Please Specify)					

SECTION III - DARE COUNTY TOMORROW (Cont'd)

10 Please check the degree of agreement or disagreement with each of the following statements.

	Agree Strongly	Agree	Neutral	Disagree	Disagree Strongly
A. There is enough economic development underway in Dare County.					
B. Industry in Dare County would improve the quality of life.					
C. New industry locating in Dare County should be required to file an environmental impact statement.					
D. A person should be able to do anything he wants with his land.					
E. Planning can minimize conflict between economic development and environmental protection.					
F. We have enough people living in Dare County now.					
G. We should try to attract more permanent residents.					
H. We should give high priority to improved community or county services (central or area water systems, sewage disposal, etc.)					
I. We must control growth to allow services to keep pace with the need.					
J. We must control natural resources to keep Dare County a tourist attraction.					
K. Other (Please Specify)					

SECTION III - DARE COUNTY TOMORROW (Cont'd)

11. Are you pleased with the direction Dare County development is taking?

_____Yes, _____No. Please use this space to write the reasons you are pleased or to indicate the changes you would like to see and your reasons for them.

SUMMARY OF QUESTIONNAIRE - DARE COUNTY RESIDENTS

#1 Of those residents who responded to the questionnaire, 3.7% were from Duck and North, 13.4% from Kill Devil Hills, 2.5% from Mann's Harbor and Stumpy Point, etc., 14.7% from Nags Head, 8.1% from Wanchese, 6.8% from Hatteras, 32.1% from Kitty Hawk, and 14.9% from Manteo and 4.0% North Roanoke Island,

#2 65% of the residents are 45+

#3 86% of the residents either own or are purchasing a home.
14% rent

#4 The majority (35%) of those surveyed either receive no income from Dare County or receive retirement income. Tourism and related (22.4%) and business and services used by general public (18.6%) represented other major economic relationships with Dare County. Agriculture and forestry accounted for only 0.4% and 0.8% respectively.

#5 72.2% of the residents surveyed were <u>not</u> born in Dare County. The qualities which attracted them to Dare County are:

(1) Freedom from pollution and population pressures
(2) The natural environment and associated recreational activities
(3) Slow pace of living

#6 Of those qualities which attracted them, the two which they are most likely to lose are:

(1) Freedom from pollution
(2) Slow pace of living

#7 Dare County citizens are concerned with the following problem areas:

(1) Lack of medical services
(2) Pollution of oceans and sounds
(3) Small lots and crowded developments
(4) Destruction of dunes and beaches
(5) Erosion by wind and water
(6) An adequate water supply
(7) Sewage disposal
(8) Limitation on building height
(9) Commercialization
(10) High rise construction

Factors which present no problems are:

(1) Lack of usable land to accomodate growth
(2) Lack of comforts or conveniences
(3) Lack of job diversification
(4) Traffic congestion

#8 88.2% of the Dare County residents had previously heard of CAMA; 35.8% through the newspapers.

#9 The major factors which the Dare County residents feel should be strongly encouraged are:

(1) Preservation of open space
(2) Preservation of wildlife habitat
(3) Soil conservation
(4) Regulation of dunes and shoreline
(5) Fishing industry and related
(6) Protection of residential areas from encroachment
(7) Single-family residences
(8) New and improved cultural facilities

Factors which are strongly discouraged are:

(1) High rise residences
(2) Heavy industry
(3) Low rise multi-family residences

Agriculture - No change

#10 Dare County residents strongly agree with the following statements:

(1) We must control gorwth to allow services to keep pace with the need.
(2) Planning can minimize conflict between economic development and environmental protection.
(3) We must control natural resources to keep Dare County a tourist attraction.
(4) New industry locating in Dare County should be required to file an EIS.
(5) We should give high priority to improved community or county services.

#11 51.4% of those surveyed are pleased with the direction Dare County development is taking.

A GEOGRAPHICAL ANALYSIS OF CITIZEN SURVEY QUESTIONNAIRES

According to the citizen survey results, Roanoke Island and the Mainland, differed in varying degrees to the residents of the Outer Banks in a few aspects. Relatively speaking, Roanoke Island and Mainland residents surveyed were:

(A) younger, more dependent on fishing, services, and tourism. (ques. 2 and 4)

(B) attracted to Dare County to a greater degree by family interests and job holdings. (ques. 5)

(C) not as environmentally concerned. (ques.7)

(D) not as opposed to industrial endeavors. (ques. 9)

(E) more concerned with the lack of job diversification, comforts, improved community facilities, and the fishing industry. (ques. 9)

(F) less concerned with an adequate water supply, planning, and envioronmental impact statements. (ques. 9)

Relatively speaking, Outer Banks residents surveyed were:

(A) older and more dependent on retirement income. (ques. 2and 4)

(B) attracted to Dare County by the environment. (ques. 5)

(C) vitally concerned with all environmental problems in the survey. (ques 7)

(D) opposed to all industrial endeavors. (ques. 9)

(E) more concerned with an adequate sewage and water supply, overcommercialization, and adequate medical facilities. (ques. 9)

(F) less concerned with the lack of job diversification, lack of access to the water, lack of conveniences, and lack of tourist facilities. (ques. 9)

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