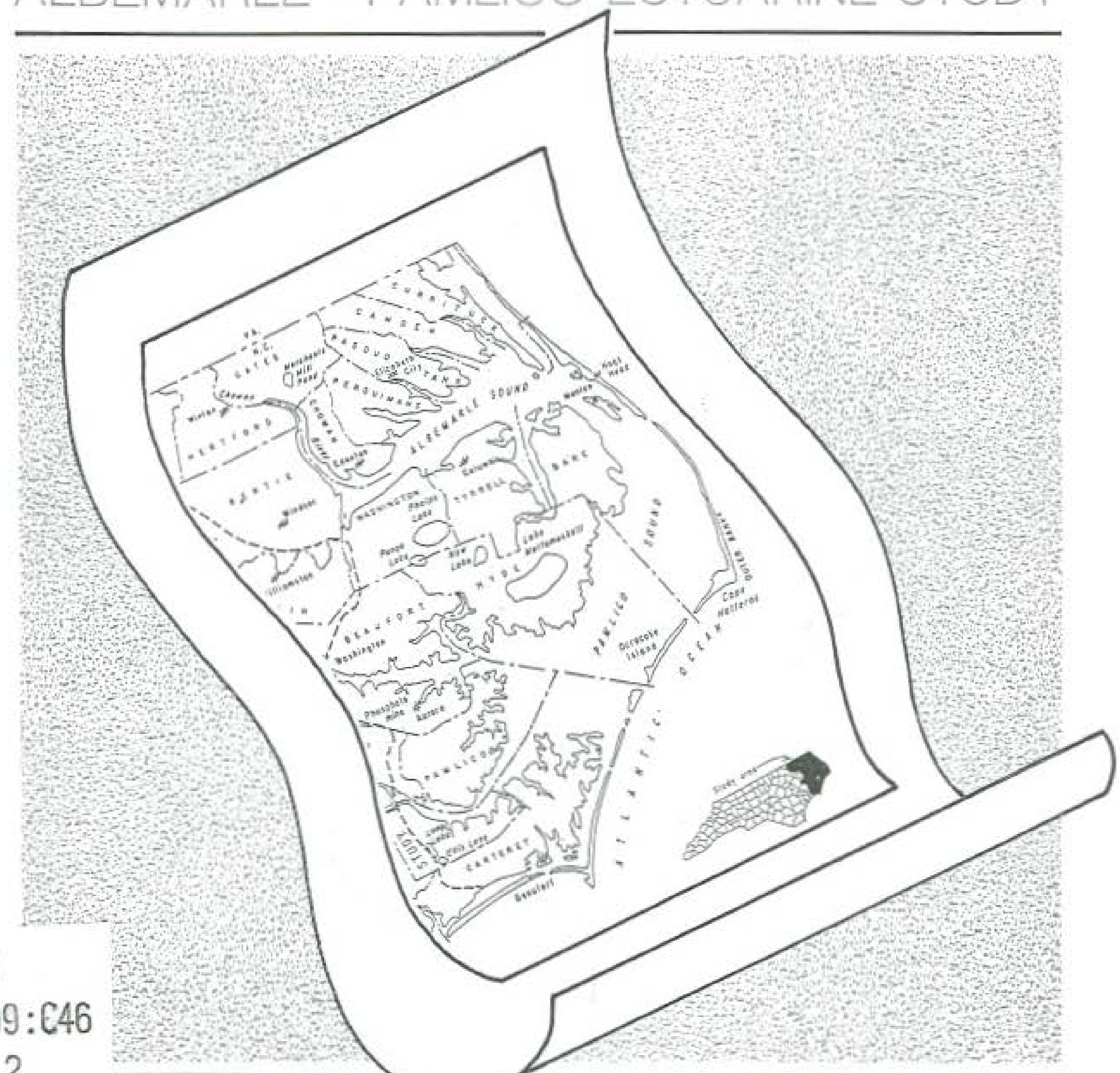
May 1989

Project No. 89-03

CHARACTERIZATION OF BASELINE DEMOGRAPHIC TRENDS IN THE YEAR-ROUND AND RECREATIONAL POPULATIONS IN THE ALBEMARLE-PAMLICO ESTUARINE STUDY AREA

ALBEMARLE - PAMLICO ESTUARINE STUDY



Funding Provided By
North Carolina Department of Natural Resources and Community Development
Environmental Protection Agency
National Estuary Program

ALBEMARLE-PAMLICO

CHARACTERIZATION OF BASELINE DEMOGRAPHIC TRENDS IN THE YEAR-ROUND AND RECREATIONAL POPULATIONS IN THE ALBEMARLE-PAMLICO ESTUARINE STUDY AREA

By
Paul D. Tschetter
Department of Sociology and Anthropology
East Carolina University
Greenville, North Carolina 27858

"The research on which the report is based was financed in part by the United States Environmental Protection Agency and the North Carolina Department of Natural Resources and Community Development, through the Albemarle-Pamlico Estuarine Study."

Project No. 89-03

May, 1989

ACKNOWLEDGEMENT

The research for this project was conducted through the Department of Sociology and Anthropology at East Carolina University. I would like to acknowledge the research support and advice of John Maiolo. Research assistance was provided by Todd McLawhorn, Lori Livingston, and Reba Lewis, who were responsible for a large part of the fieldwork. Additionally, the research help of Allyson Norris and Angela Forbes, participants in the Science Track Enhancement Program at East Carolina University, was very helpful in developing the inventories of recreational housing. I appreciate the knowledgeable assistance of Carl Adler and Carl Heckrotte in tracking down the numerous marinas on the Albemarle and Pamlico Sounds. Finally, I want to thank Shirley Smith for her usual valuable assistance.

ABSTRACT

CHARACTERIZATION OF BASELINE DEMOGRAPHIC TRENDS IN THE PERMANENT AND TEMPORARY POPULATIONS IN THE ALBEMARLE-PAMLICO ESTUARINE STUDY AREA.

Paul Tschetter
Department of Sociology and Anthropology
East Carolina University
Greenville, NC 27858

This project was designed to provide baseline demographic data and trends for the populations of the 33 county North Carolina portion of the Albemarle-Pamlico Estaurine Study (A/P Study) area. Two types of populations are identified. The first is the permanent population which is the count of people for whom a particular community is their usual place of residence. The second is the temporary recreational population, more specifically, the count of the overnight tourist population. The total estimated population for a community is the sum of the permanent population and the overnight population. The estimates were developed using the county as the unit of analysis.

Year-round population counts are available for census years. Post-censal population counts use the estimates developed by state and federal agencies using a combination of methodologies.

Estimates of the temporary population are developed by seeking counts of four different types of overnight facilities. First, the number of motels and hotels and the number of motel/hotel rooms are counted. Second, the number of campgrounds and campsites are counted. Third, the number of marinas and boat slips are counted. The data for these three types of facilities came from secondary sources plus additional on site inspection. The fourth type of overnight facility is the private recreational housing unit. Counts of private recreational housing are based on data from the Census of Housing. Estimates of the recreational population are developed using multipliers reflecting the average number of persons per motel room, campsite, boat slip, and seasonal housing unit.

In developing estimates, counties were ranked by the number of different types of recreational facilities they possess. Overall, Carteret and Dare Counties had the highest level of recreational activity. Other counties identified as having significant amounts of one or more type of overnight recreational facility are Beaufort, Currituck, Craven, Hyde, Pamlico, and Perquimans.

The estimates indicate that the prime coastline recreational counties have experienced significant growth during the 1980s. During the 1980s the most significant increases have come in private recreational housing, motels/hotels, and marinas. The number of campgrounds has remained static during the decade.

The analysis indicates that growth in the recreational infrastructure should continue in the near future. The greatest growth pressure should come in Carteret and Dare County, and to a lesser extent, Hyde County. Development activity will be greatest on the barrier islands.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SUMMARY AND CONCLUSIONS

The purpose of this project was to provide a baseline characterization of the demographics for the 33 county North Carolina portion of the Albemarle-Pamlico Estuarine Study (A/P Study) area. Specifically, we wanted to identify appropriate methodologies for developing an initial set of population estimates for the A/P Study counties. The methodology for estimating population size and change had to take into account the unique geographical and socio-economic characteristics of the counties in the study area. The relevant characteristics are the counties' proximity to the ocean and the sounds and their nonmetropolitan character.

Fourteen of the 33 A/P Study counties directly border the Atlantic Ocean and/or the Albemarle and Pamlico Sounds. The remaining 19 counties form the drainage basins for the Albemarle and Pamlico Sounds. Proximity to the ocean and sounds provides an important recreational base for economic development. In 1987, there were an estimated $646.4 million in tourist expenditures within these 14 coastline and sound counties. Two counties, Carteret and Dare, accounted for 85.7 percent of these tourism expenditures. Such revenue figures indicate there is a large recreational population frequenting these counties. Evidence also indicates that the size of the recreational population has increased over time.

The other defining demographic characteristic of the 33 A/P Study counties is their nonmetropolitan character. The two exceptions are Currituck and Wake Counties. Wake County includes the Raleigh metropolitan area, and Currituck County is part of the Norfolk-Virginia Beach metropolitan area. The 14 counties bordering the coast and sounds are overwhelmingly nonmetropolitan. In fact, in the four counties bordering the Atlantic Ocean the largest town, Morehead City, had a year-round population of 6,700 people in 1987 (N.C. Office of State Budget and Management, 1988). Importantly, the recreational population, when added to the year-round population, significantly increases the effective total population in the coastal and sound counties.

We thus identified a number of population counts and estimates that we needed. While counts of the permanent, year-round population were available for census years, we needed to develop estimates for postcensal years. Since there were no equivalent counts for recreational populations, we needed to make estimates of the recreational population for both census and postcensal years.

A number of estimation methodologies are appropriate for the year-round population. In many instances state and federal agencies use an average estimated population employing two or more methods. In fact, the county level postcensal estimates of North Carolina's year-round population (1987) used in this project were prepared using an average of two methodologies, i.e., the ratio correlation method and the administrative records method.

Most of the methods used to estimate the year-round population are inappropriate for recreational populations. An appropriate method is the housing unit method. The basic premise is that the residential population is

equal to the number of occupied housing units multiplied by the average household size. To apply this approach to the recreational population we identified the different types of recreational housing units and the occupancy rates and average household size for each type.

Four types of housing units constitute the recreational infrastructure, i.e., private housing units, motel rooms, campsites, and marina boat slips. Data for each sector were gathered from a variety of sources, e.g., census housing data, electric utility data, motel, campground, and marina directories, and fieldwork using telephone interviews and on site visits. Data included the number of units, the occupancy rates, and average household (party) size. Estimates were made separately for each sector and then combined into summary estimates for the individual North Carolina A/P Study counties. The estimates reported are for 1980 (census year) and 1987.

Trends in the year-round population can be briefly summarized. For the 33 county North Carolina area the population grew by 3.8 percent during the 1960s, 15.4 percent during the 1970s, and 11.2 percent during the 1980s. The last 30 years has shown a remarkable turnaround in individual population growth patterns for the year-round population. During the 1960s, 8 of 14 coastal/sound counties and 22 of 33 A/P Study counties lost population. The 1970s and 1980s reversed this trend. During the 1970s, all of the coastal/sound counties and 30 of 33 A/P Study counties gained population. The trend continued in the current decade as 13 of 14 coastal/sound counties and 31 of 33 A/P Study counties gained population.

Importantly, the growth rates tended to be highest in the coastline counties of Carteret, Currituck, and Dare. Among the sound counties, Craven County had the highest growth rates over the time period. Among the drainage basin counties, Wake, and its adjacent counties, had the highest growth rates over the 30 year time period. Counties which lost population during the time period tended to be predominantly rural and isolated, depending to a large extent on agriculture.

Trends in the recreational population are more complex given the variety in the recreational infrastructure. As expected the coastal counties, particularly Carteret and Dare, had the largest recreational infrastructures. With the notable exception of campgrounds, all types of recreational housing grew over the time period. During the current decade the growth rate has been highest for motel rooms (45.5 percent) followed by private housing (29.6 percent) and marina boat slips (29.1 percent). At the county level there have been significant differences in the relative gains in each type of housing.

Among the coastal counties, growth in private housing, rental and second home, has clearly led the way during the 1980s. Carteret, Dare, and Hyde Counties have each posted gains of more than 70 percent in the number of seasonal housing units. The most noticeable change in private housing during the late 1970s and 1980s has been the development of large scale condominium projects. The three coastal counties also had significant gains in the number of motel rooms. While the number of motel rooms in Hyde County more than doubled, Carteret County posted a gain of 49.4 percent and Dare County posted a gain of 29.4 percent.

While private seasonal housing constituted the largest sector of recreational housing in the sound counties, marina activity has posted the highest growth rates. Beaufort, Craven, and Pamlico Counties have led marina growth during the 1980s. The number of boat slips grew by 56.8 percent in Craven County, followed by Beaufort County with a gain of 52.1 percent and Pamlico County with a gain of 45.0 percent. In fact, boat slips outnumbered motel rooms in all three counties.

The recreational infrastructure of the drainage basin counties was minimal. The largest sector was motel rooms and the largest gains in motel rooms during the 1980s have occurred in Johnston (156.7 percent), Pitt (94.9 percent) Nash (63.7 percent), and Wake (43.5 percent). Two drainage basin counties with a significant number of private seasonal housing units were Northampton and Warren Counties. This housing has developed around the Kerr Lake recreational area.

By combining recreational housing data with information on occupancy rates and average household (party) size for each type of housing we were able to estimate the overnight recreational population. The total overnight, recreational population for the A/P Study counties increased from 164,124 people in 1980 to 217,796 people in 1987, a gain of 32.7 percent. As expected, a majority of the overnight population was concentrated in just 2 coastal counties, Carteret and Dare. In 1980, 53.1 percent of the total recreational population was concentrated in Carteret and Dare Counties. By 1987, this figure had increased to 60.6 percent.

The recreational population growth rates for individual counties paralleled the rates for the housing infrastructure. Significant gains were concentrated in the coastal and sound counties. Among the coastal counties, Carteret (56.8 percent), Dare (46.3 percent), and Hyde (92.6 percent) all had dramatic gains during the current decade. The gains in the recreational population in the sound counties were more modest, averaging less than 10 percent. The only exception was Pamlico County which grew by 41.3 percent. Pamlico's growth was due to gains in private seasonal units and marina activity.

Finally, we wanted to measure the population impact that overnight recreation had on the year-round population. To do this we calculated a recreational ratio by dividing the total population (recreational + year-round) by the year-round population. If there were no overnight recreational population then the ratio would be 1.00. As expected, the largest ratios occurred in the coastal counties.

With a estimated total overnight population of 84,573 people, Dare County had a recreational ratio of 4.23 in 1987. This means that during peak seasonal periods the total population was more than 4 times greater than the year-round population. Carteret County, with a total overnight population of 117,806 people, had a ratio of 2.33 in 1987. The peak seasonal population was more than double the year-round population. Although Hyde County had a small year-round population, with an estimated peak overnight population of 12,467 people in 1987, its recreational ratio was 2.15.

While the recreational ratios for the sound counties were not as large as

those for coastal counties, a number of the sound counties did have significant ratios. The largest recreational ratios for 1987 were found for Pamlico (1.53), Beaufort (1.24), Chowan (1.23), Tyrrell (1.21), and Perquimans (1.17) Counties. The largest ratios resulted from a combination of private seasonal housing and marina activity.

Finally, the impact of recreational activity can be measured in economic terms using estimated travel expenditures and retail sales. Total dollar figures and per capita expenditures were analyzed. The 1987 estimated travel expenditures for the 33 A/P Study counties were $1,535.9 million, resulting in a per capita travel expenditure figure of $1,005. Gross retail sales in 1987 totaled $13,475.7 million, resulting in a per capita figure of $8,819.

In terms of individual counties, per capita travel expenditures exceeded the A/P Study figure in 3 coastal and 2 drainage basin counties. Dare County, with per capita expenditures of $19,960, led all counties. Carteret County had per capita expenditures of $3,074 and, Hyde County had per capita expenditures of $2,704. The two drainage basin counties were Wake County ($1,381) and Nash County ($1,271). None of the remaining 28 counties approached the per capita travel expenditure figure for the study area.

Focusing on per capita retail sales, 6 counties exceeded the A/P Study figure. While Dare County, with a figure of $18,537, clearly led all counties, per capita retail sales for Carteret County were slightly below the A/P Study figure. The other counties exceeding the A/P Study figure were Wake ($13,201), Nash ($11,152), Wilson ($10,538), Pasquotank ($9,342), and Pitt ($9,139). In the remaining A/P Study counties, per capita retail sales tended to be higher in counties with small or medium sized cities (e.g., Beaufort, Lenoir, Wayne, Hertford, etc.). Per capita retail sales were lowest in small, rural counties (e.g., Camden, Bertie, Tyrrell, Gates, Greene, Northampton, etc.)

Several summary conclusions are suggested from the analysis:

-- The A/P Study area includes counties that stand in striking contrast. The area includes both some of the fastest growing counties in North Carolina and other, isolated rural counties that are still losing population.

-- The coastal and sound counties are a site for continuing dramatic recreational development which includes growth in private seasonal housing, motels, and marina activity.

-- The construction of private seasonal housing units including condominium projects has clearly led recreational development in the sound and coastal counties. The overwhelming majority of this development has occurred in the coastal counties, and more importantly, on the barrier islands.

-- The pace of hotel and motel growth has been greatest in the coastal counties of Carteret, Dare, and Hyde. Additionally, there was significant growth in the drainage basin counties surrounding the Raleigh metropolitan area and the counties containing small and medium sized cities, e.g., Halifax, Nash, and Pitt.

-- There has been dramatic growth in marina activity since 1970. This development has been led by growth in the sound counties of Beaufort, Craven, and Pamlico.

-- Economic data on tourism expenditures and retail sales indicate that recreation has had a major economic impact in the coastal counties of Carteret and Dare, and to a lesser extent Hyde. However, the economic impact of recreation was not noticeable in the sound counties which had significant recreational activity in private seasonal homes and marinas.

-- The identified trends for the year-round population indicate that the growth patterns should persist into the near future. Among the coastal and sound counties, Carteret and Dare, should lead the way. Among the drainage basin counties, Wake and its adjacent counties, should lead the way.

-- The patterns for the overnight recreational population indicate that the highest growth rates should obtain for the coastal counties. Specifically, Carteret and Dare Counties should lead the way. Secondary recreational growth should continue in selected sound counties based on second home and marina development, e.g., Beaufort, Craven, Pamlico, and Perquimans Counties.

RECOMMENDATIONS

A clear conclusion that can be drawn from the trends identified in this research is that the counties of the Albemarle-Pamlico Estuarine Study area present a contrasting patterns of social and economic development. The wide differences in growth rates between the counties reflect their metropolitan/ nonmetropolitan character, their proximity to the sounds and coastline, and their different socio-economic bases. At one extreme, the fastest growing counties are a mix of rapidly expanding urban areas and booming coastal recreational areas. At the other end of the continuum are the slower growing nonmetropolitan counties bordering the Albemarle and Pamlico Sounds. The overriding challenge is to manage social and economic development in the environmentally sensitive areas of the Albemarle and Pamlico Sounds. While the immediate task may be to manage and channel the pace of economic development and population growth in rapidly developing coastline counties like Carteret and Dare, the broader challenge is to manage the total estuarine system to best preserve the environmental qualities of the Albemarle and Pamlico Sounds.

The starting point for this research was to develop baseline data on the population shifts occurring in the study area. The import of this project has been to complement census and postcensal estimates of the year-round population with data on the population shifts associated with recreational development in the counties bordering the coast and the Albemarle and Pamlico Sounds. Given recent population trends, projections indicate that current growth rates for the year-round population should continue through the next decade. Among the fastest growing coastal counties these trends in the year-round population portend complementary growth in the temporary, recreational population. The task was to develop baseline measures of the recreational population and our recommendations speak to that task. The goal guiding our recommendations is to increase our knowledge about demographic and economic impacts of water related recreation.

The first step in the research was to identify a methodology appropriate for estimating temporary recreational populations. The second step was to apply the methodology to the A/P Study counties using the best available data. The final step was to combine the recreational estimates with census and postcensal estimates of the year-round population. The final product is a data set that describes the populations of the A/P Study counties.

While a variety of methodologies are appropriate for estimating year-round populations, the housing unit approach proved best for estimating overnight recreational populations. The application of the housing unit approach required data on the number of recreational units, data on the occupancy rates of units, and data on the average size of the recreational household.

Private seasonal housing units, motel units, campsites, and boat slips constitute the recreational infrastructure. Intercounty comparisons showed considerable variation in the mix and growth in the recreational infrastructure. By cross-checking agency directories, telephone directories, public

utility records, and on site visitations, data on the number of each type of recreational unit were the easiest to obtain. Housing unit counts should be periodically updated so that the data files remain timely. Additionally, the validity of using public utility data to make postcensal estimates of private seasonal housing should be assessed when 1990 housing census data are available.

Accurate information on the occupancy rates for the various types of overnight recreational units was more problematical. While more is known about occupancy rates for motel units and campsites, relatively little is known about occupancy of private seasonal housing units and marina boat slips. A benchmark survey could identify differences in occupancy rates between coastal and sound counties and between types of housing units. Survey data would also serve to define the length of the recreational season, and variations in occupancy rates within the recreational season.

The third element in applying the housing unit methodology is data on the average size of the recreational party. While limited evidence suggests that there is considerable variation in average party size between private seasonal units, motel units, and campsites, there is no research describing party size for marina activity. A benchmark survey would provide party size data for each type of recreational housing unit, including differences between rental and owner occupied private seasonal housing. Additionally, differences between coastal and sound counties could be highlighted.

As this research has highlighted the magnitude and diversity of overnight recreational activity in the A/P Study study area, we have raised questions about the economic impact of such activity. While available evidence suggests the impact is enormous in coastal counties such as Carteret and Dare, there has been little research to measure the impact of each sector of the overnight recreational infrastructure. While growth in private housing and motels has led the way in the coastal counties, marina activity and private housing have led the way in the sound counties. Research should focus on the direct and indirect economic impacts during both the construction and operational phases for each sector of recreational activity. Of special interest will be differences between the fast paced recreational development of the coastal counties and the slower growth of the sound counties.

In conclusion, this work serves as a starting point in monitoring the population growth occurring in the A/P Study counties. The data base can be updated by identifying subsequent changes in each element of the recreational infrastructure, and strengthened by filling in the knowledge gaps about the demography and economics of recreation outlined above.

INTRODUCTION

In this project we characterize baseline demographic data for the 33 county North Carolina portion of the Albemarle-Pamlico Estuarine Study (A/P Study) area. The research presents an attempt to use secondary data sources to provide a set of valid and reliable population estimates that will be useful to managers. At the same time we want to provide a basis for updating these estimates on an annual basis. The results represent a first step toward developing a demographic data base capable of forecasting population shifts likely to occur in the near and more distant future.

In this chapter, we first provide a background for understanding the social and economic development taking place within the region defined by the Albemarle and Pamlico Sounds. Second, we briefly review the methodologies that can be used in estimating populations. Third, we present the framework used in developing the data base describing the changes in the housing infrastructure and population taking place in the study area.

Background

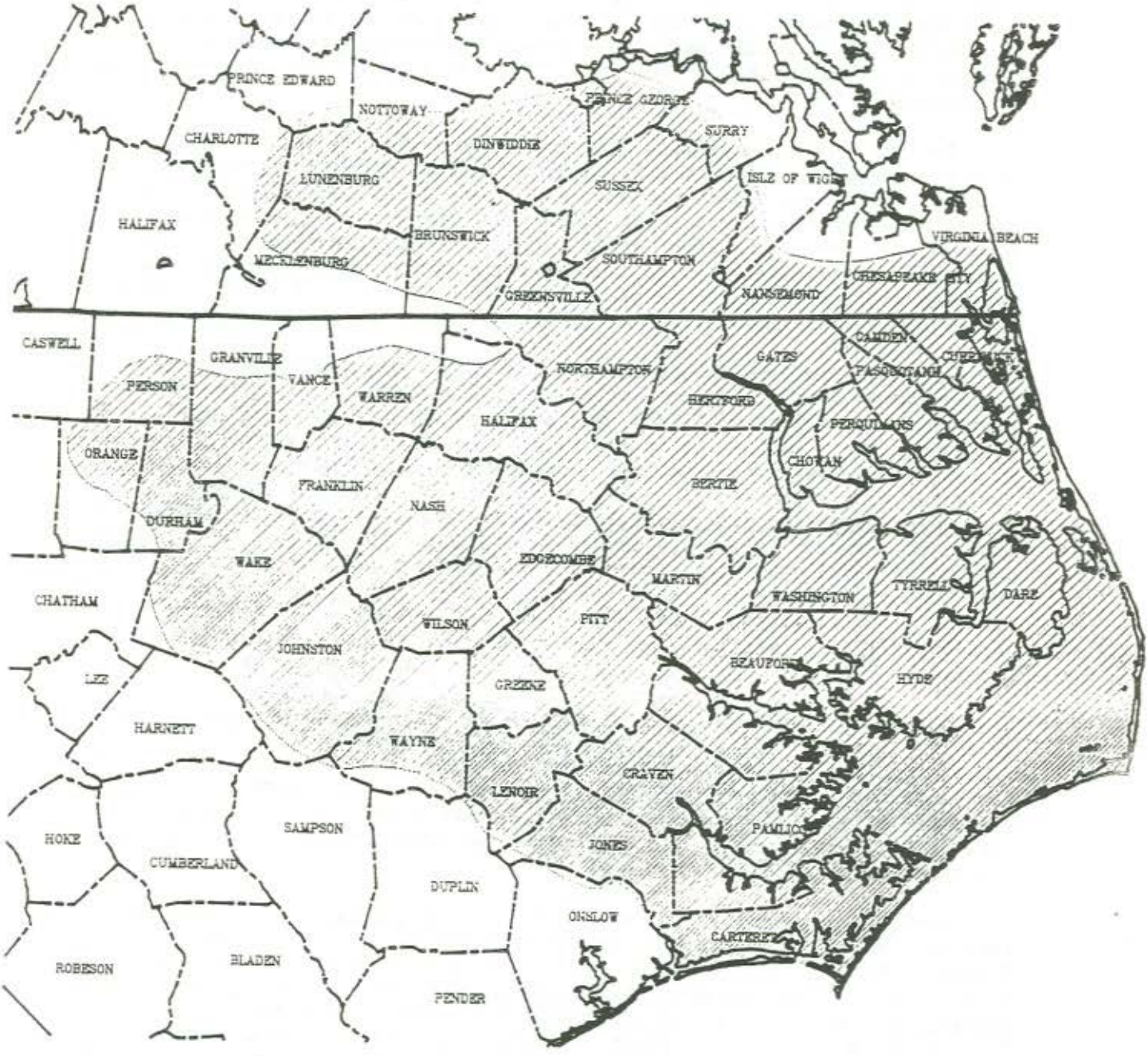
The A/P Study area covers 33 counties in eastern North Carolina and 14 counties in southeastern Virgina. A map of the entire Albemarle-Pamlico Estuarine Study is provided in Figure 1. The present analysis focuses on the North Carolina portion of the A/P Study are.

The 33 counties which comprise the North Carolina portion of the A/P Study area are best characterized as nonmetropolitan. The only exceptions are Wake county in the western part of the study area and Currituck county which is part of the Norfolk-Virginia Beach MSA. For the largest part of this century, the overwhelming majority of these nonmetropolitan counties had experienced little if any population growth. The pattern for coastal North Carolina was similar to that for nonmetropolitan America in general. Likewise, the population turnaround in nonmetropolitan America which began in the mid-1960s (Wardell and Brown, 1980), extended to coastal North Carolina by the early 1970s and was the result of changing rates of natural increase and migration. Net migration is the principle component of the basic social and economic changes occurring in the 1970s and 1980s (Goldstein, 1976; Long and Hansen, 1977).

The explanations for the turnaround in migration for nonmetropolitan areas, and the associated growth of rural areas, vary by region, and include: (1) the trend of industrial decentralization, (2) the demand for energy extraction, (3) the expansion of military installations and colleges and universities, and (4) the development of retirement and recreation centers (McCarthy and Morrison, 1979). Remarkably, the A/P Study area incorporates three of the four cited reasons for the nonmetropolitan turnaround. Of particular interest is the scope of the growth in recreational activity in the counties bordering the Albemarle and Pamlico Sounds.

Figure 1.

ALBEMARLE - PAMLICO ESTUARINE STUDY AREA



Scale 1:1,900,000

April 1989

North Carolina
and Resources Information Service

BOUNDARY AND HYDROGRAPHY DATA ACQUIRED FROM
USGS DIGITAL LINE GRAPHS, 1:2,000,000-SCALE.

Traditional economic theories of growth and development distinguish between basic activities, which bring commerce into the community by marketing goods and services to populations outside the community, and nonbasic activities, whose goods and services are consumed within the confine of the community (Berry and Norton, 1970; Murphy, 1974). Traditionally, primary activities such as agriculture, forestry, and mining, and secondary activities such as manufacturing have been viewed as the usual basic activities for rural development. The development of recreation as a basic activity represents a trend that has expanded as part of the nonmetropolitan turnaround of the last two decades. This latter pattern of growth represented by recreation is related to an intangible export, i.e., the image of the region itself (Dailey and Campbell, 1980).

The image of a nonmetropolitan area as a desirable recreational site is related to a combination of physiographic characteristics (topography, climate, water, resources, forests, etc.) and, as indicated above, the recreational opportunities these attributes make possible. Increases in disposable income, the amount of leisure time, and improvements in the transportation infrastructure (e.g., interstate highways and airports) have combined to make recreational sites in once isolated rural areas accessible. Recreational development forms a significant base for nonmetropolitan growth.

Although the development of the demographic data base for the Albemarle-Pamlico Sound area would seem rather straightforward using census data sources, virtually all U.S. Census population data refer to <u>permanent residents</u>, i.e., people for whom a particular community is their usual place of residence. What is unique about the study area is that in addition to the permanent population, there exists in specific locations a significant <u>temporary population of tourists</u>. Anyone who has spent a summer weekend at Nags Head, Emerald Isle, or Oriental, knows these communities have large numbers of people who live there for a few days, weeks, or months of the year. This temporary population often has a tremendous impact on the demand for housing, food services, health care, water, electricity, waste disposal, police and fire protection, and many other public and private goods and services.

To measure the total population size of the recreation based communities, an estimate of the temporary population must be added to the permanent population. The presence and importance of recreational based development and its associated temporary populations in many of the A/P Study counties presented an unusual data challenge. The methods for measuring temporary populations, particularly in nonmetropolitan areas recreational settings, have not been systematically developed.

Recreational populations are by definition <u>migrant</u> populations resulting from the temporary movement of people into and out of host communities. Conceptually, recreational populations can be separated into two basic categories, the <u>day recreational population</u> and the <u>overnight recreational population</u>. The day recreational population, usually measured in terms of "visitor days", refers to people who enter and leave the host community in the same day. The overnight recreational population refers to people who spend one or more nights in the host community. Although both categories of recreational population are important, this project has focused on the overnight

recreational population. The justification for this focus is found in the recreation literature.

Bryant and Napier's (1981) review of the literature on the socio-economic impact of outdoor recreation development shows that the effects of day populations on local and regional income and employment tend to be minimal. The study sites for most recreational development research have been nonmetropolitan state and local parks and reservoirs. The common methodological approach to evaluating the economic impact of recreational activity has been based on the concept of "visitor days" as a measure of recreation and the application of per capita expenditures to the visitor population.

Frick and Ching (1970) in a study of the local impacts of a state park conclude that the annual local income generated by 125,000 park users was equivalent to that which would be expected from 12 permanent families. Similarly, Garbacz (1971) in a study of growth due to recreational activity in the Ozarks found that the most significant gains came from recreational home construction associated with a lake development project. The recreational development produced economic and employment growth as well as significant tax base gains. Such findings have led several authors to suggest that recreational home construction should be encouraged as an integral part of rural recreational development programs (Dwyer and Epseth, 1977; Frick and Ching, 1970; Barrows and Wilseatuen, 1974, Duvalis, et. al., 1974).

In developing estimates of temporary populations, a series of conclusions can be drawn from the limited research on nonmetropolitan recreational development. First, overnight populations are the most important of the temporary populations. Second, temporary populations are best expressed as net rather than gross populations, e.g., one full-time permanent resident equals twelve one-month temporary residents. Third, the size of the overnight temporary population is directly related to the housing capacity of a community, i.e., a given type of housing unit occupied by numerous households during a year is equivalent to one net household for the year. Fourth, by analyzing rates of change in the housing stocks we can forecast future growth in the temporary population size.

Population Estimation Methods

There are five common ways of estimating a population. These are the censal-ratio method, component method II, the administrative-records method, the ratio-correlation method, and the housing-unit method (Smith, 1987; Raymondo, 1989). The decision as to which method to use is related to the particular characteristics of the population and the type of data available for making the estimates. In this project, we need to make two types of estimates. First, we need postcensal estimates of the permanent year-round population. Second, we need to estimate the temporary population for both census years and postcensal years.

The censal-ratio method is used to compare the population of an area from the most recent census with variables that change as the size of the population changes. Examples of variables that are related to population change include births, deaths, motor-vehicle registrations and school enrollments.

The weakness of the censal-ratio method is that its accuracy declines over time.

Component method II and the administrative records method divide population growth into its components of change, i.e., births, deaths, and migration. The estimated population is equal to the most recent census enumeration, plus births, minus deaths, and plus or minus migration. The difference between the two methods is in the way that migration is estimated. For component method II, migration is estimated using school enrollments and Medicare enrollments. For the administrative-records method migration is estimated using Medicare enrollments and income-tax returns. The weakness of these methods is related to the availability of income-tax data and the accuracy of school enrollment as a predictor of migration.

The ratio-correlation method uses multiple regression to mathematically compute a population estimate. In this approach, a group of independent variables predicts the value of a dependent variable, population. Examples of the variables that may be used include births, deaths, school enrollments, and voter registrations. This method is based on an analysis of the relationships between the variables between two previous censuses, a process which establishes a set of weights for each of the independent variables. These weights are then multiplied by the current value of each independent variable to produce the current population estimate.

The county level postcensal estimates of North Carolina's permanent, year- round population used in this project were prepared using the average of two methologies, i.e., the ratio-correlation method and the administrative records methods (N.C. Office of State Budget and Management, 1988).

Although each of these methods is appropriate to estimating the permanent population, they all prove to be of limited value in estimating recreational populations. Variables such as births, deaths, school enrollments, voter registrations, and Medicare enrollments have no relevance as indicators of recreational populations. However, the housing unit estimation method is applicable to recreational populations.

The basic premise of the housing unit method is that the residential population is equal to the number of occupied housing units multiplied by the average household size. This approach holds promise for recreational populations if we can identify and count the number of housing units, the occupancy rate, and average household size. The present work expands on our previous demographic work using census data on private housing to estimate temporary populations in the coastal area (Tschetter and Maiolo, 1983 and 1984) by identifying additional elements of overnight, recreational housing.

In using the housing unit approach we are actually estimating the potential recreational population. The actual size of the recreational population will vary considerably by season, and the maximum, potential population may be approached only for selected months (e.g., July and August) or dates (e.g., Memorial Day, Fourth of July, Labor Day). Managers must deal with this potential recreational population in planning and delivering services. The private, commercial sector takes the potential recreational population into account in its operations and hiring patterns.

Four types of housing units constitute the recreational infrastructure, i.e., private housing, motel/hotels, campgrounds, and marinas. Each of these elements is discussed separately. First, the specific steps in identifying the number of housing units, the occupancy rate, and the average household size are discussed. Second, the actual population estimates for each type of housing are presented. Finally, the four population estimates are combined into a set of summary estimates for the entire A/P Study area.

Study Area

The geographic area covered in the North Carolina portion of the Albemarle-Pamlico Estuarine Study has been defined as the Albemarle and Pamlico Sounds, including the drainage basins upstream to the first impoundments. The unit of analysis used to characterize the study area is the county. The study area, which includes a total of 33 North Carolina counties, is shown in Figure 2.

The fourteen counties which directly border on the Albemarle and/or Pamlico Sounds are broken into two categories. The four counties (Carteret, Currituck, Dare, and Hyde) which border the Atlantic Ocean and the Sounds are referred to as coastline counties. The remaining ten counties (Beaufort, Bertie, Camden, Chowan, Craven, Pamlico, Pasquotank, Perquimans, Tyrrell, and Washington) bordering the Sounds are referred to as sound counties.

The remaining 19 counties are included in the drainage basins for the Sounds. These counties include Edgecombe, Franklin, Gates, Granville, Greene, Halifax, Hertford, Johnston, Jones, Lenoir, Martin, Nash, Northampton, Pitt, Vance, Wake, Warren, Wayne, and Wilson. These counties are referred to as the drainage basin counties.

The distinction between coastline, sound, and drainage basin counties is shown in Figure 3. The substantive merit of this classification scheme is based on our discussion of recreational activity. While coastline and sound

Table 1. North Carolina Albemarle-Pamlico Estuarine Study Counties.

Coastline	Sound	Drainage Basin	
Carteret	Beaufort	Edgecombe	Martin
Currituck	Bertie	Franklin	Nash
Dare	Camden	Gates	Northampton
Hyde	Chowan	Granville	Pitt
	Craven	Greene	Vance
	Pamlico	Halifax	Wake
	Pasquotank	Hertford	Warren
	Perquimans	Johnston	Wayne
	Tyrrell	Jones	Wilson
	Washington	Lenoir	

Figure 2. North Carolina Ablemarle–Pamlico Estuarine Study Area.

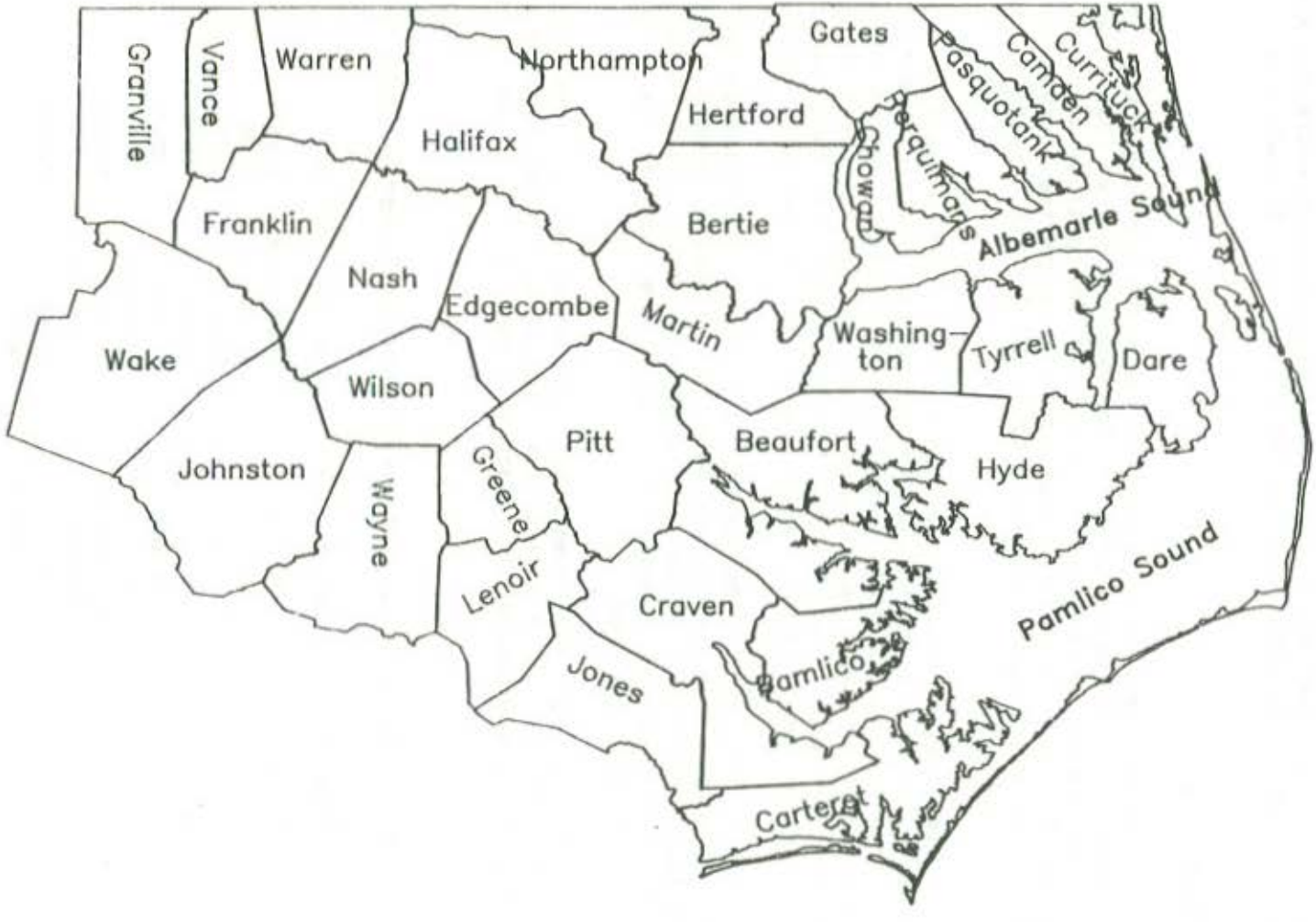
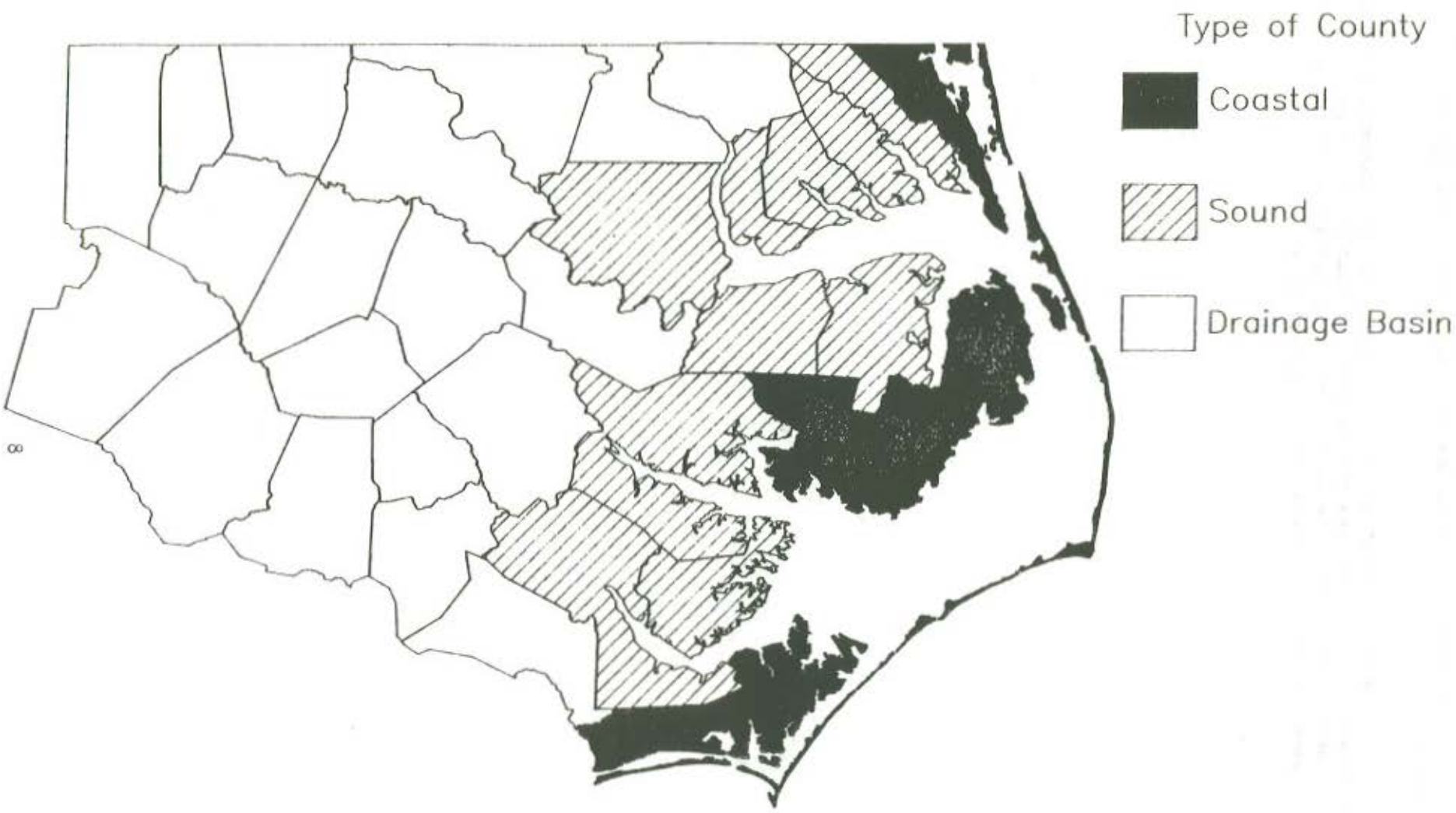


Figure 3. Coastal, sound, and drainage basin counties, APES study area.



counties both have water-related development, the access to Atlantic Ocean makes the coastline counties the most desirable sites for recreational activity.

The housing, population, electric utility, and economic data used to characterize A/P Study area are reported by county. The time frame for the data uses census years. The most recent year for reporting data is 1987, the last year for which complete data were available.

PRIVATE HOUSING

Private housing in the form of single family homes, mobile homes and trailers, duplexes, apartments, and condominiums represents a singly important source of lodging for overnight recreational activity. In this chapter, we first discuss the housing, household, and population concepts used in measuring the private housing infrastructure and the specific methods used in developing the population estimates. Second, the results of the analysis are presented.

Methodology

Our purpose in developing baseline data is to identify the different types of housing available in the A/P Study counties at specific points of time and the population associated with the different types of housing. To accomplish these tasks we used a combination of data sources. Based on the census classification of types of private housing, we distinguish between permanent, seasonal (recreational), and vacant housing units. For census years we used data from the decennial censuses of population and housing. For postcensal years we combined data from federal and state population estimates with data on residential utility customers.

Housing concepts. For this project we have divided private housing into two categories using census housing definitions. First, there are the housing stocks that are occupied on a year-round basis by the permanent population. Second, there are the housing stocks that are occupied on a seasonal basis. This seasonal housing includes that occupied by owners as second homes and that occupied by renters.

To develop the baseline inventory of a community's housing stocks we used census information on housing. Collected as part of the decennial census, the housing information starts with a pre-census listing of all housing units in the community. For census purposes a housing unit is a house, an apartment, a group of rooms, or a single room, occupied as separate living quarters, or if the unit is vacant, intended for occupancy as a separate living quarters. Thus for each county there is a single number that is the total number of housing units at the time of the census.

Within the census, units are separated into occupied housing units and vacant housing units. A housing unit is classified as occupied if it is the usual place of residence of the person or group of persons living in it at the time of census enumeration. The people occupying a housing unit are called a household. If all the persons staying in a unit at the time of the census have their usual place of residence elsewhere, the housing unit is classified as vacant.

Vacant housing units are especially important in measuring the housing stocks for overnight recreational activity. Two types of vacancy status are particularly important, i.e., "seasonal" and "units held for occasional use".

First, the census classifies some vacant housing units as "seasonal". One type of seasonal units are those intended for occupancy during only certain seasons of the year. They include units intended for recreational use such as beach cottages, apartments, and condominiums. Units classified as "seasonal" are not considered as year-round housing units. The other type of seasonal units are vacant units held for migratory farm labor employed during the crop season. For this project, we are assuming that the overwhelming majority of seasonal units in the coastline and sound counties are in fact recreational units.

The second type of vacant housing designated as recreational is year-round units classified as "held for occasional use". These are year-round units which are used for weekend or other occasional use throughout the year. Shared ownership or time-sharing condominiums are classified as held for occasional use. Also, housing units reserved by their owners as second homes usually fall into this category.

Taken together, "seasonal" and units "held for occasional use" constitute the baseline estimate of private recreational housing available in a community. Included within this housing are the cottages, duplexes, apartments, and condominiums advertised and offered for rent by the management companies operating within the coastal counties, especially the four coastline counties. We expect that the proportion of a community's housing classified as recreational should vary considerably from county to county.

The occupied housing units and the vacant "recreational" units do not exhaust the total housing units within a community. There are the "other vacant" units. These units include vacant year-round units being offered for sale or for rent. Finally, the remaining units which do not fall into any of the above categories are classified as "other" vacant year-round units. The other vacant category represents the "surplus" housing that exists within any community. In fact we would expect that proportion of a community's housing that is so classified should vary from county to county.

Household concepts. The census concepts connecting housing and population data are the housing unit and the household. The person or persons occupying a housing unit constitute a household. The household and housing unit are equivalent concepts and this relationship is used in estimating change in the number of permanent, occupied housing units and in estimating the recreational population

Given our focus on total population, there are two types of households, i.e., "permanent" (census) households and "seasonal" households. Permanent households include the population in occupied, year-round housing units. Seasonal households occupy the recreational housing units identified from the census of housing. To make census and postcensal estimates of the size and change in permanent and recreational populations we need data on the average household size of permanent and recreational households.

Data for North Carolina indicate the average size of the permanent population household is declining. From the 1980 census the average size of a household was 2.78 persons. Postcensal estimates of household size made by federal and state agencies indicate the average size of the North Carolina

household declined to 2.64 persons in 1985, 2.62 persons in 1986, and 2.60 persons in 1986. This represents a decline of 6.5 percent between 1980 and 1987.

For postcensal estimates of the number of permanent, occupied housing units, county level estimates of the average size of households are necessary. These estimates are only available for 1985 from the Current Population Report series. These 1985 county level estimates of household size are combined with 1987 population estimates to provide an estimate of the number of households (permanent, occupied housing units) by county in 1987.

The second type of household is the seasonal or recreational household. Estimates of the average size of recreational households are not readily available. In their visitor survey of the Outer Banks, Perdue and Coughlin (1987) developed an estimate of the average party size for rental cottages of 5.9 persons.

The 5.9 persons average for cottage households is almost twice the average family household size of 3.24 people reported for the North Carolina population in the 1980 Census. This supports an argument that the rental recreational household is usually comprised of more than one family unit. Further support comes from the brochures prepared by management companies to advertise cottages, duplexes, and condominiums. Examples of the advertising include statements such as "4 BR SLEEPS 12" or "2 BR SLEEPS 7".

While the preceding does offer some evidence that the 5.9 persons average may apply to coastline counties with large rental markets such as Dare, Carteret, and Hyde, the figure seems unrealistically high for owner occupied recreational households. Such owner occupied recreational households are more likely to include only a single family and the average party size figure for such households should be closer to the census figure for family households, i.e., 3.3 persons.

There is no empirical way to establish an accurate measure of the average party size in recreational communities which have a large number of rental housing units in addition to the owner occupied recreational units. The summary estimate of the average party size for recreational housing must balance the rental and owner occupied segments. For this project we will assume that the average party size for recreational housing in Carteret, Dare, and Hyde Counties is 4.5 persons.

The six remaining A/P Study counties with over 10 percent of their housing designated as recreational do not contain large rental markets for recreational housing. Rather, these units are more accurately described as owner occupied during peak season months. The Albemarle and Pamlico Sound counties included are Currituck, Beaufort, Pamlico, Perquimans, and Tyrrell. Warren County, a drainage basin county, contains Lake Gaston and has 14.9 percent of its housing designated as recreational. The average household size used for these counties is the census family household average of 3.3 persons.

Population estimates. The final stage in working with private housing and population data was to develop a census year estimate of the overnight recreational population and postcensal estimates of population and housing for 1987.

Four separate estimates were needed.

For housing, the needed estimates include the number of permanently occupied housing units and the number of seasonal housing units for 1987. For population, the needed estimates include the size of the permanent population in 1987 and the size of the overnight recreational population for 1980 and 1987. The procedures employed to develop these estimates combined federal and state estimates of the permanent population, federal estimates of average household size, and electric utility data.

The initial step is the development of county level estimates of the permanent population. State and county population estimates are developed annually by the U.S. Bureau of the Census in cooperation with the North Carolina Office of State Budget and Management. The county level population estimates for 1987 are used.

The second stage is the development of county level estimates of the number of households. County population estimates are combined with county level estimates of average household size. As previously mentioned, the best available county level estimates of average household size are those developed by the Census Bureau for 1985. The population estimate is divided by average household size to produce an estimate of the number of households in each county. The number of households represents the number of occupied, year-round housing units located in each county (1).

$$\frac{\text{1987 population estimate}}{\text{1985 average household size}} = \text{1987 estimated households} = \text{1987 estimated occupied housing units} \quad (1)$$

The third stage is the development of a postcensal estimate of the number of seasonal housing units in the coastline counties, sound counties, and those counties with more than 5 percent of their housing categorized as recreational. The number of seasonal units is the difference between the total number of housing units and the number of occupied housing units (households) minus the number of vacant units. To develop the seasonal housing estimate we needed data to estimate the rate of change in the total number of housing units and the vacancy rate for each county.

The best available approach to measuring the increase in the total number of housing units involved using rates of change in the number of residential electric meters in each county. While electricity is the only utility that all housing units have, several questions had to be answered before finally deciding to use electric meters.

First, investigation indicated that the use of a single meter for multiple housing units is rare. Contact with condominium developments in Carteret and Dare Counties indicated that condominium units are singly metered. If anything, the number of electric meters may somewhat underestimate the total number of housing units.

Another question focused on seasonal variation in the number of electric meters. Discussion with utility company representatives revealed that while

there is some seasonal variation in the number of meters, a majority of households pay a minimal utility fee each month rather than paying larger disconnection and connection fees with the change in seasons. Additionally, since we were interested in using the rate of change in electric meters over the seven year period (1980-1987), intra-year fluctuations were not as important as inter-year shifts.

Investigation revealed that most counties were served by more than one utility company and that individual utility companies frequently served more than one county. The relevant utility companies were able to provide a breakdown by county of the number of residential electric meters in their service area. The data were collected for 1980 and 1987. County by county breakdowns for the years prior to 1980, (e.g., for 1970) were unavailable from many of the utility companies.

There are three types of utility companies serving the area. First, there are two large companies serving the area, i.e., Carolina Power and Light and North Carolina Power. Second, there are the electric membership corporations which generally serve several counties. Finally, there are municipal utility services which are generally restricted to single counties. A list of the utility companies serving each county is provided in Appendix A.

Two steps were used to estimate the total number of housing units in 1987. First, we estimated the increase in housing units by multiplying the total housing units in 1980 by the rate of change in electric meters between 1980 and 1987 (2). Second, we added the increase in housing units to the total housing units in 1980 (3).

1980 total housing units	X	percent change electric meters 1980-1987	=	estimated change total housing units 1980-1987	(2)

1980 total housing units	+	estimated change total housing units 1980-1987	=	1987 estimated total housing units	(3)

Next, we needed to estimate the number of vacant units (for sale or rent, etc.) for each county. We assumed that all counties had a vacancy rate of 8 percent. The total estimated number of housing units was multiplied by the vacancy rate to estimate the total number of vacant housing units (4).

1987 estimated total housing units	X	1987 estimated vacancy rate	=	1987 estimated vacant housing units	(4)

Finally, the number of seasonal housing units is estimated by subtracting the number of households and the number of vacant housing units from the estimated total housing units (5).

1987 estimated total housing units	-	1987 estimated households	-	1987 estimated vacant housing units	=	1987 estimated seasonal units	(5)

The final step is to develop estimates of the overnight recreational population in seasonal housing units for 1980 (census year) and 1987 (postcensal year). The basic formula used multiplied the number of seasonal housing units by the average size of the recreational household (6). As mentioned previously, there were two estimates of the average size of recreational households. For the coastline counties of Carteret, Dare, and Hyde, the estimated size was 4.5 persons. For the sound counties and the drainage basin counties of Northhampton and Warren, the estimated household size was 3.3 persons.

estimated seasonal housing units	X	average recreational household size	=	estimated overnight recreational population	(6)

Findings.

Census year. Although the population of the total study area grew by 3.8 percent during the 1960s, 22 of the 33 counties lost population during the decade. The largest population losses (> 10 percent) were found in primarily agricultural counties (Bertie, Greene, Jones, Northhampton, Tyrrell, and Warren). Of the four coastline counties only Hyde lost population (-3.4 percent).

Among the counties experiencing population growth during the 1960s, Wake County (Raleigh SMSA) led the way with a 35.1 percent increase. The only other county with a double digit increase was Dare County with a gain of 17.9 percent. The other coastline counties experienced modest increases. Carteret County grew by 2.1 percent and Currituck County grew by 5.7 percent. Of the remaining 9 counties directly bordering the Albemarle and Pamlico Sounds, only Craven and Pasquotank experienced population gains during the 1960s. Both counties contained small cities and military installations.

When compared to the 1960s, the decade of the 1970s marked a period of dramatic growth in the 33 counties in the A/P Study area. The 15.4 percent growth rate for the A/P Study counties represents a fourfold increase over the 1960s rate. The inter-decade changes in the population growth rates were even more spectacular when individual counties are examined.

Fourteen of the A/P Study counties had growth rates greater than 10 percent. The coastline counties of Dare (91.2 percent), Currituck (58.9 percent), and Carteret (30.0 percent) were among the fastest growing of North Carolina's counties. Although the coastline county of Hyde grew by only 5.4 percent, it was the first time in this century that Hyde had gained population due to net migration. The Raleigh metropolitan area, Wake County, grew by 31.9 percent during the 1970s.

Over all only three counties experienced population loss during the decade. Hertford County experienced a loss of 0.7 percent, Jones County experienced a loss of 0.8 percent, and Northampton County experienced a loss of 5.9 percent.

Another way of examining population shifts during the 1970s is to compare

Table 2. Total population and percent change by county, 1960, 1970 and 1980.

County	Total Population 1960	1970	1980	Percent Change 60-70	70-80
Carteret	30940	31603	41092	2.1	30.0
Currituck	6601	6976	11089	5.7	58.9
Dare	5935	6995	13377	17.9	91.2
Hyde	5765	5571	5873	-3.4	5.4
Beaufort	36014	35980	40355	-0.1	12.2
Bertie	24350	20477	21024	-15.9	2.7
Camden	5598	5453	5829	-2.6	6.9
Chowan	11729	10764	12558	-8.2	16.7
Craven	58773	62554	71043	6.4	13.6
Pamlico	9850	9467	10398	-4.2	9.8
Pasquotank	25630	26824	28462	4.7	6.1
Perquimans	9178	8351	9486	-9.0	13.6
Tyrrell	4520	3806	3975	-15.8	4.4
Washington	13488	14038	14801	4.1	5.4
Edgecombe	54226	52341	55988	-3.5	7.0
Franklin	28755	26820	30055	-6.7	12.1
Gates	9254	8524	8875	-7.9	4.1
Granville	33110	32762	34043	-1.1	3.9
Greene	16741	14967	16117	-10.6	7.7
Halifax	58956	53884	55286	-8.6	2.6
Hertford	22718	23529	23368	3.6	-0.7
Johnston	62936	61737	70599	-1.9	14.4
Jones	11005	9779	9705	-11.1	-0.8
Lenoir	55276	55204	59819	-0.1	8.4
Martin	27139	24730	25948	-8.9	4.9
Nash	61002	59122	67153	-3.1	13.6
Northampton	26811	24009	22584	-10.4	-5.9
Pitt	69942	73900	90146	5.7	22.0
Vance	32002	32691	36748	2.2	12.4
Wake	169082	228453	301327	35.1	31.9
Warren	19652	15810	16232	-19.5	2.7
Wayne	82059	85408	97054	4.1	13.6
Wilson	57716	57486	63132	-0.4	9.8
TOTAL	1146753	1190015	1373541	3.8	15.4

source

Census of Population, 1980 Bureau of the Census, U.S. Department of Commerce, (PC80-1-B35), Table 14.

changes in the number of households and the number of housing units. As previously discussed, total households represent the number of occupied year-round housing units. The total housing units represent the number of occupied units plus the seasonal units and vacant units. Data from the 1970 and 1980 population and housing censuses are presented in Table 3.

Examination of the data reveals that all 33 counties experienced positive growth in both the number of households and the total number of housing units. The ranking of counties by their growth rates generally follows the rankings for population growth. Dare County had the highest growth rates, followed by Currituck County, Carteret County, Wake County, and Pitt County.

Another way of looking at the data is to compare the two rates for each county. In general the rates of change for households and housing units are within 3 percentage points of each other. However there are notable exceptions to this finding. In several instances the growth rate in total housing units is significantly greater than that for households (> than 10 percentage points), and in one instance households grew significantly faster than the number of housing units (> than 10 percentage points).

In Carteret County, the growth rate for housing units was 35.3 percentage points greater than the rate for households. Other counties with a difference of greater than 10 percentage points comparing housing units to households include Warren (23.2 percentage points), Currituck County (17.5 percentage points), Hyde County (15.2 percentage points), Pamlico County (13.2 percentage points), Perquimans County (12.8 percentage points), and Northampton County (12.3 percentage points).

The explanation for such differences is that the number of seasonal and/or vacant units had to grow faster than the number of households. Seasonal units and vacant units held for occasional use have been designated as recreational units. Thus the indication is that the recreational component of the private housing stocks grew during the decade. We can check this interpretation by examining the counties' detailed housing characteristics for 1980.

As shown in Table 4, housing units are broken down into occupied units, recreational units, and other vacant units. For the 33 county area, 7.4 percent were classified as "other vacant". Closer examination of this category reveals that 29 of the counties fell within ± 2 percentage points of the 7.4 percent vacancy rate. The exceptions were Northampton, Jones, Warren, and Hyde Counties. Northampton and Jones Counties experienced population decline during the 1970s, and Warren County had the second lowest growth rate during the decade. While the rate for Hyde County does not seem consistent with its status as a coastline county, the vacancy rate probably applies to the mainland portion of the county as opposed to Ocracoke Island.

We also want to examine the designation of "recreational units". As shown in Table 4, almost five percent of the housing units in the A/P Study area were classified as recreational. Closer examination of individual counties clearly reveals the magnitude of private recreational housing in the coastline counties. Dare County led with 44.7 percent of its housing meeting the criteria for classification as recreational units. Carteret County has 27.2 percent designated recreational, followed by Currituck County with 21.0 percent

Table 3. Households, housing units and percent change by county, 1970 and 1980.

County	Households 1970	Households 1980	Percent Change	Housing Units 1970	Housing Units 1980	Percent Change
Carteret	9997	15128	51.3	12720	23740	86.6
Currituck	2164	3897	80.1	2735	5405	97.6
Dare	2465	5359	117.4	5057	11006	117.6
Hyde	1604	2029	26.5	2002	2836	41.7
Beaufort	11030	14253	29.2	13015	17172	31.9
Bertie	5664	6897	21.8	6640	7902	19.0
Camden	1596	1931	21.0	1747	2148	23.0
Chowan	3171	4350	37.2	3614	5265	45.7
Craven	17543	23499	33.9	18973	25549	34.9
Pamlico	2886	3678	27.4	3563	5011	40.6
Pasquotank	7952	9723	22.3	8634	10502	21.6
Perquimans	2500	3283	31.3	2894	4170	44.1
Tyrrell	1128	1381	22.4	1371	1766	28.8
Washington	3810	4729	24.1	4243	5432	28.0
Edgecombe	14709	18397	25.1	16071	20278	26.2
Franklin	7622	9983	31.0	8242	11154	35.3
Gates	2396	2889	20.6	2622	3224	23.0
Granville	8294	10445	25.9	8970	11563	28.9
Greene	3915	5059	29.2	4707	5588	18.7
Halifax	15036	18286	21.6	16281	20296	24.7
Hertford	6553	7499	14.4	7064	8259	16.9
Johnston	19190	25157	31.1	21023	27961	33.0
Jones	2679	3203	19.6	3027	3655	20.7
Lenoir	15941	20674	29.7	17289	22563	30.5
Martin	7019	8615	22.7	7601	9319	22.6
Nash	17331	23470	35.4	18512	25719	38.9
Northampton	6214	7097	14.2	6892	8721	26.5
Pitt	20914	30198	44.4	22874	32973	44.2
Vance	9406	12239	30.1	10099	13808	36.7
Wake	67533	106525	57.7	71181	113372	59.3
Warren	4339	5257	21.2	4855	7010	44.4
Wayne	23829	32300	35.5	25370	35032	38.1
Wilson	16709	21549	29.0	17846	23447	31.4
TOTAL	345139	468978	35.9	377698	531846	40.8

Source

Census of Population, 1980, Bureau of the Census, U.S. Department of Commerce, (PC80-1-B35), Table 14. Census of Housing, 1980 Bureau of the Census, U.S. Department of Commerce, (PC80-1-A35), Table 1.

Table 4. Housing characteristics by county, 1980.

County	Total Units	Occupied Units	Recreational Units: Seasonal	Recreational Units: Occasional Use	Recreational Units: Pct.	Other Vacant: No.	Other Vacant: Pct.
Carteret	23740	15128	3072	3376	27.2	2164	9.1
Currituck	5405	3897	689	445	21.0	374	6.9
Dare	11006	5359	4894	28	44.7	725	6.6
Hyde	2836	2029	256	220	16.8	331	11.7
Beaufort	17172	14253	1380	435	10.6	1104	6.4
Bertie	7902	6897	163	148	3.9	694	8.8
Camden	2148	1931	1	82	3.9	134	6.2
Chowan	5265	4350	466	36	9.5	413	7.8
Craven	25549	23499	101	121	.9	1828	7.1
Pamlico	5011	3678	906	61	19.3	366	7.3
Pasquotank	10502	9723	94	46	1.3	639	6.1
Perquimans	4170	3283	359	232	14.2	296	7.1
Tyrrell	1766	1381	186	27	12.1	172	9.7
Washington	5432	4729	169	52	4.1	482	8.9
Edgecombe	20278	18397	16	100	.6	1765	8.7
Franklin	11154	9983	23	144	1.5	1004	9.0
Gates	3224	2889	61	45	3.3	229	7.1
Granville	11563	10445	80	259	2.9	779	6.7
Greene	5588	5059	72	11	1.5	446	8.0
Halifax	20296	18286	225	169	1.9	1616	8.0
Hertford	8259	7499	109	58	2.2	593	7.2
Johnston	27961	25157	234	244	1.7	2326	8.3
Jones	3655	3203	12	40	1.4	400	10.9
Lenoir	22563	20674	95	118	.9	1676	7.4
Martin	9319	8615	22	102	1.3	580	6.2
Nash	25719	23470	67	96	.6	2086	8.1
Northampton	8721	7097	476	98	6.6	1050	14.7
Pitt	32973	30198	141	153	.9	2481	7.5
Vance	13808	12239	166	309	3.4	1094	7.9
Wake	113372	106525	90	386	.4	6371	5.6
Warren	7010	5257	520	525	14.9	708	10.1
Wayne	35032	32300	48	183	.6	2501	7.1
Wilson	23447	21549	53	133	.8	1712	7.3
TOTAL	531846	468979	15246	8482	4.5	39139	7.4

Source

Census of Housing, 1980 Bureau of the Census, U.S. Department of Commerce, (HC80-1-A35), Table 1 and Table 5.

Figure 4. Percent of private housing designated as seasonal, by county, 1980.

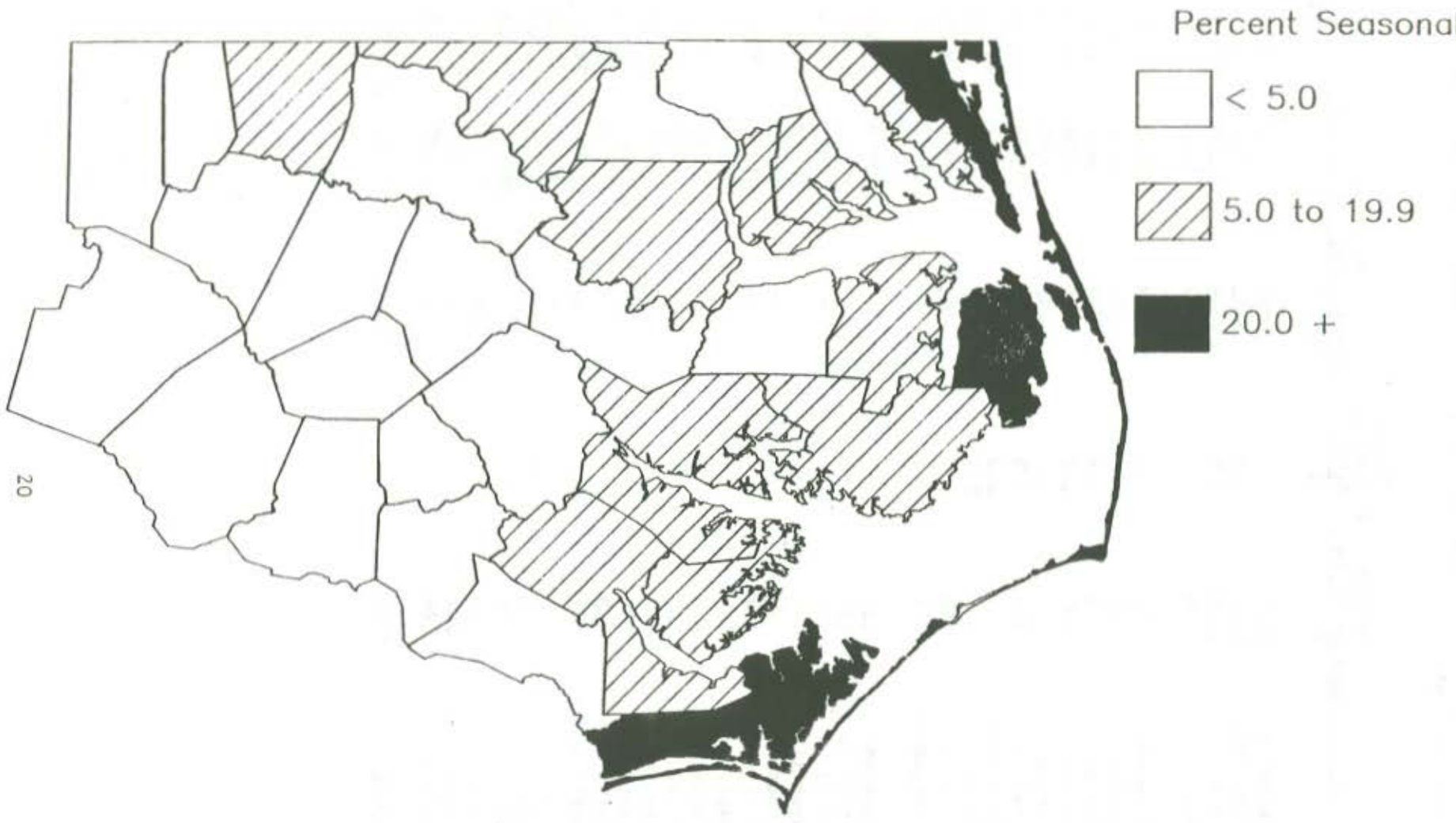


Table 5. Estimated population in private housing for recreational counties, 1980.

County	Seasonal Housing Units	Average Household Size	Population Recreational	Population Permanent	Population Total
	(1)	(2)	(1x2=3)	(4)	(3+4=5)
Carteret	6448	4.5	29016	41092	70108
Currituck	1134	3.3	3742	11089	14831
Dare	4922	4.5	22149	13377	35526
Hyde	456	4.5	2052	5873	7925
Beaufort	1815	3.3	5989	40355	46344
Bertie	311	3.3	1026	21024	22050
Camden	83	3.3	273	5829	6102
Chowan	502	3.3	1656	12558	14214
Craven	222	3.3	732	71043	71775
Pamlico	967	3.3	3191	10398	13589
Pasquotank	140	3.3	462	28462	28924
Perquimans	591	3.3	1950	9486	11436
Tyrrell	213	3.3	702	3975	4678
Washington	221	3.3	729	14801	15530
Edgecombe	116	--	--	55988	55988
Franklin	167	--	--	30055	30055
Gates	106	--	--	8875	8875
Granville	339	--	--	34043	34043
Greene	83	--	--	16117	16117
Halifax	394	--	--	55286	55286
Hertford	167	--	--	23368	23368
Johnston	478	--	--	70599	70599
Jones	52	--	--	9705	9705
Lenoir	213	--	--	59819	59819
Martin	124	--	--	25948	25984
Nash	163	--	--	67153	67153
Northampton	574	3.3	1394	22584	24478
Pitt	294	--	--	90146	90146
Vance	475	--	--	36748	36748
Wake	476	--	--	301327	301327
Warren	1045	3.3	3448	16232	19680
Wayne	231	--	--	97054	97054
Wilson	186	--	--	63132	63745
TOTAL	23728		77117	1373541	1450658

and Hyde County with 16.8 percent.

Five of the ten counties directly bordering the Albemarle and Pamlico Sounds had more than 5 percent of their housing designated as recreational. The counties included Beaufort, Chowan, Pamlico, Perquimans, and Tyrrell. Of the remaining counties in the study area only Northampton and Warren County had more than 5 percent of their housing categorized as recreational. Both Northampton and Warren Counties border Lake Gaston. Of these counties, we have previously identified Hyde, Pamlico, Perquimans, and Warren Counties as having experienced significant expansion in recreational housing during the 1970s.

These designated recreational housing units form the basis for estimating the overnight recreational population in private housing. However, to complete the estimates data are needed on the average size of the household party occupying rental recreational units and private recreational units. As previously discussed we assume an average household size of 4.5 persons per housing unit in Carteret, Dare, and Hyde Counties. For Currituck and the sound counties we assume an average household size of 3.3 persons.

As shown in Table 5, the counties of Carteret and Dare had the largest population in private housing in 1980. With an estimated 29,016 persons in renter and owner occupied recreational housing, Carteret County's population in private housing increased by 70.6 percent during peak seasonal times. With an estimated 22,149 persons, Dare County's population increased by 165.6 percent at peak times. Hyde County's population increased by 34.9 percent and Currituck County's population increased by 33.7 percent.

The population increases in the other counties with more than 5 percent of their housing designated as recreational were also significant. Chowan County showed the smallest increase at 13.2 percent. Beaufort County's increase was 17.1 percent. Pamlico County's population increased by 35.5 percent, and Perquimans County's population increased by 23.6 percent.

For the drainage basin counties bordering Lake Gaston, Warren County showed a population increase of 21 percent and Northampton County showed an increase of 8.4 percent.

Postcensal Year. An examination of population estimates presented in Table 6 indicates that 31 of the 33 A/P Study counties have grown during this decade. Four counties have grown by more than 20 percent and an additional 6 counties have grown more than 10 percent. There are several factors which can explain the pattern of population growth during the 1980s.

The growth in Carteret County (22.9 percent) and Dare County (33.1 percent) reflects the continuation of the well established trend of permanent population growth due to recreational and retirement development in the coastline counties. The population growth in Currituck County (23.4 percent) is a combination of recreational development and growth related to being part of the Norfolk-Virginia Beach metropolitan area. Interestingly, the remaining coastline county, Hyde, was one of only two counties in the study area experiencing population loss during the current decade.

Another group of counties with growth rates greater than 10 percent

included Wake County (24.3 percent) and its adjacent nonmetropolitan counties, i.e., Franklin (17.1 percent), Granville (12.3 percent), and Johnston (12.2 percent). With the 1990 census we expect these adjacent counties to be included as part of the Raleigh-Durham metropolitan area.

The remaining counties with growth rates of greater than 10 percent were Perquimans County (13.1 percent), Craven County (13.0 percent), and Pitt County (10.5 percent). Both counties contain growing small cities, i.e., New Bern and Greenville. In fact Greenville is expected to be designated as a metropolitan area with the 1990 census. Perquimans County, an entirely rural county, borders the Albemarle Sound and contains the small town of Hertford.

To identify the growth rate in the number of households during the 1980s, the 1987 population estimates were combined with the most recent (1985) county level census estimates of average household size. A significant part of household growth is due to a decline in the average size of households during the 1980s. The growth rate for households exceeded the growth rate for population with one exception. Only Hyde County experienced a decline in the number of households during the 1980s.

As shown in Table 7, the largest household growth rates were found in the coastline counties (Carteret, Currituck, and Dare), the metropolitan county of Wake and its adjacent nonmetropolitan counties (Franklin, Granville, and Johnston), and the nonmetropolitan counties of Craven and Pitt. In five of these high growth counties (Carteret, Dare, Craven, Granville, and Wake) the household growth rate exceeded the population growth rate by more than 10 percentage points.

The next step in developing estimates of the 1987 recreational housing stock was to use residential electric utility data as a measure of the rate of change in the total number of housing units in the coastline, sound, and recrea-tional counties. In Table 8, housing and household data for 1980 are combined with 1980 and 1987 residential utility data. The growth rates for electric meters and households (occupied housing units) between 1980 and 1987 are also presented.

In comparing data on housing and electric meters, it must be noted that housing data were as of April 1, 1980, while the utility data were as of December 31, 1980 and December 31, 1987. For all counties the counts of meters and housing units differed. For the total fifteen counties, the difference between the number of 1980 housing units and the number of electric meters was 1.2 percent.

For six counties the number of housing units was greater than the number of electric meters. In five of the counties the difference between housing units and electric meters was greater than 5 percent. These counties are Carteret (-12.6 percent), Currituck (-6.7 percent), Camden (-17.2 percent), Tyrrell (-16.6 percent) and Washington (-7.8 percent). However, in four of these counties the number of meters exceeded the number of occupied housing units. Only for Camden County does the number of meters exceed the number of occupied housing units. Of the 9 counties in which the number of electric meters exceeded housing units, in only one county, Hyde (9.2 percent), is the difference greater than 5 percent.

Table 6. Population estimate by county, 1987.

County	1980 Population	1987 Population Estimate	Percent Change 80-87
Carteret	41092	50485	22.9
Currituck	11089	13689	23.4
Dare	13377	19992	33.1
Hyde	5873	5796	- 1.3
Beaufort	40355	42754	5.9
Bertie	21024	21132	.5
Camden	5829	5984	2.7
Chowan	12558	13535	7.8
Craven	71043	80272	13.0
Pamlico	10398	10830	4.1
Pasquotank	28462	30466	7.0
Perquimans	9486	10725	13.1
Tyrrell	3975	4144	4.3
Washington	14801	14658	- 1.0
Edgecombe	55988	59127	5.6
Franklin	30055	35205	17.1
Gates	8875	9686	9.1
Granville	34043	38217	12.3
Greene	16117	16467	2.2
Halifax	55076	56586	2.7
Hertford	23368	23862	2.1
Johnston	70599	79234	12.2
Jones	9705	10090	4.0
Lenoir	59819	60341	0.9
Martin	25948	26815	3.3
Nash	67153	72344	7.7
Northampton	22195	22247	0.2
Pitt	90146	99601	10.5
Vance	36748	39127	6.5
Wake	301429	374582	24.3
Warren	16232	16560	2.0
Wayne	97054	98152	1.1
Wilson	63132	65304	3.4
TOTAL	1373541	1528009	11.2

Source

Census of Population, 1980, Bureau of the Census, U.S. Department of Commerce, PC80-1-B35, Table 14. "North Carolina Municipal Population, 1987", Management and Information Services, Office of State Budget and Management, Raleigh, North Carolina.

Figure 5. Estimated growth in year–round population, by county, 1980–1987.

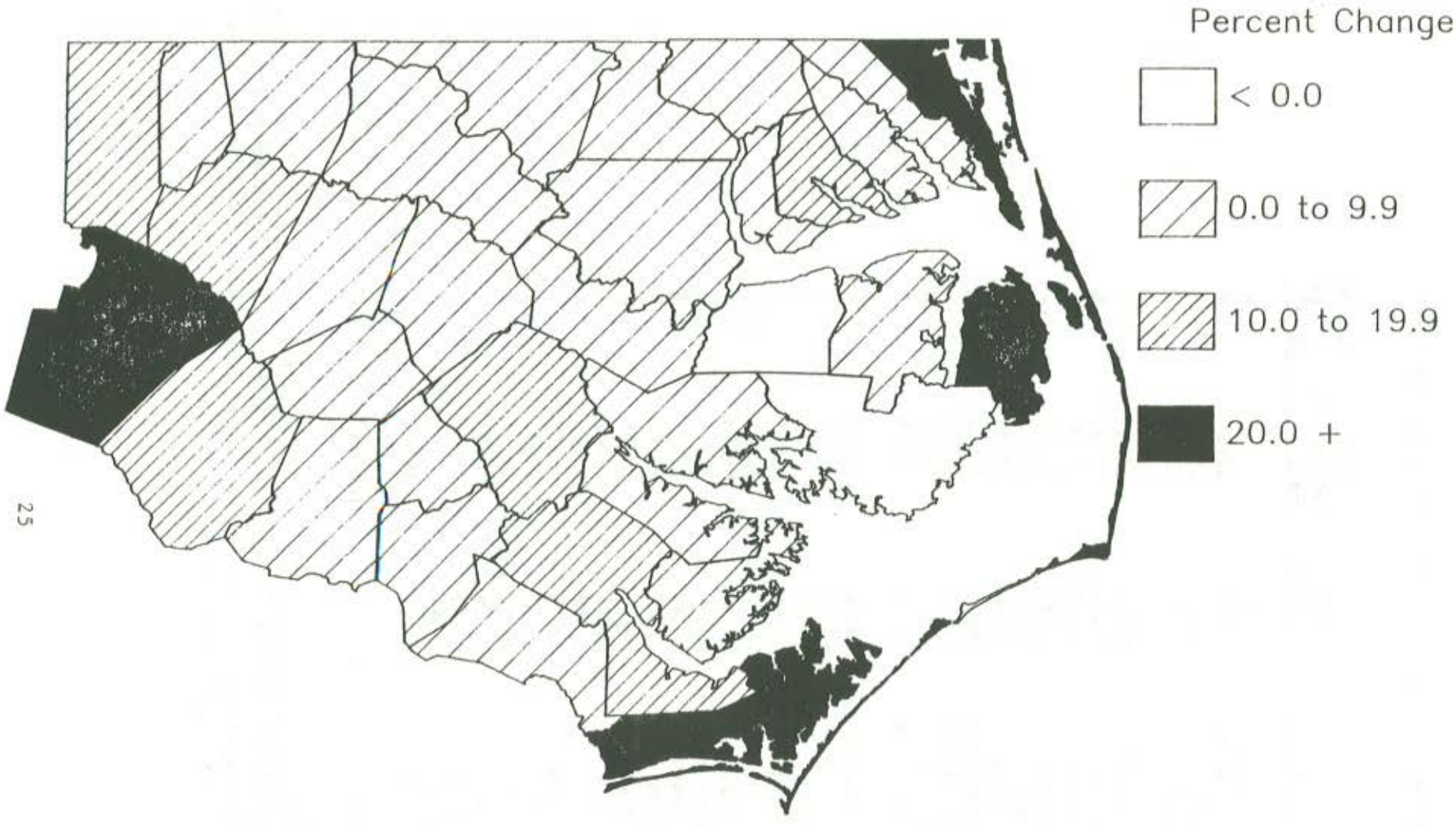


Table 7. Household estimates by county, 1987

County	1987 Population Estimate (1)	1985 Average Household Size (2)	1987 Households Estimate (1/2=3)	1980 Households (4)	Percent Change Households 80-87 (3-4/4=5)
Carteret	50485	2.49	20275	15128	34.0
Currituck	13689	2.66	5146	3897	32.0
Dare	19992	2.38	8400	5359	56.7
Hyde	5796	2.84	2041	2029	.5
Beaufort	42754	2.66	16073	14253	12.8
Bertie	21132	2.94	7188	6897	4.2
Camden	5984	2.87	2085	1931	7.8
Chowan	13535	2.78	4869	4350	11.9
Craven	80272	2.65	30291	23499	28.9
Pamlico	10830	2.66	4071	3678	10.7
Pasquotank	30466	2.63	11584	9723	19.1
Perquimans	10725	2.78	3858	3283	17.5
Tyrrell	4144	2.79	1485	1381	7.1
Washington	14658	2.96	4859	4729	3.5
Edgecombe	59127	2.84	20751	18397	12.8
Franklin	35205	2.79	12338	9883	24.6
Gates	9686	2.92	3270	2889	13.2
Granville	38217	2.82	12589	10445	23.1
Greene	16467	3.10	5108	5059	0.1
Halifax	56586	2.82	19789	18286	8.2
Hertford	23862	2.87	8028	7499	7.1
Johnston	79234	2.68	29491	25157	17.2
Jones	10090	2.86	3528	3203	10.1
Lenoir	60341	2.68	22065	20674	6.7
Martin	26815	2.89	9232	8615	7.2
Nash	72344	2.71	26566	23470	13.2
Northampton	22247	2.85	7613	7097	7.3
Pitt	99601	2.65	35440	30198	17.4
Vance	39127	2.65	14717	12239	20.2
Wake	374582	2.51	143584	106525	34.8
Warren	16560	2.93	5652	5257	7.5
Wayne	98152	2.72	35040	32300	8.5
Wilson	65304	2.70	23861	21549	10.7
TOTAL	1527554		560887	468978	19.6

Source

"Estimates of Households for Counties, 1985" Current Population Reports, Series P-25. "North Carolina Municipal Population, 1987" Management and Information Services, Office of State Budget and Management, Raleigh, North Carolina. Census of Population, 1980, Bureau of the Census, U.S. Department of Commerce, PC80-1-B35, Table 14.

Table 8. Housing units, occupied housing units, and residential electric utility meters for the coastline, sound, and recreational counties, 1980 and 1987.

County	1980 Housing Units	1980 Occupied Housing Units (Households)	RESIDENTIAL ELECTRIC UTILITIES 1980 Electric Meters	1987 Electric Meters	Percent Change Meters 80-87	Percent Change Households 80-87
Carteret	23740	15128	20282	29878	43.4	34.0
Currituck	5405	3897	5043	6650	31.9	32.0
Dare	11006	5359	11443	19429	69.8	56.7
Hyde	2836	2112	3098	3601	16.2	- 3.4
Beaufort	17172	14253	17755	20031	12.8	12.8
Bertie	7902	6897	8348	8816	5.6	4.2
Camden	2148	1931	1778	2053	15.5	8.0
Chowan	5265	4350	5325	6174	15.9	11.9
Craven	25549	23499	26221	32285	23.1	28.9
Pamlico	5011	3678	4985	5874	17.8	10.7
Pasquotank	10502	9723	10877	12232	12.5	19.6
Perquimans	4170	3283	4374	5104	14.3	17.5
Tyrrell	1766	1381	1472	1553	5.5	7.1
Washington	5432	4729	5009	5253	4.9	3.5
Northampton	8721	7097	9088	9797	7.8	7.3
Warren	7010	5257	7278	8430	15.8	7.5
TOTAL	143635	112544	142376	177164	24.4	18.7

Source

Census of Housing, 1980, Bureau of the Census, U.S. Department of Commerce, HC80-1-A35, Table 1.

Table 9. Estimated total housing units for coastline, sound and recreational counties, 1987.

County	1980 Total Housing Units (1)	Percent Change Electric Meters 80-87 (2)	1987 Estimated Total Housing Units ((1x2)+1=3)
Carteret	23740	43.4	34043
Currituck	5405	31.9	7129
Dare	11006	69.8	18688
Hyde	2836	16.2	3295
Beaufort	17172	12.8	19370
Bertie	7902	5.6	8344
Camden	2148	15.5	2480
Chowan	5265	15.9	6102
Craven	25549	23.1	31450
Pamlico	5011	17.8	5902
Pasquotank	10502	12.5	11814
Perquimans	4170	14.3	4766
Tyrrell	1766	5.5	1863
Washington	5432	4.9	5698
Northampton	8721	7.8	9401
Warren	7010	15.8	8117
TOTAL	143635	24.4	178681

Table 10. Estimates of the seasonal housing infrastructure by county, 1987.

County	1987 Estimated Total Housing Units (1)	1987 Estimated Households (2)	1987 Estimated Vacant Units (1x(.08)=3)	1987 Estimated Seasonal Units (1-(2+3)=4)
Carteret	34043	20275	2723	11045
Currituck	7129	5146	570	1413
Dare	18688	8400	1495	8793
Hyde	3295	2041	263	991
Beaufort	19370	16073	1549	1748
Bertie	8344	7188	677	479
Camden	2480	2085	198	197
Chowan	6102	4869	488	745
Craven	31450	30291	2516	(000)
Pamlico	5902	4071	472	1359
Pasquotank	11814	11584	978	(000)
Perquimans	4766	3858	381	527
Tyrrell	1863	1485	149	229
Washington	5698	4859	455	384
Edgecombe	--	20751	--	--
Franklin	--	12338	--	--
Gates	--	3270	--	--
Granville	--	12589	--	--
Greene	--	5108	--	--
Halifax	--	19789	--	--
Hertford	--	8028	--	--
Johnston	--	29491	--	--
Jones	--	3528	--	--
Lenoir	--	22065	--	--
Martin	--	9232	--	--
Nash	--	26566	--	--
Northampton	9401	7613	752	1036
Pitt	--	35440	--	--
Vance	--	14717	--	--
Wake	--	143584	--	--
Warren	8117	5652	649	1816
Wayne	--	35040	--	--
Wilson	--	23861	--	--
TOTAL	178462	560887	14315	30762

Table 11. Estimated recreational and permanent population in private housing, 1987.

County	Seasonal Housing Units (1)	Average Household Size (2)	Population Seasonal (1x2=3)	Population Permanent (4)	Population Total (3+4=5)
Carteret	11098	4.5	49941	50485	100426
Currituck	1476	3.3	4428	13689	18117
Dare	8793	4.5	39568	19992	59560
Hyde	991	4.5	4459	5796	10255
Beaufort	1748	3.3	5768	42754	48522
Bertie	479	3.3	1580	21132	22712
Camden	179	3.3	590	5984	6574
Chowan	745	3.3	2458	13535	15993
Craven	(000)	3.3	(000)	80272	80272
Pamlico	1359	3.3	4484	10830	15314
Pasquotank	(000)	3.3	(000)	30466	30466
Perquimans	527	3.3	1739	10725	12464
Tyrrell	229	3.3	755	4144	4899
Washington	384	3.3	1267	14658	15925
Edgecombe	--	--	--	59127	59127
Franklin	--	--	--	35205	35205
Gates	--	--	--	9686	9686
Granville	--	--	--	38217	38217
Greene	--	--	--	16467	16467
Halifax	--	--	--	56586	56586
Hertford	--	--	--	23862	23862
Johnston	--	--	--	79234	79234
Jones	--	--	--	10090	10090
Lenoir	--	--	--	60341	60341
Martin	--	--	--	26815	26815
Nash	--	--	--	72344	72344
Northampton	1036	3.3	3418	22247	25665
Pitt	--	--	--	99601	99601
Vance	--	--	--	39127	39127
Wake	--	--	--	374582	374582
Warren	1816	3.3	5992	16560	22552
Wayne	--	--	--	98152	98152
Wilson	--	--	--	65304	65304
TOTAL	30681		126447	1528009	1654456

Source

"North Carolina Municipal Population, 1987" Management and Information Services, Office of State Budget and Management, Raleigh, North Carolina.

The most important step is to compare growth rates for households and electric meters. As seen in Table 6, for eight counties the rates were within ± 3 percentage points of each other. In the remaining counties the rate of increase for electric meters was greater than that for households. Of these six counties, five (Carteret, Dare, Hyde, Pamlico, and Warren) had more than 10 percent of their housing designated as recreational. This offers support for the continuing growth in private recreational housing development in the coastal and sound area.

For two sound counties (Craven and Pasquotank), the growth rate for households exceeded that for electric meters by more than 5 percentage points. Despite their proximity to the Pamlico and Albemarle Sounds, respectively, Craven and Pasquotank Counties contain less than 1 percent housing designated as recreational. The data indicate that the permanent population has grown faster than the recreational population.

To estimate the total housing units in 1987, the 1980 total housing units were multiplied by the percent change in electric meters between 1980 and 1987. The results are presented in Table 9. This estimate of the total housing units was then used to calculate the number of vacant and seasonal housing units (see Table 10).

When compared to the 1980 seasonal housing numbers, the 1987 seasonal housing estimates indicate large increases during the 1980s. For the coastline counties Carteret's seasonal housing units grew by 72.1 percent, Currituck's grew by 30.1 percent, Dare's grew by 78.6 percent, and Hyde's grew by 108.2 percent. This growth represented an increase of over 9,000 private recreational units during the 1980s.

Among the sound counties, Bertie registered a 54.0 percent increase in seasonal units. Camden's seasonal units grew by 137.3 percent, Chowan's grew by 48.4 percent, Pamlico's grew by 37.9 percent, Tyrrell's grew by 7.5 percent, and Washington's grew by 73.4 percent. These growth rates indicate an increase of approximately 1,500 units. The largest absolute increases are found in Pamlico, Perquimans, and Chowan Counties.

The final step in estimating the population in private recreational units was to multiply the number of recreational housing units by the average household size of recreational households. As seen in Table 11, the seasonal populations of Carteret and Dare Counties were more than six times larger than the recreational populations for the other coastline and sound counties. More importantly, the peak seasonal population in Carteret County was as large as the permanent population. In Dare County, the peak seasonal population was almost twice as large as the permanent population.

MOTELS AND HOTELS

Motel activity comprises one of the most readily identifiable segments of overnight, recreational activity. Our goal in analyzing motel operations was to identify the number of motels and motel rooms located in the A/P Study area. Specifically, we wanted to develop data for census years and the most recent available year (1987). In our discussion of motels and hotels we use the terms motel and motel rooms to refer to motel, hotel, and bed and breakfast establishments. First, we discuss the methodology used in counting motels and motel rooms. Second, we discuss the findings from our analysis.

Methodology

To develop our initial inventory of motel facilities we used the North Carolina Accommodations Directory which is prepared by North Carolina Division of Travel and Tourism, Department of Commerce. The Directory is prepared on an annual basis from information solicited by the Division of Travel and Tourism from individual establishments. The data for each annual edition are gathered during August and September of the previous year. Data for the 1988 Directory were gathered during August, 1987.

The Division of Travel and Tourism's initial mailing list of motels was developed using data from the North Carolina Board of Health, and it is updated annually by contacting all Chambers of Commerce in the state and the North Carolina Hotel and Motel Association. Finally, individual facilities can request to be included in the Directory.

The Directory information was supplemented by reference to travel brochures published by local Chambers of Commerce and to local telephone directories. An additional check in developing our data on the number of motels and the number of available units was to use telephone and on site interviews.

As we were developing our data on motels we decided that it was impossible to accurately reconstruct the number of motels for pre-1980 census years. Although we realized that significant growth had occurred during the 1970s, pre-1980 directories were not available, especially for the 1970 census year. Thus we decided to develop data for the 1980 census year and the post-censal year of 1987.

In gathering data on motels for the period from 1980 through 1987 using the North Carolina Accommodations Directory, we noticed two important changes in the type of establishments that were included in the several editions. These shifts were most noticeable in the A/P Study counties along the coastline of North Carolina, i.e., Carteret, Dare, and Hyde.

First, bed and breakfasts were not listed in the 1980 Directory, but they were included in the 1987 and 1988 editions. This represented the introduction

of a new type of accommodation during the 1980s. As usually smaller establishments, the number of bed and breakfasts has fluctuated considerably even during the short time they have been included in the directories.

A more significant change between 1980 and 1987 was the inclusion of management companies, usually realty firms, in the directory. For example, the 1980 directory listing for the town of Atlantic Beach included 18 motels and no management companies. The 1987 listing for Atlantic Beach includes 19 motels and 12 management companies. The listings for the management companies include some combination of condominiums and/or cottages for rent. This change is indicative of a "new" approach to development and capitalization of overnight accommodations in recreational communities. A further example of this shift to a new approach to overnight accommodations was the conversion of two "traditional" Atlantic Beach motels (Landmark and Whaler Inn) to condominiums during the 1980s.

A decision had to be made on whether to count the management companies as motels, and thus count condo and cottage units in the inventory of motel rooms. Consistent with the previous discussion of census definitions of types of housing, we did not include counts of condominiums and cottages in the motel units operating in individual counties. Such units are already counted in the census enumeration of private housing.

Using the North Carolina Accommodations Directory, telephone directories, and interviews we identified the number of motel rooms for individual establishments. Additionally we were able to establish whether motels were open year round or seasonally, and to determine whether or not the motel was located on the barrier islands.

A final concern was developing an estimate of the population in motels for 1980 and 1987. The basic formula was to multiply the number of motel rooms by the occupancy rate and by the average size of the party occupying rooms (1).

estimated motel rooms	X	estimated occupancy rate	X	average motel party size	=	estimated motel population	(1)

It was apparent that there are several types of motels operating in the A/P Study counties, and that there were significant differences in the average party size for these categories. In discussing motel users it is useful to use the term "household" to refer to the average party size of the persons who occupy each motel unit.

Motels in the coastline and sound counties are "recreational" or "vacation" motels and the modal "household" tends to be a family-type unit. Motels in non-sound counties such as Wake, Pitt, Nash, and Wayne, tend to be "business" motels and the modal "household" is more likely to be a non-family unit such as one or two unrelated individuals on business trips.

Direct estimation of party size was beyond the scope of this project. However, data are available on the average "household" size of parties frequenting recreational motels. In the 1987 Outer Banks Chamber of Commerce

Visitor Survey (Perdue and Coughlin, 1987), the average household size for people staying in midscale motels (the authors' designation) was 3.8 people, and for upscale motels the average household size was 4.3 people. The authors offered no explanation for how the distinction between midscale and upscale motels was made. Taken together these averages indicate that recreational motel households tend to be made up of single family units. These survey figures were both higher than the average size of family households (3.24 persons) found in the 1980 census. To be conservative, we used an average of 3.5 persons as the multiplier for recreational motel units.

There were no data available on average household size for business motel units. Again taking a conservative approach we used a multiplier of 2.00 persons per unit for business motels.

Findings

As shown in Table 12, there was substantial growth in the number of motels and the number of motel rooms between 1980 and 1987. In 1980, motels were located in 25 of the 33 A/P Study counties and, in 1987, there were motels in 26 of the 33 A/P Study counties. Between 1980 and 1987 the number of motels in the study area increased from 281 to 372, an increase of 32.4 percent. The number of motel rooms increased from 15,054 rooms to 21,965 rooms, an increase of 45.9 percent.

Cautions must be exercised in looking at the changes in motels that occurred between 1980 and 1987. During this period some motels went out-of-business, some new motels began operations, and some motels changed ownership and names. Thus the figures on percentage change between 1980 and 1987 represent net differences in the number of motel rooms. Second, in some counties the large growth rates in the number of motel rooms resulted from the addition of one or two motels. For example, the large growth for Hertford County (213.6 percent) resulted from two additional motels with 126 rooms.

There are clearly identifiable reasons for the growth patterns of motels and rooms during the time period. Wake County, a rapidly growing metropolitan area, led all counties with an additional 2,069 rooms. Johnston County's increase of 616 rooms resulted from the county being adjacent to the Wake metropolitan area. Nash County with its location on the north-south interstate travel route has traditionally been an overnight stopover point. Its increase of 669 rooms reflected its continuing role on the I-95 route. Pitt County's increase of 602 rooms reflected its continuing growth as a regional business and medical center.

The coastline counties of Carteret, Dare, and Hyde all experienced important growth in the number of motel rooms during this decade. Dare County, with an additional 819 rooms, saw the largest increase, and is followed by Carteret County with an additional 754 rooms. While Hyde County's increase of 176 rooms did not compare with that for Dare or Carteret, the figure represented a growth rate of 172.5 percent for Hyde County. These figures indicate that growth in overnight recreational activity for the counties bordering the Albemarle and Pamlico Sounds is still overwhelmingly concentrated in the three coastline counties.

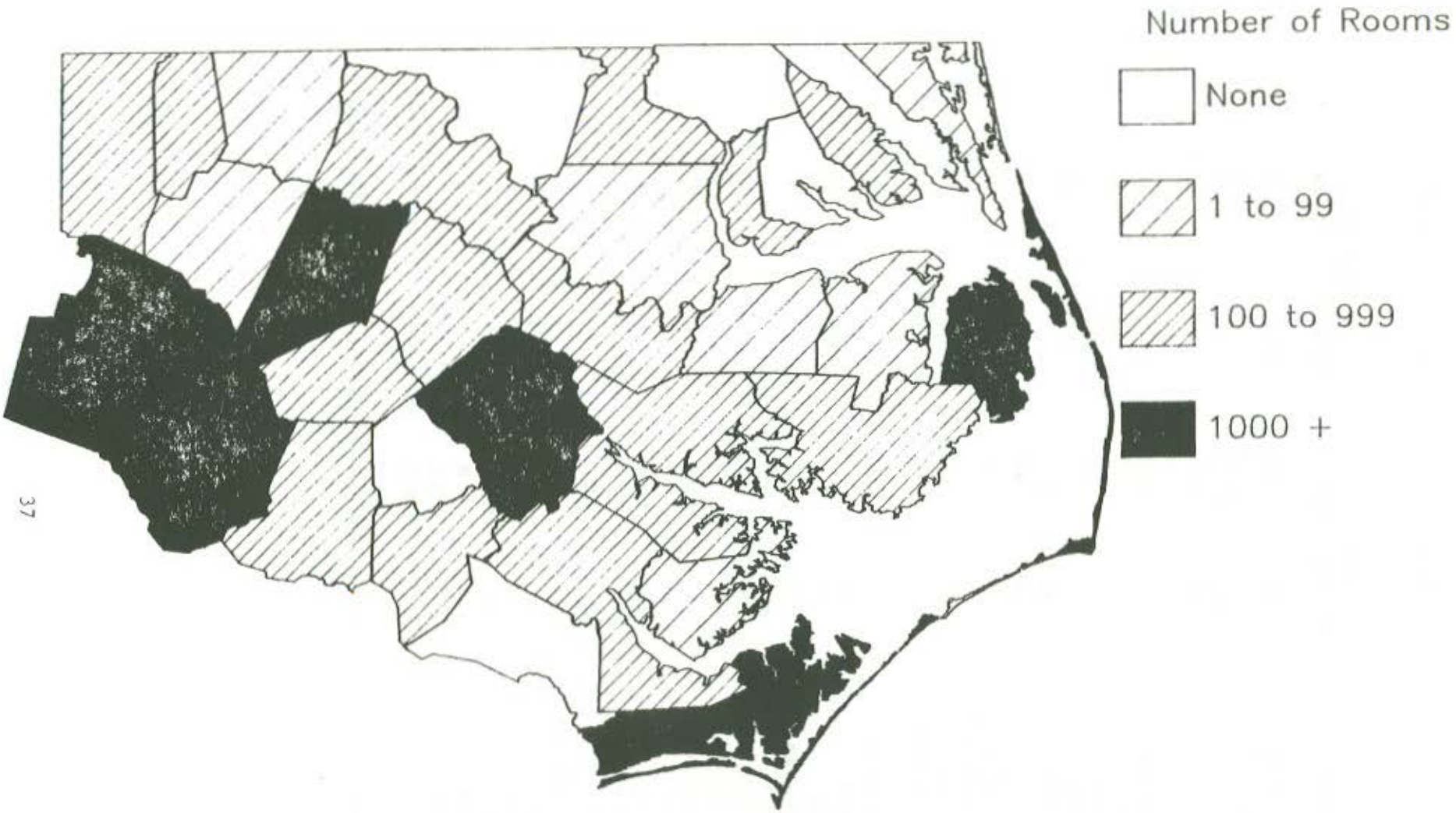
Table 12. The number of motels and motel rooms, and percentage change, by county, 1980-1987.

County	1980 Hotels/Motels Number	1980 Hotels/Motels Rooms	1987 Hotels/Motels Number	1987 Hotels/Motels Rooms	Percent Change in Rooms 80-87
Carteret	60	1527	68	2281	49.4
Currituck	1	12	1	12	--
Dare	86	2816	107	3635	29.1
Hyde	5	102	15	278	172.5
Beaufort	7	302	8	315	4.3
Bertie	1	11	1	11	--
Camden	--	--	--	--	--
Chowan	2	50	4	130	160.0
Craven	8	397	10	465	17.1
Pamlico	3	30	3	40	33.3
Pasquotank	5	302	6	316	4.6
Perquimans	--	--	--	--	--
Tyrrell	--	--	1	10	--
Washington	2	50	2	50	--
Edgecombe	1	88	2	127	44.3
Franklin	2	54	2	54	--
Gates	--	--	--	--	--
Granville	2	134	3	206	53.7
Greene	--	--	--	--	--
Halifax	9	568	9	632	11.3
Hertford	1	59	3	185	213.6
Johnston	5	393	10	1009	156.7
Jones	--	--	--	--	--
Lenoir	4	271	4	332	22.5
Martin	3	165	5	219	32.7
Nash	15	1051	21	1720	63.7
Northampton	--	--	--	--	--
Pitt	8	634	13	1236	94.9
Vance	2	256	5	461	80.1
Wake	34	4757	49	6826	43.5
Warren	--	--	1	8	--
Wayne	9	704	12	961	36.5
Wilson	6	321	7	446	38.9
TOTAL	281	15054	372	21965	45.9

Table 13. Number of motels and units by county, 1987.

County	Number of Motels	Number of Units	Percent of Motels	Percent of Units
Carteret	68	2281	18.3	10.4
Currituck	1	12	.3	.0
Dare	107	3635	28.8	16.5
Hyde	15	278	4.0	1.3
Beaufort	8	315	2.1	1.4
Bertie	1	11	.3	.0
Camden	--	--	--	--
Chowan	4	130	1.1	.6
Craven	10	465	2.7	2.1
Pamlico	3	40	.8	.2
Pasquotank	6	316	1.6	1.4
Perquimans	--	--	--	--
Tyrrell	1	10	.3	.0
Washington	2	50	.5	.2
Edgecombe	2	127	.5	.6
Franklin	2	54	.5	.2
Gates	--	--	--	--
Granville	3	206	.8	.9
Greene	--	--	--	--
Halifax	9	632	11.3	2.9
Hertford	3	185	.8	.8
Johnston	10	1009	2.7	4.6
Jones	--	--	--	--
Lenoir	4	332	1.1	1.5
Martin	5	219	1.3	1.0
Nash	21	1720	5.6	7.8
Northampton	--	--	--	--
Pitt	13	1236	3.5	5.6
Vance	5	461	1.3	2.1
Wake	49	6826	13.2	31.1
Warren	1	8	.3	.0
Wayne	12	961	3.2	4.4
Wilson	7	446	1.9	2.0
TOTAL	372	21965	100.0	100.0

Figure 6. Number of motel rooms, by county, 1987.



It is difficult at this point in time to forecast future motel growth in the coastline counties. While two Carteret County motels (the Angler Inn and the Bel Air Motel) went out of business with the 1988 season, one new motel (a 90 unit Days Suites) opened, and another, a Sheraton Hotel is under construction. In Dare County, one new motel (the 100 unit Nags Head Inn) opened during 1988. However, the problem in forecasting is to determine whether the growth during the 1980s of condominium developments as rental, motel-like units will continue. There is some evidence that changes in the tax laws may now slow down condominium development.

A closer examination of the 1987 motel data (see Table 13) reveals the magnitude of overnight recreational activity in the coastline counties. Dare County (28.8 percent), Carteret County (18.3 percent), and Hyde County (4.0 percent) accounted for 51.1 percent of all motels in the A/P Study area. The other counties with large numbers of motels were the Raleigh, Wake County, metropolitan area (13.2 percent), and the I-95 counties of Halifax (11.3 percent) and Nash (5.6 percent).

Looking at the total number of motel rooms in the A/P Study area, Wake County clearly led with 31.1 percent of all motel rooms. Again, the three coastline counties contained a large proportion of the motel rooms in the study area. Dare County (16.5 percent), Carteret County (10.4 percent), and Hyde County (1.3 percent) accounted for 28.2 percent of the rooms in the study area. The I-95 counties of Halifax and Nash accounted for 10.7 percent of the motel rooms. The regional business and medical center of Pitt County accounted for 5.6 percent of the motel rooms.

Finally, we wanted to look at the unique characteristics of the motels located in the three coastline counties. Specifically, we wanted to examine the location of the motels within the counties and the proportion of the motels which are open year round.

Table 14. Characteristics of motels in Carteret, Dare, and Hyde Counties, 1987.

County	Number of Motels/Hotels	Percent on Barrier Islands	Percent Open Year Round
Carteret	68	80.9	70.6
Dare	107	92.5	39.2
Hyde	15	93.3	26.7

As shown in Table 14, 80.9 percent of the Carteret County motels were located on Bogue Banks. The majority of the remaining Carteret County motels were located in Morehead City. In Dare County, 92.5 percent of the 107 motels were located on the barrier islands with the remaining 7.5 percent of motels being located on Roanoke Island. Of the 15 Hyde County motels, 14 (93.3 percent) were located on Ocracoke Island. Clearly, the evidence indicates that developers have and will favor the barrier islands for future projects.

The operation of motels in the coastline counties differs significantly from that in the remaining A/P Study counties. Seasonal operation is a clear pattern for Carteret, Dare, and Hyde Counties. While 70.6 percent of Carteret County's 68 motels operated year-round, only 39.2 percent of Dare County's 107 motels and 26.7 percent of Hyde County's 15 motels operated on a year round basis. These figures indicate the magnitude of seasonal fluctuations in recreational motel activity, and indicate that there is a lot of unused seasonal motel capacity in Dare and Hyde Counties.

As shown in Table 15, the total estimated motel population in the A/P Study area for 1980 was 36,738 people, and the estimated population for 1987 was 53,198 people, an increase of 44.8 percent. The estimated population for the four coastline counties in 1980 was 15,599 people and in 1987 the estimate was 21,720 people, representing an increase of 39.2 percent.

Closer inspection of the 1980 estimated motel population reveals that Carteret County's population of 5,344 people was 13 percent as large as the permanent population. Dare County's estimate of 9,856 people was 73.7 percent as large as the permanent population. The estimated motel populations for Currituck and Hyde Counties are less 6 percent of their permanent populations.

Of the counties with "business" motels, Wake County clearly led with an estimated motel population of 9,514 people in 1980 and 13,652 people in 1987. Wayne County follows with an estimate of 1,408 people in 1980 and 1,922 people in 1987. Pitt County has an estimated motel population of 1,268 people in 1980 and 2,472 people in 1987.

The last type of county with a large number of motels and motel units are the I-95 counties. Halifax County had an estimated motel population of 1,136 people in 1980 and 1,264 people in 1987. Nash County had an estimated population of 2,102 people in 1980 and 3,440 people in 1987. Nash County probably can best be described as combination of I-95 motels and business motels.

Table 15. Estimated population in motel/hotel rooms, by county, 1980 and 1987.

County	1980 Motel Rooms (1)	1980 Avg. Hshld. Size (2)	1980 Estimated Population (1x2=3)	1987 Motel Rooms (4)	1987 Avg. Hshld. Size (5)	1987 Estimated Population (4x5=6)
Carteret	1527	3.5	5344	2281	3.5	7983
Currituck	12	3.5	42	12	3.5	42
Dare	2816	3.5	9856	3635	3.5	12722
Hyde	102	3.5	357	278	3.5	973
Beaufort	302	2.0	604	315	2.0	630
Bertie	11	2.0	22	11	2.0	22
Camden	--		--	--		--
Chowan	50	2.0	100	130	2.0	260
Craven	397	2.0	794	465	2.0	930
Pamlico	30	3.5	105	40	3.5	140
Pasquotank	302	2.0	604	316	2.0	632
Perquimans	--		--	--		--
Tyrrell	--		--	10	2.0	20
Washington	--		--	8	2.0	16
Edgecombe	88	2.0	176	127	2.0	254
Franklin	54	2.0	108	54	2.0	108
Gates	--		--	--		--
Granville	134	2.0	268	206	2.0	412
Greene	--		--	--		--
Halifax	568	2.0	1136	632	2.0	1264
Hertford	59	2.0	118	185	2.0	370
Johnston	393	2.0	786	1009	2.0	2018
Jones	--		--	--		--
Lenoir	271	2.0	542	332	2.0	664
Martin	165	2.0	330	219	2.0	438
Nash	1051	2.0	2102	1720	2.0	3440
Northampton	--		--	--		--
Pitt	634	2.0	1268	1236	2.0	2472
Vance	256	2.0	512	461	2.0	922
Wake	4757	2.0	9514	6826	2.0	13652
Warren	--		--	--		--
Wayne	704	2.0	1408	961	2.0	1922
Wilson	321	2.0	642	446	2.0	892
TOTAL	15054		36738	21965		53198

CAMPGROUNDS

Campgrounds constitute a significant part of the overnight visitor activity in the coastal counties of the A/P Study area. Our goals in analyzing camping activity were to identify the number of campgrounds and the number of campsites existing at different points of time. To estimate the population occupying campgrounds we also wanted to develop information on the occupancy rate and average party size for campers. First, we discuss the methodology employed in estimating the campground population. Second, we present the results of the analysis.

Methodology

The original goal was to identify changes over time in the number of campgrounds. To accomplish this we used a number of sources including the North Carolina Camping and Outdoors Directory which is prepared by the North Carolina Travel and Tourism Division of the Department of Commerce. The Camping and Outdoors Directory is updated (published) every second or third year. The campgrounds listed in the directory are identified through contacts with local government officials and Chambers of Commerce, information provided by the North Carolina Campground Owners Association, and information provided by individual campground owners.

Also used were travel brochures created by local Chambers of Commerce, telephone directories, and on site inspection. As we were developing our list of campgrounds from these several sources we felt increasingly uncomfortable in identifying all campgrounds in existence for pre-1980 census years. Directories for pre-1980 were not available, especially for the 1970 census year. Thus we decided to use data for the 1980 census year and the most recent year for which data were available (1987). A list of campgrounds existing in 1987 is provided in Appendix B.

The number of sites available at respective campgrounds was determined by cross-referencing listings from different directories and on site inspection. One problem in counting sites from directories arose from the fact that some camps had both seasonal and transient sites. A site was classified as seasonal if the campground rented the space for the entire recreational season. A site was identified as transient if there was a limit on the number of days a camping party could occupy the space. For example, the National Park Service campgrounds place a 14 day maximum on use of a camping space.

To develop estimates of the occupancy rate and the average party size, a group of 17 private and public campgrounds from Dare and Carteret Counties were surveyed. Additionally, 2 campgrounds from Beaufort and Hyde Counties were also visited. The survey included both small (less than 100 sites) and large (100 or more sites) campgrounds. A copy of the questionnaire used can be found in Appendix C. The information from the questionnaire allows us to identify the number of seasonal sites, the occupancy rate for peak periods,

weekdays, and weekends. During the campground visits we discovered systematic data on changes over time in the occupancy rate and the average size of the camping party existed for the National Park Service campgrounds in Dare and Hyde Counties.

The basic formula used to estimate the population staying in campgrounds multiplied the number of campsites by the estimated occupancy rate and by the average size of the party staying at campsites (1).

number of campsites	X	estimated occupancy rate	X	average campsite party size	=	estimated campground population	(1)

Data on the average size of a camping party came from several sources. For purposes of continuity between the several segments of the recreational population, we use the term household to describe the camping party occupying a campsite. Counts of campers were available from a National Park Service census of sites at the Cape Point campgrounds for June, 1983, and May, 1988. The data from 1983 showed an average of 2.7 persons for sites occupied using tents and an average of 3.0 persons for sites occupied using recreational vehicles. Corresponding data for 1988 indicated 2.12 persons for tent sites and 2.07 persons for recreational vehicles.

Another source of data for the average household size of campground users were from Perdue and Coughlin's (1987) Outer Banks Visitor Survey. For Dare County campgrounds, the average household size was 3.6 people. This figure was the smallest of the three types of lodging (cottages, campgrounds, and motels) surveyed by the authors.

The inference we drew from the data on average household size is that the parties occupying campsites are basically single family units. Since the two averages differed significantly, we have chosen to adopt an average that was between the 3.6 and 2.12 persons averages. We have used an average of 3.0 people per camping party as the multiplier for estimating the population in campgrounds. Our population estimates reflect a maximum population assuming all campsites are occupied. As discovered during the data collection, such a maximum population is approached for major holiday weekends (Memorial Day, Fourth of July, and Labor Day).

Findings

Campgrounds exist in 18 of the 33 counties in the A/P Study area. While all of the 14 counties that directly border either the Albemarle or Pamlico Sounds contain at least 1 campground, the coastline counties (Carteret, Currituck, Dare, and Hyde) had by far the largest proportion of campgrounds.

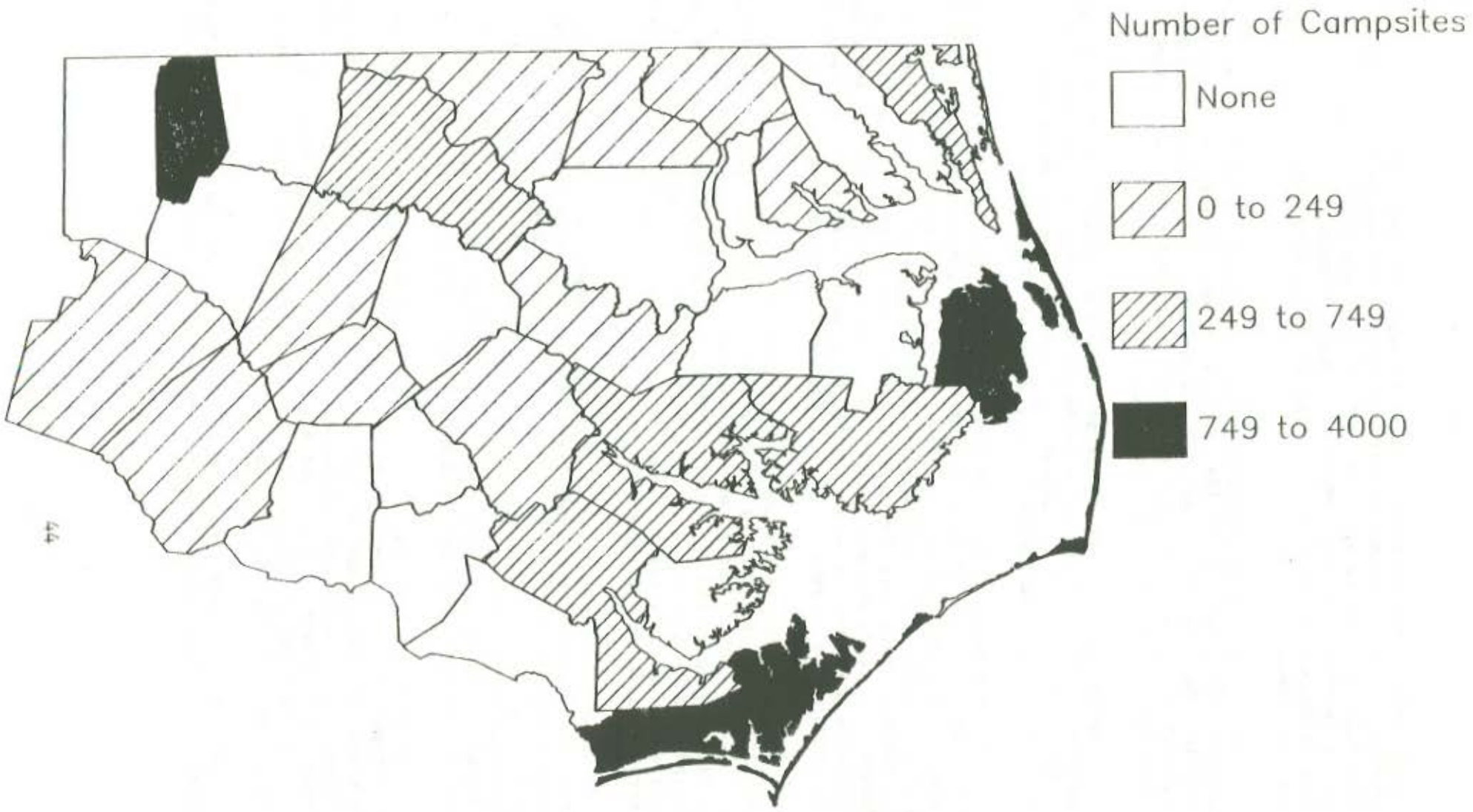
Eleven of the 19 drainage basin counties have at least 1 campground. Among these counties the largest number of campgrounds were found in Vance County as part of the Kerr Lake State Recreation Area.

In examining the number of campgrounds, there were minimal changes in both the number of campgrounds and the number of campsites. The number of

Table 16. Campgrounds, campsites, and percent change in campsites, by county, 1980 and 1987.

County	1980 Campgrounds Number	1980 Campgrounds Sites	1987 Campgrounds Number	1987 Campgrounds Sites	Percent Change Campsites 80-87
Carteret	17	1699	19	1866	9.8
Currituck	2	315	2	315	0.0
Dare	28	3718	28	3718	0.0
Hyde	6	309	6	309	0.0
Beaufort	7	524	6	524	0.0
Bertie	--	--	--	--	--
Camden	--	--	--	--	--
Chowan	--	--	--	--	--
Craven	3	152	3	152	0.0
Pamlico	--	--	--	--	--
Pasquotank	--	--	--	--	--
Perquimans	1	46	1	46	0.0
Tyrrell	--	--	--	--	--
Washington	--	--	--	--	--
Edgecombe	--	--	--	--	--
Franklin	--	--	--	--	--
Gates	1	206	1	206	0.0
Granville	--	--	--	--	--
Greene	--	--	--	--	--
Halifax	4	630	4	630	0.0
Hertford	1	125	1	125	0.0
Johnston	2	195	2	195	0.0
Jones	--	--	--	--	--
Lenoir	--	--	--	--	--
Martin	1	175	1	175	0.0
Nash	2	25	2	25	0.0
Northampton	1	60	1	60	0.0
Pitt	1	100	1	100	0.0
Vance	10	893	10	893	0.0
Wake	2	48	2	48	0.0
Wayne	--	--	--	--	--
Wilson	2	120	2	120	0.0
TOTAL	91	9340	93	9507	1.8

Figure 7. Number of campsites, by county, 1987.



campgrounds increased from 91 to 93 between 1980 and 1987. The 2 additional campgrounds were located in Carteret County. The number of campsites increased from 9,340 in 1980 to 9,507 in 1987, an increase of 167 campsites or a growth of 1.8 percent. The only prospective change discovered during this project was that Sandpiper Trace, a 500 site campground in Dare County, will close after the 1988 season.

An examination of campground characteristics for 1987 showed that a majority (58.5 percent) of the campgrounds were located in the four coastline counties. Dare County led with 28 campgrounds (29.8 percent), followed by Carteret County with 19 (20.2 percent), Hyde County with 6 (6.4 percent), and Currituck County with 2 (2.1 percent).

Looking at the number of campsites, Dare County with its 3,718 sites and Carteret County with its 1,866 sites accounted for 58.7 percent of all campsites in the study area. If we include the other two coastal counties, Currituck and Hyde Counties, we accounted for 65.2 percent of all campsites.

The overwhelming majority of campgrounds (82.8 percent) and campsites (83.3 percent) were private. Six of 16 public campgrounds were operated by federal agencies. The National Park Service operated 3 campgrounds in Dare County (Oregon Inlet, Frisco, and Cape Point) and 1 campground in Hyde County (Ocracoke). There were two smaller campgrounds located in the Croatan National Forest. The state operated campgrounds include Goose Creek in Beaufort County, Merchants Mill Pond in Gates County, William B. Umstead in Wake County, and the seven state recreation area campgrounds in Vance County.

We also examined the location of camping activity in the four coastal counties containing barrier islands. For Carteret County 8 of 19 campgrounds and 60.2 percent of the sites were located on Bogue Banks. In Dare County 26 of 28 campgrounds and 86.3 percent of all sites were located on the barrier islands. In Hyde County 3 of 6 campgrounds and 61.8 percent of all sites were located on Ocracoke Island. There was no camping activity located on the barrier islands of Currituck County.

We are also interested in the pace of camping activity within the study area. Specifically we wanted to measure the occupancy rate for the campgrounds and the average size of the camping party. We surveyed 19 campgrounds, i.e., 9 in Carteret County, 9 in Dare County, and 1 each in Hyde and Beaufort Counties. In both Carteret and Dare Counties the survey included campgrounds located on the mainland and the barrier islands. Also the National Park Service campgrounds in Dare and Hyde County were included.

As shown in Table 18, 10 of the 16 private campgrounds rented some spaces on a seasonal basis. There were no differences by location (island versus mainland) in renting spaces on a seasonal basis. Looking at the proportion of seasonal sites, Kitty Hawk Campground, with over 90 percent of its sites rented on a seasonal basis leads all private campgrounds surveyed. The National Park Service campgrounds rented no spaces on a seasonal basis, and in fact places a 14 day limit on campers.

Data on occupancy rates are broken down by the percentage of campsites normally occupied during weekdays, weekends, and peak periods. The data for

Table 17. Campground characteristics, 1987.

County	Private Number	Private Sites	Public Number	Public Sites	Percent of Camps	Percent of Sites
Carteret	18	1826	1	40	20.2	19.6
Currituck	2	315	--	--	2.1	3.3
Dare	25	3269	3	449	29.8	39.1
Hyde	5	173	1	136	6.4	3.2
Beaufort	6	512	1	12	7.4	5.5
Bertie	--	--	--	--	--	--
Chowan	--	--	--	--	--	--
Craven	2	130	1	22	3.2	1.6
Pamlico	--	--	--	--	--	--
Pasquotank	--	--	--	--	--	--
Perquimans	1	46	--	--	1.1	.5
Tyrrell	--	--	--	--	--	--
Washington	--	--	--	--	--	--
Edgecombe	--	--	--	--	--	--
Franklin	--	--	--	--	--	--
Gates	--	--	1	206	1.1	2.2
Granville	--	--	--	--	--	--
Greene	--	--	--	--	--	--
Halifax	4	630	--	--	4.3	6.6
Hertford	1	125	--	--	1.1	1.3
Johnston	2	195	--	--	2.1	2.1
Jones	--	--	--	--	--	--
Lenoir	--	--	--	--	--	--
Martin	1	175	--	--	1.1	1.8
Nash	2	25	--	--	2.1	.3
Northampton	1	60	--	--	1.1	.6
Pitt	1	100	--	--	1.2	1.1
Vance	3	196	7	697	10.6	9.4
Wake	1	20	1	28	2.1	.5
Warren	--	--	--	--	--	--
Wayne	--	--	--	--	--	--
Wilson	2	120	--	--	2.1	1.3
TOTAL	77	7917	16	1590	100.0	100.0

Table 18. The number of seasonal and transient sites, and occupancy rates for campground survey, 1987.

County	Campsites			Occupancy rates		
	Seasonal	Transient	Total	Weekday	Weekend	Peak
				pct.	pct.	pct.
CARTERET COUNTY						
Arrowhead Campsite	93	78	171	50	100	100
Bridgeview	33	95	128	50	50	100
Camp Ocean Forest	--	160	160	55	100	100
Coastal Riverside	21	49	70	50	75	100
Emerald Isle	--	75	75	55	55	100
Holiday Trav-L Park	99	201	300	85	100	100
Indian Beach	--	86	86	65	95	100
Pender Park	22	123	145	33	90	98
Salter Path Family	na	na	200	80	95	99
DARE COUNTY						
Collington Park	20	80	100	30	60	100
Cozy Cove	--	88	88	33	85	100
Kitty Hawk	98	2	100	na	na	100
KOA Holiday	60	195	255	80	95	100
KOA Original	60	117	177	80	95	100
NPS Cape Point	--	202	202	30	70	100
NPS Frisco	--	127	127	45	50	100
NPS Oregon Inlet	--	120	120	70	95	100
Sandpiper Trace	100	400	500	30	95	98
HYDE COUNTY						
NPS Ocracoke	--	136	136	60	75	100
BEAUFORT COUNTY						
Twin Lakes	100	85	185	65	90	100

the private campgrounds were collected by interviewing camp personnel using the most current year as the reference year. The National Park Service data were collected through interviews and access to official records kept by the Park Service. The official records offer an opportunity to look at change in the occupancy rates for the public campgrounds.

Campground personnel consistently identified the peak periods as the Memorial Day weekend, the Fourth of July weekend, and the Labor Day weekend. Virtually all of the campgrounds reported 100 percent occupancy for the peak summer holidays. Occupancy rates were lowest for weekdays, ranging from a low of 33 percent for Pender Park in Carteret County to a high of 85 percent for Holiday Trav-L Park in Carteret County. While weekends generally showed higher occupancy rates than weekdays, the range in the rates was considerable. Two campgrounds showed 50 percent occupancy for the average weekend while three campgrounds reported occupancy rates of 100 percent.

As mentioned, National Park Service data allowed us to examine changes in the occupancy rates. Using July as the reference month, and 1982 and 1987 as the reference years, the occupancy rates for all four NPS campgrounds declined. The largest decline is 46.4 percent for the Frisco campground while the lowest decline was 14.2 percent for the Ocracoke campground.

Table 19. Occupancy rates for National Park Service camps for July, 1982, and July, 1987.

Campground	Occupancy Rate July, 1982	Occupancy Rate July, 1987	Percent Change 82-87
	Pct.	Pct.	
Oregon Inlet	99.8	79.2	20.6
Frisco	87.5	46.9	46.4
Cape Point	83.2	54.4	35.0
Ocracoke	78.1	67.0	14.2

As shown in Table 20, the 1980 total estimated population in campgrounds was 25,813 people and the 1987 total estimated population was 26,314 people. The shift reflected a population increase of 1.9 percent. This change was due to an increase of 167 campsites in Carteret County.

The largest estimated campground populations were found in the coastline counties of Dare and Carteret. The Dare County estimate of 11,154 people was the largest. For 1980, this campground population figure was 83.4 percent as large as Dare County's permanent population of 13,377 people. Carteret County's estimated campground population was 5,097 people in 1980 and 5,598 people in 1987. The 1980 population was 12.4 percent as large as Carteret County's permanent population of 41,092 people.

The other coastline counties, Currituck and Hyde, had smaller estimated campground populations. Currituck County's estimated population of 945 people was 8.5 percent as large as the 1980 permanent population of 11,089 people.

Table 20. Estimated population in campgrounds, 1980 and 1987.

County	1980 No. of Sites (1)	1980 Avg. Hshld. Size (2)	1980 Estimated Population (1x2=3)	1987 No. of Sites (4)	1987 Avg. Hshld. Size (5)	1987 Estimated Population (4x5=6)
Carteret	1699	3.0	5097	1866	3.0	5598
Currituck	315	3.0	945	315	3.0	945
Dare	3718	3.0	11154	3718	3.0	11154
Hyde	309	3.0	927	309	3.0	927
Beaufort	524	3.0	1572	524	3.0	1572
Bertie	--		--	--		--
Camden	--		--	--		--
Chowan	--		--	--		--
Craven	152	3.0	456	152	3.0	456
Pamlico	--		--	--		--
Pasquotank	--		--	--		--
Perquimans	46	3.0	138	46	3.0	138
Tyrrell	--		--	--		--
Washington	--		--	--		--
Edgecombe	--		--	--		--
Franklin	--		--	--		--
Gates	206	3.0	618	206	3.0	618
Granville	--		--	--		--
Greene	--		--	--		--
Halifax	630	3.0	1854	630	3.0	1854
Hertford	125	3.0	375	125	3.0	375
Johnston	195	3.0	585	195	3.0	585
Jones	--		--	--		--
Lenoir	--		--	--		--
Martin	175	3.0	525	175	3.0	525
Nash	25	3.0	75	25	3.0	75
Northampton	60	3.0	180	60	3.0	180
Pitt	100	3.0	300	100	3.0	300
Vance	893	3.0	2679	893	3.0	2679
Wake	48	3.0	144	48	3.0	144
Warren	--		--	--		--
Wayne	--		--	--		--
Wilson	120	3.0	360	120	3.0	360
TOTAL	9340		28020	9507		28521

Hyde County's estimated population of 927 people was 15.8 percent as large as the 1980 population of 5,873 people.

Of the remaining counties, Vance, Beaufort, and Halifax had the largest estimated campground populations. Vance County's camping actvity is tied to the Kerr Lake State Recreation Area. Vance County's estimated population of 2,679 people was 7.3 percent of the 1980 permanent population. Beaufort County's campgrounds are tied to water related activity on the Pamlico River and Sound. The estimated population of 1,572 persons was 3.9 percent of the 1980 permanent population. Halifax County's campground population is tied to interstate travel, and the estimate of 1,854 people was 3.4 percent of the 1980 permanent population.

MARINAS

Boating is an integral part of recreational activity in the A/P Study area. Boats, power and sail, are a potentially significant source of overnight recreational activity. Marinas and the boats they attract constitute an identifiable indicator of boating as a type of overnight tourist activity. This is especially true in the counties that border the Albemarle and Pamlico Sounds. Our goal was to identify the number of marinas and the corresponding number of boat slips in the A/P Study counties. Also, we wanted to develop an estimate of the occupancy rates for marinas and the average size of the party occupying boats (boat slips). First, we discuss the methodology used in analyzing marina activity. Second, we present the findings from that analysis.

Methodology

Our goal was to identify changes over time in the number of marinas in the A/P Study area. Our initial investigation revealed that no state agency maintains a current listing of marinas similar to the directories for campgrounds or hotels/motels prepared by the North Carolina Travel and Tourism Division. Our starting point was to use the marinas listed in a private publication, The Waterway Guide, Mid-Atlantic, 1988, as our initial source for an inventory of marinas. On the basis of that list we decided to visit each of the marinas. The onsite visits allowed us to verify the information from the directory, and also to locate other marinas in the proximity which were not listed in the directory.

In conducting the fieldwork we discovered considerable variation in the type of marina facilities included in the Waterway Guide. Given our focus on the overnight recreational population, we included marina facilities (specifically wet slips) capable of docking boats of a size and type which can house people overnight. We excluded those facilities that only did marine repairs, those that only docked commercial fishing boats, and those listed in the Waterway Guide that had no dockage other than for refueling. A list of the marinas operating in 1987 is provided in Appendix D.

A questionnaire (see Appendix E) was developed and used to elicit information about the present and past operations of the respective marinas. The interviewees were asked about the current number and type of boat slips available at the marina. Boat slips were classified as being either dry stack or wet slips. Wet slips were further classified as transient or seasonal. A slip was classified as seasonal if the marina rented the space for the entire season or year. A boat slip was identified as transient if there was a limit on the number of days a boat could occupy a slip. For example, some marinas would only allow overnight docking or docking for a maximum of 7 or 14 days.

We also inquired about the past operations of the marina. We wanted to know the year in which the marina began operation and if there had been any changes over time in the number and type of boat slips at the marina. This

information allowed us to reconstruct the history of each marina and note changes in the number of marinas and boat slips for the census years of 1970 and 1980, and for the postcensal period from 1981 through 1987.

Finally we wanted data about the occupancy rate for the marina over the course of a year, i.e., what proportion of the slips are occupied during the peak summer months and in the off-season. During the fieldwork, it immediately became clear that we needed to adequately define what we meant by occupancy. The unit to be occupied is the wet slip and being occupied means that the boat slip is rented.

We feel that in using this definition of occupancy two points need to be clarified. First, a slip may be rented (and thus occupied) even though the boat owner may have taken his boat somewhere else for varying lengths of time. Second, the slip may be rented (and thus occupied), the boat may be present, but there may be no people occupying the boat. While data on the size of the boating party are important for calculating the overnight recreational population we determined that it was beyond the scope of this project to estimate the number of people per boat. We asked the interviewee to express occupancy as a percent of the number of wet slips available.

The final step is to estimate the population associated with marina activity. The boat is the housing unit and the person or persons occupying the boat is the household. We assume that the occupancy rate for wet slips is 85 percent. Further, we assume that the modal household type occupying the boat is a single family unit. In making the population estimates we assumed the average household size was 3.25 persons. The basic formula used to estimate the recreational population located in marinas multiplied the number of boat slips by the occupancy rate (.85) and the average party size (3.25 persons) (1).

estimated number of wet slips	X	estimated occupancy rate	X	average party size	=	estimated marina population	(1)

Findings

We reconstructed marina development between 1970 and 1987 from the data gathered during the fieldwork phase. As shown in Table 21, there had been significant growth in marina activity during the time period. Marinas existed in 9 of the 33 A/P Study counties in 1970 and in 11 counties by 1980. There were 32 marinas in 1970, 62 marinas in 1980, and 91 marinas in 1987. This represents a 184 percent increase in the number of marinas between 1970 and 1987. The development of marinas has been limited to counties which directly border the Albemarle or Pamlico Sounds.

Between 1980 and 1987 there was a 36.6 percent increase in the number of boat slips. The growth was due to the expansion of the number of slips at existing marinas and to the development of new marinas. In terms of percentage change, Hyde County led with a 145.7 percent increase, followed by Craven (54.4 percent), Beaufort (50.3 percent), and Pamlico (41.6 percent) Counties. In absolute numbers, Carteret County grew the most with an additional 681

Table 21. Marinas and boat slips by county, 1970, 1980 and 1987.

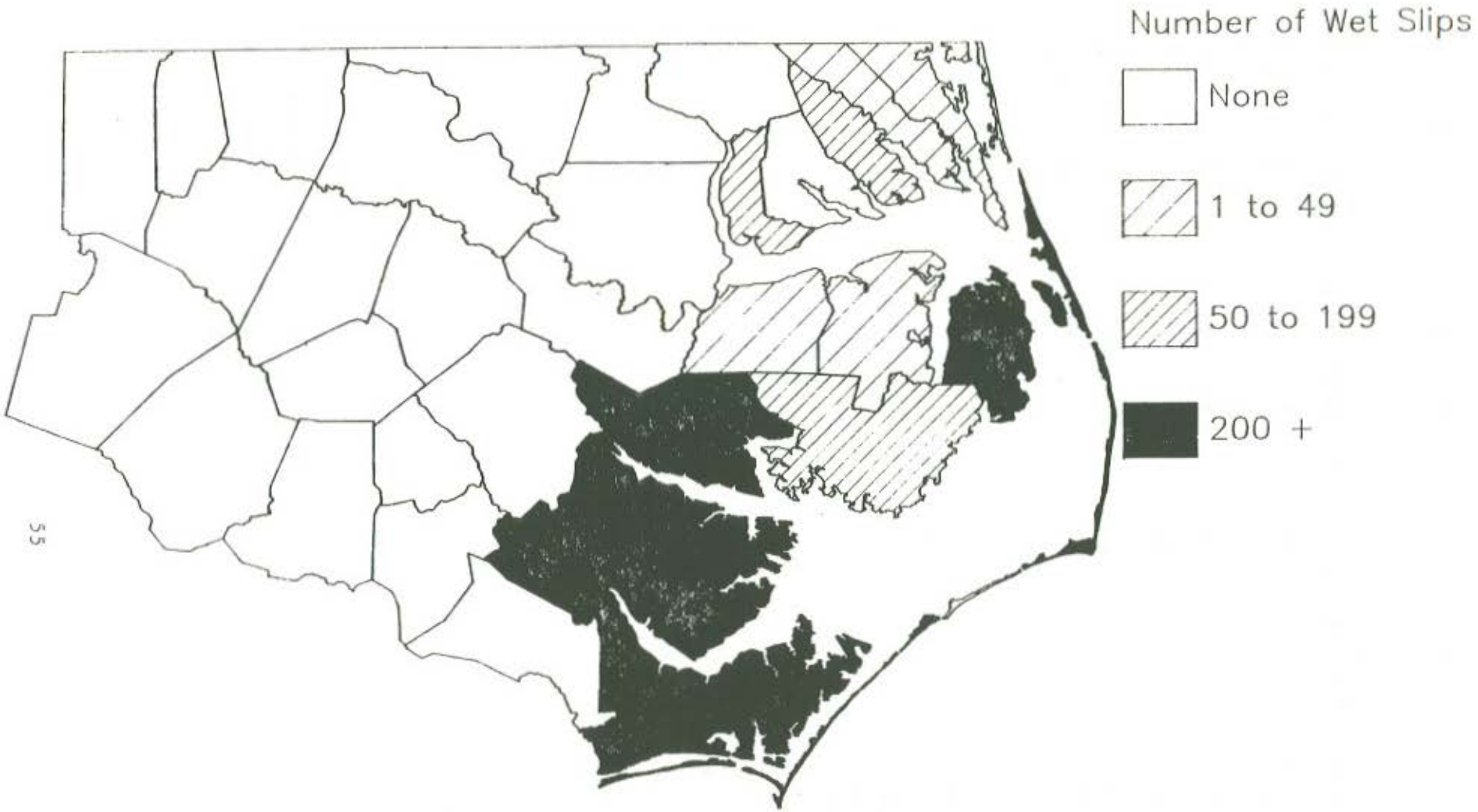
County	1970 Marinas Number	1970 Marinas Slips	1980 Marinas Number	1980 Marinas Slips	1987 Marinas Number	1987 Marinas Slips	Percent Change 80-87
Carteret	13	548	24	2093	29	2774	32.5
Currituck	3	45	3	45	3	45	--
Dare	2	110	8	354	10	412	15.0
Hyde	1	40	3	46	5	113	145.7
Beaufort	5	412	12	610	18	917	50.3
Bertie	--	--	--	--	--	--	---
Camden	1	24	1	28	2	38	35.7
Chowan	3	131	3	131	3	156	19.1
Craven	1	60	6	471	8	727	54.4
Pamlico	--	--	2	291	8	422	41.6
Pasquotank	2	74	2	74	2	74	--
Perquimans	--	--	--	--	--	--	--
Tyrrell	--	--	2	44	2	44	--
Washington	1	4	1	4	1	4	--
Edgecombe	--	--	--	--	--	--	--
Franklin	--	--	--	--	--	--	--
Gates	--	--	--	--	--	--	--
Granville	--	--	--	--	--	--	--
Greene	--	--	--	--	--	--	--
Halifax	--	--	--	--	--	--	--
Hertford	--	--	--	--	--	--	--
Johnston	--	--	--	--	--	--	--
Jones	--	--	--	--	--	--	--
Lenoir	--	--	--	--	--	--	--
Martin	--	--	--	--	--	--	--
Nash	--	--	--	--	--	--	--
Northampton	--	--	--	--	--	--	--
Pitt	--	--	--	--	--	--	--
Vance	--	--	--	--	--	--	--
Warren	--	--	--	--	--	--	--
Wayne	--	--	--	--	--	--	--
Wilson	--	--	--	--	--	--	--
TOTAL	*32*	*1448*	*62*	*4191*	*91*	*5726*	*36.6*

Table 22. Number of marinas and boat slips by county, 1987.

County	Number of Marinas	Wet Slips Transient	Wet Slips Seasonal	Dry Stack	Total	Percent of Marinas	Percent of Slips[1]
Carteret	29	186	1189	1399	2774	31.9	32.1
Currituck	3	45	--	--	45	3.3	1.0
Dare	10	109	303	--	412	11.0	9.6
Hyde	5	91	22	--	113	5.5	2.6
Beaufort	18	82	815	20	917	19.8	20.9
Bertie	--	--	--	--	--	--	--
Camden	2	14	24	--	38	2.2	.9
Chowan	3	6	150	--	156	3.3	3.6
Craven	8	20	687	20	727	8.8	16.5
Pamlico	8	35	387	--	422	8.8	9.8
Pasquotank	2	--	74	--	74	2.2	1.7
Perquimans	--	--	--	--	--	--	--
Tyrrell	2	--	44	--	44	2.2	1.0
Washington	1	4	--	--	4	1.1	.1
Edgecombe	--	--	--	--	--	--	--
Franklin	--	--	--	--	--	--	--
Gates	--	--	--	--	--	--	--
Granville	--	--	--	--	--	--	--
Greene	--	--	--	--	--	--	--
Halifax	--	--	--	--	--	--	--
Hertford	--	--	--	--	--	--	--
Johnston	--	--	--	--	--	--	--
Jones	--	--	--	--	--	--	--
Lenoir	--	--	--	--	--	--	--
Martin	--	--	--	--	--	--	--
Nash	--	--	--	--	--	--	--
Northampton	--	--	--	--	--	--	--
Pitt	--	--	--	--	--	--	--
Vance	--	--	--	--	--	--	--
Wake	--	--	--	--	--	--	--
Warren	--	--	--	--	--	--	--
Wayne	--	--	--	--	--	--	--
Wilson	--	--	--	--	--	--	--
TOTAL	91	592	3695	1439	5726	100.0	100.0

1. The percent of slips only includes "wet slips"in both the numerator and the denominator.

Figure 8. Number of marina wet slips, by county, 1987.



slips, followed by Beaufort (307 slips), Craven (256 slips), and Pamlico (131 slips) Counties.

Marina expansion has continued during 1988 with two new marinas opening in 1988. Portside Marina has opened in Carteret County and Matthews Point Marina has opened in Craven County. Additionally, the Sheraton Hotel and Marina is planning to add an additional 150 slips to their facilities. Whether future marina development will keep pace with the previous rate is an important empirical question. While many of the marina operators indicated a demand for an increasing number of slips, the permitting process makes expansion problematical.

A closer examination of the 1987 marina data show that 51.7 percent of marinas were located in two counties, Carteret and Beaufort. If we add an additional three counties (Dare, Pamlico, and Craven) we can account for fully 80 percent of all marinas in the A/P Study area. These five counties possess two common characteristics. First, they all border the Albemarle and Pamlico Sounds. Second, the five counties are on the route of the Intracoastal Waterway.

In 1987 there were 5,726 slips at the 91 marinas in the study area. Wet slips comprised 74.8 percent and dry stack slips accounted for 25.1 percent of all slips. Given our focus on the overnight recreational population we are specifically interested in the 4,287 wet slips available for the overnight docking of boats. The breakdown for wet slips shows that 13.8 percent (592) were transient slips and 86.2 percent (3,695) were seasonal slips.

Five counties accounted for 87.6 percent of the wet slips in the study area. Carteret County led with 32.1 percent, followed by Beaufort County (20.9 percent), Craven County (16.5 percent), Pamlico County (9.8 percent), and Dare County (9.6 percent).

Interestingly, three of these counties (Beaufort, Craven, and Pamlico) did not have significant amounts of other overnight recreational activity, i.e., camping, hotel/motel, or recreational housing. The figures for marina size and growth for the three counties showed the importance that boating on the Sounds and on the Intracoastal Waterway has for the development of the recreational sector in the study area.

Finally, we were concerned with occupancy rates for marinas. Given the fact that we had to reconstruct marina data for prior years through our interviews, we only felt confidence in occupancy data for the most recent year, i.e., 1987. However, we feel that we could apply the 1987 occupancy rate to the marina data for 1980.

Our findings on marina occupancy rates can be summarized as follows. First, during the peak 14 week summer season, a clear majority of the private marinas had occupancy rates approaching, or at, 100 percent. The 100 percent occupancy rate was especially true for marinas that rented slips on a seasonal basis. Facilities reporting less than full summer occupancy included marinas with transient slips, newer marinas, and marinas which are more geographically isolated. Taking a conservative approach we assume that during peak summer months 85 percent of the wet slips are occupied (rented).

Table 23. The estimated population in marinas by county, 1980.

County	Total Number of Wet Slips	Percent Occupied	Occupied Wet Slips	Avg. Hshld. Size	Estimated Population
Carteret	1261	.85	1072	3.25	3483
Currituck	45	.85	38	3.25	123
Dare	354	.85	301	3.25	978
Hyde	46	.85	39	3.25	127
Beaufort	590	.85	501	3.25	1628
Bertie	--		--		--
Camden	28	.85	24	3.25	78
Chowan	131	.85	111	3.25	361
Craven	451	.85	383	3.25	1245
Pamlico	291	.85	247	3.25	802
Pasquotank	74	.85	63	3.25	205
Perquimans	--		--		--
Tyrrell	44	.85	37	3.25	120
Washington	4	.85	3	3.25	10
Edgecombe	--		--		--
Franklin	--		--		--
Gates	--		--		--
Granville	--		--		--
Greene	--		--		--
Greene	--		--		--
Halifax	--		--		--
Hertford	--		--		--
Johnston	--		--		--
Jones	--		--		--
Lenoir	--		--		--
Martin	--		--		--
Nash	--		--		--
Northampton	--		--		--
Pitt	--		--		--
Vance	--		--		--
Wake	--		--		--
Wayne	--		--		--
Wilson	--		--		--
TOTAL	3319		2819		9160

Table 24. The estimated population in marinas by county, 1987.

County	Total Number of Wet Slips	Percent Occupied	Occupied Wet Slips	Avg. Party Size	Estimated Population
Carteret	1375	.85	1169	3.25	3799
Currituck	45	.85	38	3.25	123
Dare	412	.85	350	3.25	1137
Hyde	113	.85	96	3.25	312
Beaufort	897	.85	762	3.25	2476
Bertie	--		--		--
Camden	38	.85	32	3.25	104
Chowan	156	.85	132	3.25	429
Craven	707	.85	601	3.25	1953
Pamlico	422	.85	359	3.25	1167
Pasquotank	74	.85	63	3.25	205
Perquimans	--		--		--
Tyrrell	44	.85	37	3.25	120
Washington	4	.85	3	3.25	10
Edgecombe	--		--		--
Franklin	--		--		--
Gates	--		--		--
Granville	--		--		--
Greene	--		--		--
Halifax	--		--		--
Hertford	--		--		--
Johnston	--		--		--
Jones	--		--		--
Lenoir	--		--		--
Martin	--		--		--
Nash	--		--		--
Northampton	--		--		--
Pitt	--		--		--
Vance	--		--		--
Wake	--		--		--
Warren	--		--		--
Wayne	--		--		--
Wilson	--		--		--
Total	4287		3642		11837

While all marinas reported that they remained open year round, the overall occupancy rates declined during the off-season. Individual marinas, particularly those renting wet slips on a seasonal basis, did maintain near 100 percent occupancy rates. However, the occupancy rates reported by marinas with primarily transient slips rarely exceeded 50 percent and in many cases occupancy declined by more than two-thirds.

The marina population estimates for 1980 and 1987 are presented in Tables 23 and 24. For 1980 the total estimated overnight marina population was 9,160 people. By 1987, the estimated marina population was 11,837 people, an increase of 29.2 percent. The rank ordering of counties by estimated population size was the same for 1980 and 1987.

The coastline county of Carteret had the largest estimated marina population with 3,483 people in 1980 and 3,799 people in 1987. This difference represented an increase of 9.1 percent. In rank order by size the Sound counties of Beaufort, Craven, and Pamlico have the next largest overnite marina populations. Beaufort's estimated marina population increased by 52.1 percent during the 1980s, while the increase for Craven County was 56.9 percent, and for Pamlico County the increase was 45.5 percent.

SUMMARY ESTIMATES

To integrate the several estimates for the counties in the A/P Study area, the separate estimates of the housing infrastructure and the associated populations are combined in a set of four tables. First, the estimates of the housing infrastructure (housing units, motel rooms, campsites, and boat slips) in 1980 and 1987 are discussed. Second, corresponding estimates for the 1980 and 1987 permanent and seasonal populations are discussed. Finally, the population estimates are compared to economic data on retail spending and travel and tourism expenditures.

Housing Infrastructure

A number of observations can be drawn from the housing data presented in Tables 25 and 26. Taken together, seasonal private housing units, motel rooms, campsites, and boat slips constitute the recreational infrastructure. The permanent housing infrastructure includes the occupied and vacant private housing units. Looking at the totals for the entire study area in 1980, the 50,847 seasonal units accounted for 9.1 percent of the total available housing (i.e., permanent and seasonal). By 1987, the number of seasonal units had grown to 65,704 units, (a 29.2 percent increase) and constituted 10.3 percent of total housing in the A/P Study counties.

A closer examination of the seasonal infrastructure showed that in both years by far the largest part was private housing, i.e., rental and second home. Private housing units constituted 47 percent of the seasonal infrastructure for both 1980 and 1987. During the current decade motel rooms increased from 29.6 percent to 33.3 percent of the recreational infrastructure. Campsites, the number of which remained constant during the decade, declined from 17.2 percent to 13.3 percent of the recreational infrastructure. Boat slips remained unchanged at 6.5 percent of the recreational infrastructure.

County by county inspection of the coastline and sound counties reveals the magnitude of the recreational infrastructure. Further, private rental and second home seasonal housing constitutes the largest part of the recreational infrastructure in each of the coastline and sound counties with the notable exceptions of Craven and Pasquotank Counties. In fact the estimated number of private seasonal housing units declined in four sound counties between 1980 and 1987. These counties are Beaufort, Craven, Pasquotank, and Perquimans. Examination of the individual counties reveals the pattern for the 1980s.

While 66.0 percent of Dare County's housing infrastructure was classified as recreational in 1980, the figure declined slightly to 62.6 percent of all housing by 1987. This shift is due to changes during the decade in the various elements of the recreational infrastructure. Private seasonal housing units increased from 27.5 percent in 1980 to 33.2 percent of all housing by 1987. Motel rooms represented 15.7 percent of all housing in 1980 and decreased to 13.7 percent by 1987. Since the number of campsites remained

Table 25. Housing infrastructure by county, 1980.

County	Housing Units Occupied	Seasonal	Vacant	Hotel Motel Rooms	Camp-sites	Boat Slips	Total Units
Carteret	15128	6448	2164	1527	1699	1261	28227
Currituck	3897	1134	374	12	315	45	5777
Dare	5359	4922	725	2816	3718	354	17894
Hyde	2029	476	331	102	309	46	3293
Beaufort	14253	1815	1104	302	524	590	18588
Bertie	6897	311	694	11	--	--	7913
Camden	1931	83	134	--	--	28	2176
Chowan	4350	502	413	50	--	131	5446
Craven	23499	222	1828	397	152	451	26549
Pamlico	3678	967	366	30	--	291	5332
Pasquotank	9723	140	639	302	--	74	10878
Perquimans	3283	591	296	--	46	--	4216
Tyrrell	1381	213	172	--	--	44	1810
Washington	4729	221	482	--	--	4	5436
Edgecombe	18397	116	1765	88	--	--	20366
Franklin	9983	167	1004	54	--	--	11208
Gates	2889	106	229	--	206	--	3420
Granville	10445	339	779	134	--	--	11697
Greene	5059	83	446	--	--	--	5588
Halifax	18286	394	1616	568	630	--	21494
Hertford	7499	167	593	59	125	--	8443
Johnston	25157	478	2326	393	195	--	28549
Jones	3203	52	400	--	--	--	3655
Lenoir	20674	213	1676	271	--	--	22834
Martin	8615	124	580	165	175	--	9659
Nash	23470	163	2086	1051	25	--	26795
Northampton	7097	574	1050	--	60	--	8781
Pitt	30198	294	2481	634	100	--	33707
Vance	12239	475	1094	256	893	--	14957
Wake	106525	486	6371	4757	48	--	118187
Warren	5257	1045	708	--	--	--	7010
Wayne	32300	231	2501	704	--	--	35736
Wilson	21549	186	1712	321	120	--	23888
TOTAL	468978	23728	39139	15054	9340	3319	559558

Table 26. Housing infrastructure by county, 1987.

County	Estimated Housing Units			Hotel Motel Rooms	Camp-sites	Boat Slips	Total Units
	Occupied	Seasonal	Vacant				
Carteret	20275	11045	2723	2281	1866	1375	39565
Currituck	5146	1413	570	12	315	45	7501
Dare	8400	8793	1495	3635	3718	412	26453
Hyde	2041	991	263	278	309	113	3995
Beaufort	16073	1748	1549	315	524	897	21106
Bertie	7188	479	677	11	--	--	8355
Camden	2085	197	198	--	--	38	2518
Chowan	4869	745	488	130	--	156	6388
Craven	28296	(000)	2516	465	152	707	32136
Pamlico	4071	1359	472	40	--	422	6364
Pasquotank	11584	(000)	978	316	--	74	12952
Perquimans	3858	527	381	--	46	--	4812
Tyrrell	1485	229	149	10	--	44	1917
Washington	4859	384	455	8	--	4	5710
Edgecombe	20751	--	--	127	--	--	20878
Franklin	12338	--	--	54	--	--	12392
Gates	3270	--	--	--	206	--	3476
Granville	12589	--	--	206	--	--	12795
Greene	5108	--	--	--	--	--	5108
Halifax	19789	--	--	632	630	--	21051
Hertford	8028	--	--	185	125	--	8338
Johnston	29491	--	--	1009	195	--	30695
Jones	3528	--	--	--	--	--	3528
Lenoir	22065	--	--	322	--	--	22387
Martin	9232	--	--	219	175	--	9626
Nash	26566	--	--	1720	25	--	28311
Northampton	7613	1036	752	--	--	--	9401
Pitt	35440	--	--	1236	100	--	36776
Vance	14717	--	--	461	893	--	16071
Wake	143584	--	--	6826	48	--	150458
Warren	5652	1816	649	--	--	--	8117
Wayne	35040	--	--	961	--	--	36001
Wilson	23861	--	--	446	120	--	24427
TOTAL	558892	30762	14315	21905	9507	4287	639668

constant during the decade, campsites declined from 20.8 percent of housing in 1980 to 14.1 percent by 1987. Boat slips declined slightly from 2.0 percent in 1980 to 1.6 percent in 1987.

Carteret County's recreational infrastructure, as a percent of total housing, showed a small increase during the 1980s. While 38.7 percent of Carteret's infrastructure was recreational in 1980, the figure increased to 41.9 percent by 1987. Private seasonal units increased from 22.8 percent of all housing to 27.9 percent by 1987. Motel rooms remained relatively constant at 5.4 percent in 1980 and 5.8 percent in 1987. Campsites declined from 6.0 percent in 1980 to 4.7 percent in 1987. Finally, boat slips declined from 4.5 percent in 1980 to 3.5 percent in 1987.

Hyde County, the smallest of the coastline counties, showed the largest increases during the decade. The recreational infrastructure increased from 28.4 percent of all housing in 1980 to 42.2 percent in 1987. Hyde's growth is primarily due to a 108 percent increase in the estimated number of private seasonal housing units. Private seasonal units were 14.5 percent of all housing in 1980 and 24.8 percent in 1987. Another sector which grew was motel rooms. They comprised 3.1 percent of all housing in 1980 and more than doubled to 6.9 percent by 1987. Boat slips also doubled, growing from 1.4 percent of all housing in 1980 to 2.8 percent in 1987.

The fourth coastline county, Currituck, experienced the least change during the current decade. In fact the recreational infrastructure, as a percentage of total housing, declined during the decade from 26.0 percent in 1980 to 23.8 percent in 1987. The reasons for this decline are straightforward. The number of motel rooms, campsites, and boat slips remained constant during the decade, and the growth rate for private seasonal housing units was less than that for permanent occupied housing units.

Among the sound counties, the recreational infrastructure is clearly dominated by private seasonal housing units with the previously noted exceptions (Craven and Pasquotank Counties). Interestingly, the second largest recreational component in individual counties was marina activity. Of the eight counties with marinas, the number of boat slips was greater than the number of motel rooms or campsites in seven counties. Marina activity was especially important in three sound counties, i.e., Beaufort, Craven, and Pamlico.

Pamlico County clearly led among the sound counties with 24.0 percent of its total housing infrastructure classified as seasonal in 1980. The figure increased to 28.6 percent by 1987. Two types of housing accounted for the growth in Pamlico County. First, private seasonal housing grew from 18.1 percent to 21.4 percent of total housing. Second, boat slips grew from 5.5 percent to 6.6 percent of total housing. The latter change reflected a 45.0 percent increase in the number of boat slips during the decade. This figure illustrates the importance of marina activity in Pamlico County.

The importance of marina activity is also seen in the data for Beaufort County. While 17.4 percent of Beaufort County's total housing was classified as recreational in 1980, the figure declined slightly to 16.4 percent by 1987. This shift reflected a 3.7 percent decrease in the estimated number of private seasonal housing units between 1980 and 1987. At the same time there

was a 52.0 percent increase in the number of boat slips in Beaufort County. As a result, boat slips increased from 3.2 percent of total housing in 1980 to 4.2 percent in 1987.

In Craven County, the recreational infrastructure constituted less than 5 percent of total housing and private seasonal housing was less than 1 percent of total housing in both years. However, the number of boat slips increased by 56.8 percent during this decade, and marina activity increased from 1.2 of total housing in 1980 to 2.4 percent in 1987. Again marina activity shows increased significance.

For the remaining sound counties the recreational infrastructure represented more than 10 percent of total housing in 3 counties, i.e., Chowan, Perquimans, and Tyrrell. Chowan County experienced increases in private seasonal units, motel rooms, and boat slips during the decade. The only change in Perquimans County during the decade has been a slight decrease in the number of private seasonal units. Tyrrell County experienced a slight increase in the number of private seasonal units.

In summary, the recreational infrastructure has grown in size during the 1980s. This growth has been led by the construction of private seasonal homes. As previously mentioned, this growth in seasonal housing has been strongest in the coastline counties and has been led by growth in the number of planned developments, especially condominium developments. The other significant growth sector has been in marina activity. The most significant marina development has occurred in the sound counties, specifically Beaufort, Pamlico and Craven Counties. Although the time frame for measuring changes in the recreational infrastructure is limited, we do expect that the growth in private seasonal housing and marinas will continue in the immediate future.

Population Estimates

Our attention now focuses on the population estimates for the A/P Study counties. Population estimates for each of the sectors of the recreational infrastructure (private housing, motel rooms, campsites, and boat slips) are combined with figures for the permanent population to develop a single estimate of the peak population for each county. To reiterate an important point, the estimates represent peak populations if all of the units in the housing infrastructure were occupied. Such peak populations are approached for specific times during the summer season, e.g., Memorial Day weekend, Fourth of July weekend, and Labor Day weekend. The population estimates for 1980 are presented in Table 27, and the population estimates for 1987 are presented in Table 28.

To gauge the magnitude of recreational activity a new measure was developed, i.e., a recreational ratio (rec ratio). The recreational ratio is calculated by dividing the total estimated population by the permanent population. A ratio of 1.00 would indicate there is no meaningful overnight recreational population impact. A ratio of 2.00 would indicate that the recreational population effectively doubles the estimated population in a specific county. For the purposes of this analysis a rec ratio of 1.10 was used as an arbitrary indicator of significant recreational population impact. While we did not

Table 27. Population estimates by county, 1980.

County	Population in Housing Units Permanent	Seasonal	Hotels Motels	Camp-grounds	Marinas	Total	Rec Ratio[1]
Carteret	41092	29016	5344	5097	3483	84032	2.04
Currituck	11089	3742	42	945	123	15941	1.44
Dare	13377	22149	9856	11154	978	57514	4.30
Hyde	5873	2052	357	927	127	9336	1.59
Beaufort	40355	5989	604	1572	1628	50148	1.24
Bertie	21024	1026	22	---	---	22072	1.05
Camden	5829	273	---	---	78	6180	1.06
Chowan	12558	1656	100	---	361	14675	1.17
Craven	71043	732	794	456	1245	74270	1.04
Pamlico	10398	3191	105	---	802	14496	1.39
Pasquotank	28462	462	604	---	63	29591	1.04
Perquimans	9486	1950	---	138	---	11574	1.22
Tyrrell	3975	702	---	---	120	4797	1.21
Washington	14801	729	---	---	10	15540	1.05
Edgecombe	55988	382	176	---	---	56546	1.01
Franklin	30055	551	108	---	---	30714	1.02
Gates	8875	349	---	618	---	9842	1.11
Granville	34043	1118	268	---	---	34429	1.01
Greene	16117	273	---	---	---	16390	1.02
Halifax	55286	1300	1136	1854	---	59576	1.08
Hertford	23368	551	118	375	---	24412	1.04
Johnston	70599	1577	786	585	---	73547	1.04
Jones	9705	171	---	---	---	9876	1.02
Lenoir	59819	702	542	---	---	61063	1.02
Martin	25948	409	330	525	---	27212	1.05
Nash	67153	537	2102	75	---	69942	1.04
Northampton	22584	1894	---	180	---	24658	1.09
Pitt	90146	970	1268	300	---	92684	1.03
Vance	36748	1567	512	2679	---	41056	1.12
Wake	301327	1570	9514	144	---	312555	1.04
Warren	16232	3448	---	---	---	19680	1.21
Wayne	97054	762	1408	---	---	99224	1.02
Wilson	63132	613	642	360	---	64105	1.02
TOTAL	1373541	92413	36738	27904	9160	1539756	1.12

1. Recreational ratio = total estimated population/permanent population.

consider this ratio statistically significant, we felt that an increase of 10 or more percent would have substanively significant impacts on the community.

1980 Estimates. Examination of the population estimates for 1980 reveals the magnitude of recreational activity in the coastline and sound counties. Using a rec ratio of 1.10, all 4 coastline counties, 5 of the 10 sound counties, and 3 of the drainage basin counties meet the criteria. The most dramatic rec ratios are those for Dare County and Carteret County.

The impact of overnight recreational activity is most dramatic in Dare County. While the permanent population in 1980 was 13,377 people, the estimated peak population was 57,514 people. The 4.30 rec ratio for Dare County indicates the population increases by a factor of 4. Another indicator is the change in the population density occurring with recreational development. While there were 34.2 people per square mile using the permanent population, the figure increased to 147.1 people per square mile during peak summer times. While this shift in population density is dramatic, the figure understates the density impact of recreational populations because the development was concentrated on Bodie Island and Hatteras Island.

The estimated peak overnight population for Carteret County in 1980 was 84,032 people. The rec ratio of 2.04 indicates that the overnight population doubled the permanent population. The population density for the permanent population of 78.1 people per square mile increased to 159.8 people per square mile when the overnight recreational population was added. Although the shift in population density is dramatic it actually understates the effect of recreational activity because the latter is concentrated in a small area, i.e., Bogue Banks.

The other coastline counties, Currituck and Hyde, also showed significant recreational activity. Currituck County's population of 11,089 people increased to 15,941 people with the addition of the recreational population, a rec ratio of 1.44. Hyde County's population increased from 5,873 people to 9,336 people in peak recreational periods, a rec ratio of 1.59. For both of these counties the overwhelming majority of the recreational activity is located in private, seasonal housing.

Among the 5 sound counties with significant recreational activity, Pamlico County was the clear leader. Pamlico County's population increased from 10,398 people to 14,496 people during peak periods, a rec ratio 1.39. The recreational infrastructure (private seasonal housing and marinas) is concentrated on the Neuse River, Pamlico Sound and around the small towns of Oriental and Minnesott.

Beaufort County, located on the Pamlico and Pungo Rivers, had a rec ratio of 1.24. The peak population of 50,148 people represented an increase of 9,793 people over the permanent population. While most of the recreational population was in private seasonal homes, there was significant activity in marinas and campgrounds.

Chowan, Perquimans, and Tyrrell are the remaining sound counties with significant recreational activity. All three counties are located on the Albemarle Sound. The recreational activity in Perquimans and Tyrrell Counties

Table 28. Population estimates by county, 1987.

County	Population in Housing Units Permanent	Seasonal	Hotels Motels	Camp-grounds	Marinas	Total	Rec Ratio[1]
Carteret	50485	49941	7983	5598	3799	117806	2.33
Currituck	13689	4428	42	945	123	19227	1.40
Dare	19992	39568	12722	11154	1137	84573	4.23
Hyde	5796	4459	973	927	312	12467	2.15
Beaufort	42754	5768	630	1572	2476	53200	1.24
Bertie	21132	1580	22	--	--	22734	1.07
Camden	5984	590	--	--	104	6678	1.11
Chowan	13535	2458	260	--	429	16682	1.23
Craven	80727	(000)	930	456	1953	83611	1.04
Pamlico	10830	4484	140	--	1167	16621	1.53
Pasquotank	30466	(000)	632	--	205	31303	1.02
Perquimans	10725	1739	--	138	--	12602	1.17
Tyrrell	4144	755	20	--	120	5039	1.21
Washington	14658	1267	16	--	10	15951	1.09
Edgecombe	59127	--	254	--	--	59381	1.00
Franklin	35205	--	108	--	--	35313	1.00
Gates	9686	--	--	618	--	10304	1.06
Granville	38217	--	412	--	--	38629	1.01
Greene	16467	--	--	--	--	16467	1.00
Halifax	56586	--	1264	1854	--	59704	1.06
Hertford	23862	--	370	375	--	24607	1.03
Johnston	79234	--	2018	585	--	81837	1.03
Jones	10090	--	--	--	--	10090	1.00
Lenoir	60341	--	664	--	--	61005	1.01
Martin	26815	--	438	525	--	27778	1.04
Nash	72344	--	3440	75	--	75859	1.05
Northampton	22247	3418	--	180	--	25845	1.16
Pitt	99601	--	2472	300	--	102373	1.03
Vance	39127	--	922	2697	--	42728	1.09
Wake	374582	--	13652	144	--	388378	1.04
Warren	16560	5992	--	--	--	22552	1.36
Wayne	98152	--	1922	--	--	100074	1.02
Wilson	65304	--	892	360	--	66556	1.02
TOTAL	1528009	126447	53198	28405	11837	1747896	1.14

1. Recreational ratio = total estimated population/estimated permanent population.

Figure 9. Estimated peak overnight (recreational) population, by county, 1987.

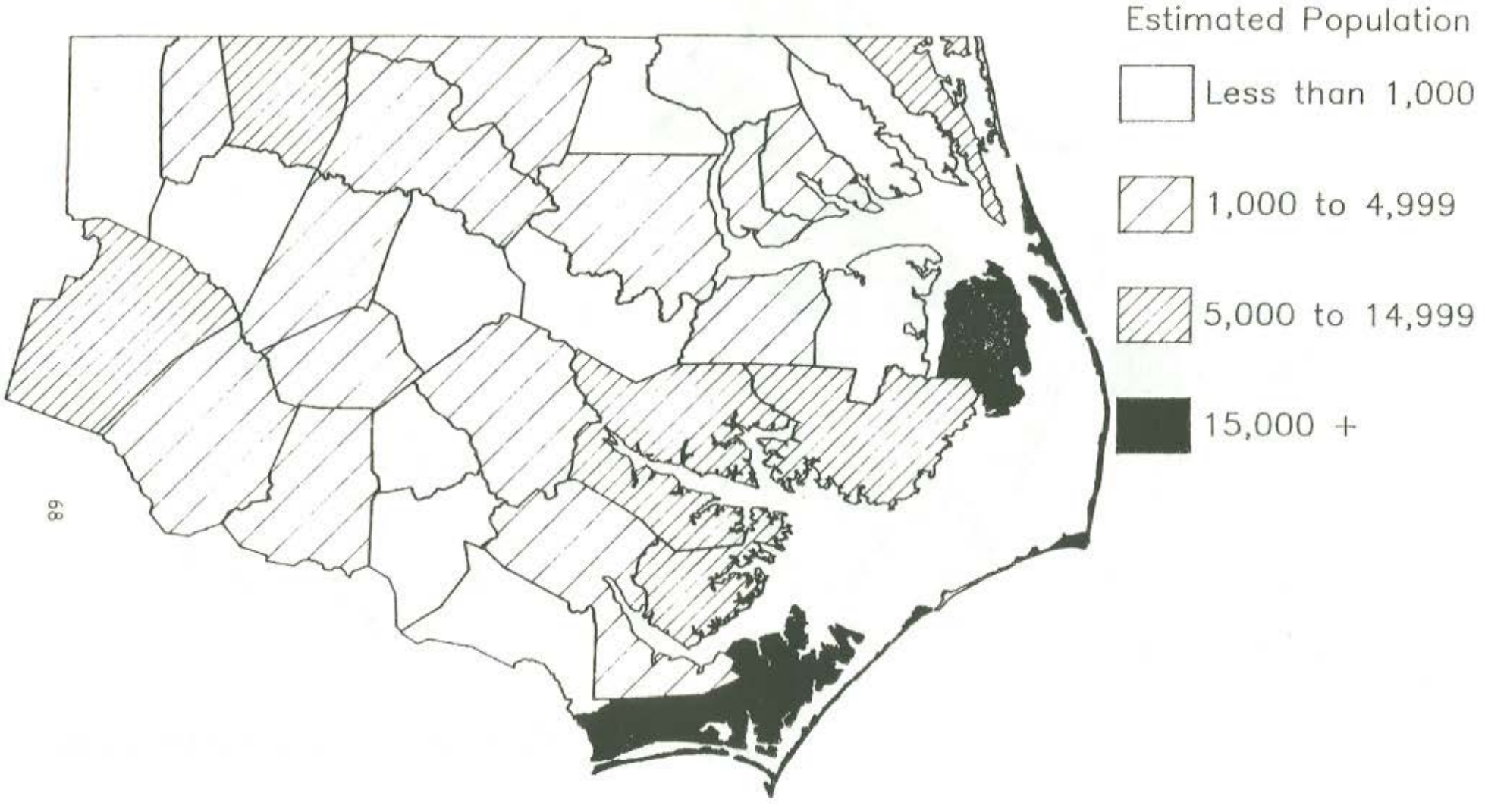
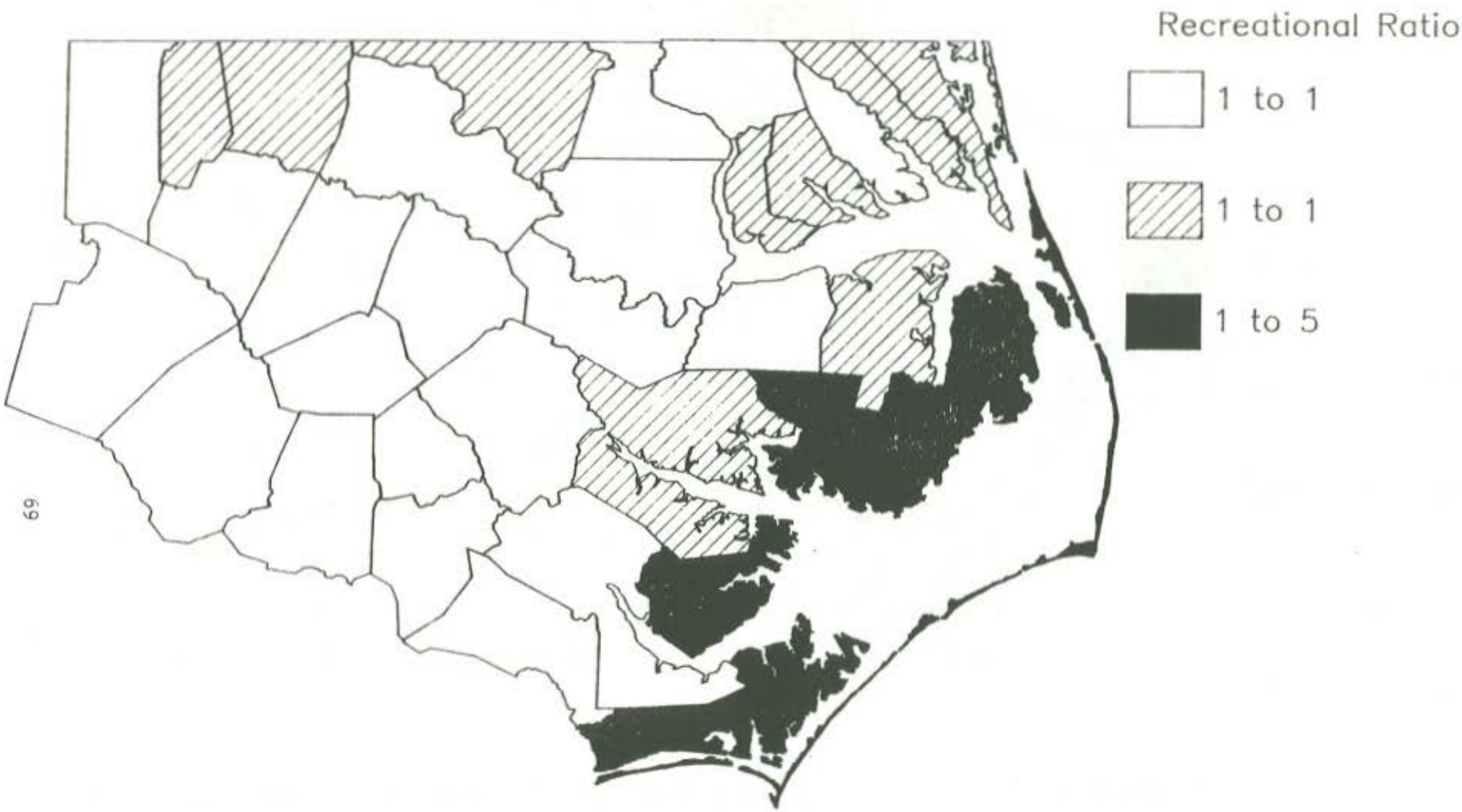


Figure 10. Recreational ratio, by county, 1987.



Ratio = estimated total population/estimated year-round population.

was concentrated in private seasonal housing. In Chowan County, there was significant marina activity in addition to that for private seasonal housing.

Among the drainage basin counties only Gates, Vance and Warren Counties had rec ratios greater than 1.10. The largest part of Gates County's recreational population was located in the county's public campgrounds. The largest part Vance County's development was based around campground activity related to the Kerr Lake State Recreation Area. Warren County's recreational population was entirely located in private seasonal housing associated with Lake Gaston development.

1987 Estimates. During the current decade there was a 13.6 percent increase in the total estimated population for the 33 county study area. Using the rec ratio as an indicator, the coastline and sound counties led in recreational activity. All 4 coastline counties, 6 of 10 sound counties, and 2 of the drainage basin counties had rec ratios greater than 1.10.

With a rec ratio of 4.23, the gain in total population from recreational activity was dramatic in Dare County. Dare County's estimated permanent population of 19,992 increased to 84,573 people during peak periods, a fourfold increase. The rec ratio declined by less than 2 percent between 1980 and 1987. Comparing the estimated total populations for the two dates reveals that the total grew by 47.0 percent during the decade. The 1987 total population estimate resulted in a density of 216.3 people per square mile.

The rec ratio for Carteret County grew by 14.2 percent between 1980 and 1987. With a rec ratio of 2.33, Carteret's estimated permanent population of 50,485 people increased to 117,806 people during peak summer times. The latter figure represented a 40.0 percent increase over the 1980 total population estimate. The 1987 total population figure represented a population density of 224 people per square mile. To reiterate an important point, the population density figure underestimates the true density in primary recreational areas since the overwhelming majority of the recreational activity is located in the relatively small area on Bogue Banks.

Examining the figures for Currituck County indicates the rec ratio actually declined to 1.40, a decrease of less than 3 percent. The estimated permanent population of 11,089 people increased to 19,227 people during peak seasonal periods. The latter figure for the total population represented an increase of 20.6 percent over 1980. The population density figure for 1987 was 75.1 people per square mile.

The rec ratio for Hyde County increased by 35.2 percent during the current decade to a figure of 2.15 for 1987. The estimated permanent population increased from 5,796 people to 12,467 people during the peak recreational season. The total population figure for 1987 increased by 33.5 percent from the 1980 figure. While the population density in 1987 was 20.0 people per square mile, this truly underestimates the density figure for the prime recreational area of Ocracoke Island.

Six of the 10 sound counties have significant recreational activity. Again, Pamlico County led the sound counties with a rec ratio of 1.53, a 10.1 percent increase over the ratio for 1980. The recreational growth in Pamlico

County was a combination of growth in private seasonal housing and marina activity. The 1987 estimated total population represented a 14.7 percent increase over 1980. The population density in 1987 was 48.7 people per square mile.

Other sound counties with significant recreational activity were Beaufort County (1.24), Chowan County (1.23), Tyrrell County (1.21), Perquimans County (1.17), and Camden County (1.11). In Chowan, Camden, Tyrrell, Perquimans, and Camden Counties the recreational housing was concentrated in private seasonal housing. In Beaufort County, marina activity combined with private seasonal housing as the most important types of overnight recreational activity.

Among the drainage basin counties, Northampton County (1.16) and Warren County (1.36) had significant recreational activity. In both cases it was private seasonal housing that accounted for the respective ratios. Northhampton County's rec ratio increased by 6 percent during the current decade. Vance County's, with its campground development along Kerr Lake, still had significant recreational activity.

Tourism and Economic Activity

A final step is to place overnight recreational activity in an economic context. To accomplish this we used two data sources. First, we used data on retail sales and service industry receipts. Second, we used county level estimates of North Carolina tourist income.

Retail sales. We combined data from the Census of Retail Trade with data from the Census of Service Industries. Data were available for 1977 and 1982. The retail trade census included all establishments engaged in selling merchandise for personal and household consumption and rendering services incidental to the sales of goods. The service industries census included information on a wide range of activities. Examples of the services covered include lodging places, recreational services, business services, health services, legal services, and engineering services. These data allow us to make two important comparisons. First, we examine differences in receipts between counties and between years. Second, we place North Carolina's coastal development in a national context by comparing per capita retail sales by county.

An examination of Table 29 reveals that total retail sales in North Carolina were approximately $16.8 billions in 1977. In absolute dollars, Wake County led all A/P Study counties by a large margin. County by county comparisons are based on per capita retail sales.

The per capita sales figure for North Carolina was $2,971 which is below the figure of $3,291 for the United States. Ten of the 33 A/P Study counties had per capita sales figures higher than the state figure. By and large the leading counties contain small and medium size cities, i.e., Beaufort, Pasquotank, Hertford, Lenoir, Nash, Pitt, Vance, and Wilson. Dare County clearly led the way. Its per capita sales ($5,215) were 37 percent greater than the per capita sales figure for the next highest county, Wake ($3,799).

Service industry receipts for North Carolina in 1977 totaled $2.7 billion.

Table 29. Total retail sales, per capita retail sales, and total service industry receipts, by county, 1977 and 1982.

County	1977 Total Retail Sales (Mil. Dol.)	1977 Per Capita Sales (Dol.)	1977 Service Industry Receipts (Mil. Dol.)	1982 Total Retail Sales (Mil. Dol.)	1982 Per Capita Sales (Dol.)	1982 Service Industry Receipts (Mil. Dol.)
Carteret	116.1	2,930	17.7	197.4	4,516	39.2
Currituck	12.4	1,223	1.4	22.7	1,940	3.6
Dare	57.9	5,215	19.1	114.9	7,818	34.3
Hyde	6.9	1,155	1.2	10.0	1,692	2.4
Beaufort	136.5	3,467	13.5	169.0	4,054	24.6
Bertie	32.0	1,505	2.2	39.4	1,857	3.2
Camden	4.2	746	.5	10.7	1,845	.7
Chowan	30.3	2,505	2.9	46.9	3,719	8.2
Craven	199.0	2,788	22.4	319.2	4,331	52.8
Pamlico	13.7	1,385	3.1	26.8	2,526	1.8
Pasquotank	112.1	3,977	11.4	154.3	5,394	27.6
Perquimans	19.3	2,173	1.0	20.0	2,087	1.5
Tyrrell	7.5	1,914	.4	6.9	1,677	1.0
Washington	37.5	2,488	3.5	36.0	2,463	5.0
Edgecombe	140.7	2,549	12.6	162.2	2,845	32.6
Franklin	50.0	1,731	3.9	62.7	2,037	9.2
Gates	9.3	1,101	1.2	14.0	1,553	2.8
Granville	54.9	1,628	4.4	84.8	2,403	11.9
Greene	14.5	965	1.1	18.5	1,148	2.2
Halifax	151.9	2,727	11.8	218.7	3,947	31.4
Hertford	74.9	3,236	6.2	88.2	3,753	14.6
Johnston	165.5	2,427	19.1	278.5	3,847	39.2
Jones	10.0	1,032	1.3	16.9	1,740	5.0
Lenoir	204.4	3,441	24.9	255.0	4,243	60.8
Martin	62.5	2,422	4.9	80.3	3,065	12.0
Nash	241.9	3,652	40.7	359.2	5,244	92.7
Northampton	25.9	1,125	2.4	34.9	1,545	6.8
Pitt	279.7	3,455	28.4	429.2	4,615	86.0
Vance	113.4	3,191	10.0	147.5	3,956	26.4
Wake	1064.4	3,799	250.8	1686.9	5,355	628.5
Warren	20.0	1,229	2.7	30.4	1,890	3.7
Wayne	273.2	2,886	36.0	382.5	3,915	67.9
Wilson	204.7	3,344	41.3	290.6	4,556	116.8
NORTH CAROLINA	16842.3	2,971	2752.8	24082.7	4,156	6268.2

Source

County and City Data Book, 1983, Bureau of the Census, U.S. Department of Commerce, Table B. County and City Data Book, 1988, Bureau of the Census, U.S. Department of Commerce, Table B.

Again, Wake County led the way with receipts of $250.8 million. The counties with the largest service industry receipts were counties with small or medium sized cities. The exceptions were Carteret and Dare Counties which reflected the impact of recreational activity in the counties.

In 1982, total retail sales for North Carolina were $25.0 billion, an increase of 48.5 percent over the 1977 census. All counties, except Tyrrell and Washington, posted significant gains in retail sales over the period. Wake County, with $1.7 billion in sales, clearly led all counties in total sales.

The 1982 per capita retail sales figure for North Carolina, $4,156, was lower than that for the United States, $4,595. Nine of the 33 A/P Study counties had per capita sales greater than the state figure. Again, the counties with higher per capita sales contained small or medium sized cities. The notable exceptions were the coastline counties, Carteret and Dare.

Dare County clearly led all counties with per capita sales of $7,818. This was 46 percent higher than the next highest county, Pasquotank. Three counties, Pasquotank, Wake, and Nash, had per capita sales figures greater than $5,000. Ten counties had per capita sales less than $2,000. In general these were small rural counties. Importantly, these counties included the coastline counties of Currituck and Hyde, and the sound counties of Bertie, Camden, and Tyrrell.

Table 30. Population, county rank, per capita retail sales, and United States rank, by county.

County, State	1986 Population Size	County Rank	1982 Retail Sales Per Capita Sales (Dol.)	U.S. Rank
Nantucket, MA	6000	2,775	13,170	1
Pitkin, CO	10300	2,378	12,890	2
Summit, CO	11100	2,307	11,015	3
Eagle, CO	16400	1,909	10,931	4
Teton, WY	10800	2,337	10,689	5
Jones, SD	1500	3,097	9,756	6
Anchorage, Ak	235000	201	8,790	7
Lincoln, CO	4700	2,881	5,532	8
Dukes, MA	10900	2,323	8,504	9
Worcester, MD	36100	1,103	8,490	10
.....	...	...	...	..
Dare, NC	18800	1,757	7,818	19
UNITED STATES			4,595	

Source

County and City Data Book, 1988, Bureau of the Census, U.S. Department of Commerce, Tables 1 and B.

North Carolina's service industry receipts for 1982 were $6.3 billion, a 46 percent increase over 1977. Wake County, with $628.5 million, led all counties. Counties with small and medium sized cities generally led the A/P Study area. However, the coastline counties of Carteret and Dare were among the leaders. Carteret County's service receipts increased by 121.5 percent, and Dare County's receipts increased by 79.6 percent, during the intercensal period.

To demonstrate the importance of recreational activity, and to place these dollar figures in a national context, Dare County's per capita retail sales figures are compared to national figures. There are 3,139 counties in the United States. In Table 30, counties' population size and population rank for 1986 are compared to per capita retail sales data for 1982. As seen, Dare County's figure of $7,818, ranked as the 19 highest figure in the United States. Equally important, 8 of the top 10 counties are similar to Dare County. They are small, non-adjacent, nonmetropolitan counties with significant overnight recreational activity.

Nantucket and Dukes Counties, located in Massachusetts, are islands off the Cape Cod coastline. Pitkin, Summitt, Eagle, and Lincoln Counties, located in Colorado, represent recreational development built around skiing. Teton County, in Wyoming, is also based on skiing development. Jones County, in central South Dakota, is based on recreation on the White River. Worcester County is located on the barrier islands of Maryland. Only the metropolitan area of Anchorage, Alaska, is counted among the top 10 counties. The per capita retail sales figures for all these counties reflect the money spent by people visiting them.

The pattern for per capita retail sales extends to eating and drinking places. Two of the top 10 counties, North Slope and Bristol Bay, are located in Alaska. Pitkin, Summit, and Eagle, (Colorado), Nantucket, (Massachusetts), Worcester, (Maryland), and Teton, (Wyoming), also rank in the top 10 in eating and drinking places per capita retail sales. Dare County, with a figure of $1,508, ranks ninth in per capita retail sales for eating and drinking places.

Travel expenditures and retail sales. A final approach to evaluating the economic impact of recreation is to compare 1987 population data to 1987 figures on tourism revenue and retail sales.

The estimates of tourism revenues are developed for the Division of Travel and Tourism, North Carolina Department of Commerce (1988). State esti-mates of tourism dollars are based on benchmark data developed from the U.S. Census of Transportation, National Travel Survey, 1977, which indicate that hotel and motel receipts are 16 to 17 percent of total travel expenditures. Total travel expenditures for 1987 were computed as hotel-motel sales divided by 0.17.

North Carolina's total tourism expenditures for 1987 were estimated at $5.7 billion. This represented an increase of 11.8 percent over 1986. Spending by out-of-state visitors was estimated at $4.1 billion in 1987. County by county tourism revenue data are presented in Table 31. The 1987 total estimated expenditures for the 33 A/P Study counties were $1.5 billion which represented 27 percent of state travel revenues.

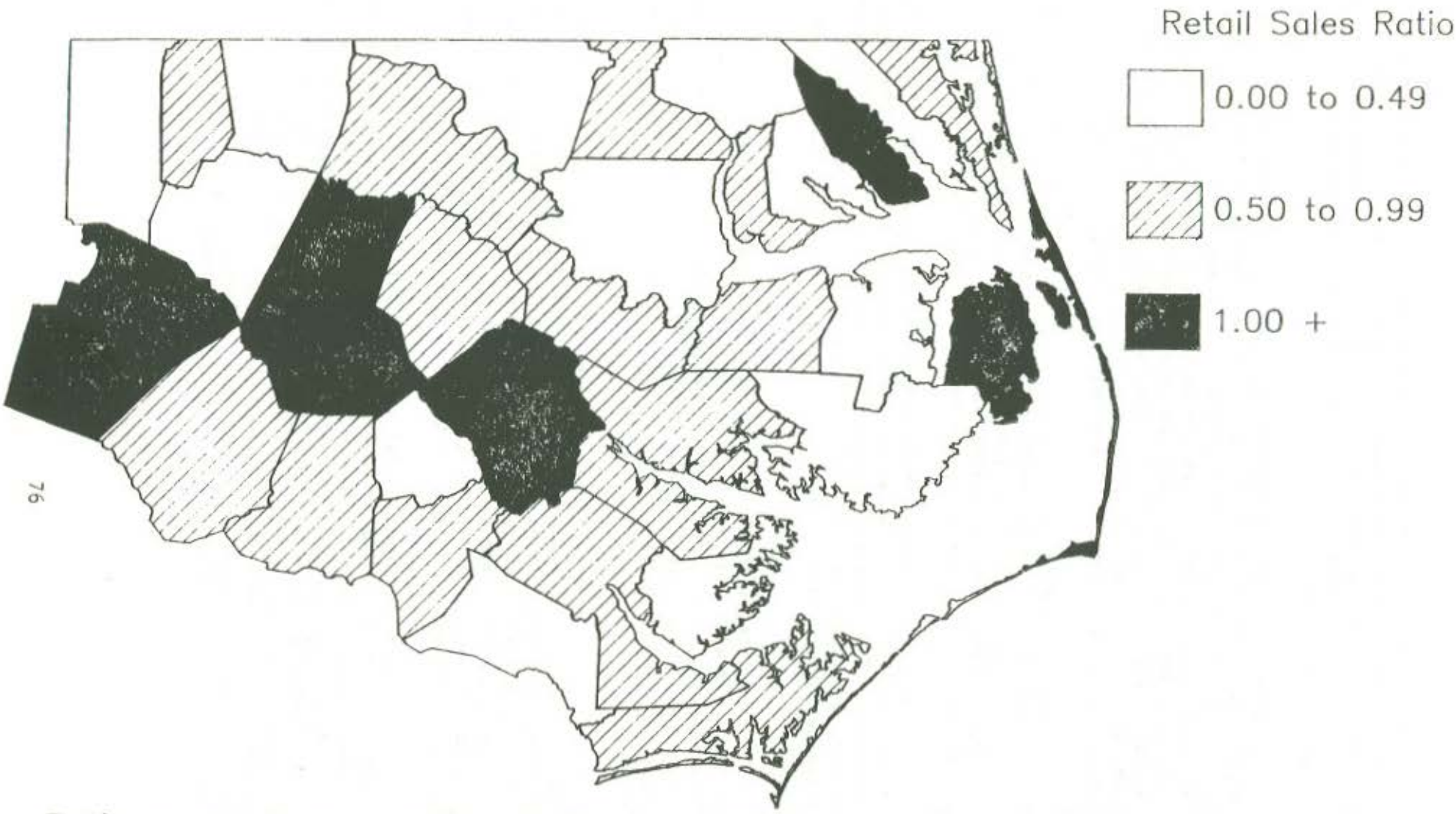
Table 31. Permanent population, estimated travel expenditures, per capita travel expenditures, gross retail sales, and per capita retail sales, by county, 1987.

County	Permanent Estimated Population	Estimated Travel Expenditures ($1,000)	Per Capita Expenditures (Dol.)	Gross Retail Sales (Mil. Dol.)	Per Capita Sales (Dol.)
Carteret	50485	155,192	3,074	430.1	8,519
Currituck	13689	2,864	209	75.4	5,508
Dare	19992	399,058	19,960	372.6	18,637
Hyde	5796	15,674	2,704	25.1	4,331
Beaufort	42754	5,848	137	348.9	8,160
Bertie	21132	347	16	67.7	3,204
Camden	5984	351	59	14.5	2,423
Chowan	13535	4,591	339	74.7	5,519
Craven	80727	40,006	496	530.0	6,565
Pamlico	10830	745	69	41.0	3,786
Pasquotank	30466	19,559	642	284.6	9,342
Perquimans	10725	630	59	35.3	3,291
Tyrrell	4144	179	43	15.4	3,716
Washington	14658	1,788	122	79.5	5,424
Edgecombe	59127	6,138	104	336.2	5,686
Franklin	35205	2,337	66	148.0	4,204
Gates	9686	322	33	31.4	3,242
Granville	38217	12,831	336	168.8	4,417
Greene	16467	193	12	54.8	3,328
Halifax	56586	34,375	607	366.1	6,470
Hertford	23862	9,516	399	182.6	7,652
Johnston	79234	41,189	520	579.6	7,315
Jones	10090	200	20	29.9	2,963
Lenoir	60341	23,419	388	513.2	8,505
Martin	26815	13,521	504	146.9	5,478
Nash	72344	91,944	1,271	806.8	11,152
Northampton	22247	2,003	90	54.9	2,468
Pitt	99601	62,648	629	910.3	9,139
Vance	39127	17,292	442	285.8	7,304
Wake	374582	517,416	1,381	4,944.8	13,201
Warren	16560	1,000	60	55.4	3,345
Wayne	98152	32,229	328	777.2	7,918
Wilson	65304	20,820	319	688.2	10,538
TOTAL	1528009	1,535,925	1,005	13,475.7	8,819

Source

"1987 North Carolina Travel Study" (Technical Report), Division of Travel and Tourism, North Carolina Department of Commerce, Raleigh, North Carolina. "State Sales and Use Tax: Gross Collections and Gross Retail Sales by County, 1987" N.C. Department of Revenue, Raleigh, North Carolina.

Figure 11. Per capita retail sales ratios, by county, 1987.



Ratio = county per capita retail sales/state per capita retail sales.

Three counties accounted for 69.8 percent of the travel revenues generated in the A/P Study area. Wake County, with $517.4 million in estimated travel expenditures, led all counties. Dare County had an estimated $399.1 million in travel expenditures, and Carteret County had an estimated $155.2 million in travel expenditures.

To make inter-county comparisons, per capita travel expenditures were calculated by dividing the estimated travel revenue by the permanent esti-mated population. Three coastline counties, 2 drainage basin counties, and none of the sound counties had figures greater than the per capita figure for the A/P Study area ($1,005). The coastline counties were Dare ($4,718), Carteret ($1,317), and Hyde ($1,257). The drainage basin counties were Wake ($1,332) and Nash ($1,212). The per capita figure for Dare County is truly remarkable, representing the highest figure among North Carolina's 100 counties.

Gross retail sales in North Carolina for 1987 totaled $61,813.6 million. Examination of 1987 retail sales figures for the A/P Study area indicated total sales of $13,475.7 million, 21.8 percent of the state total. Nineteen of the 33 A/P Study counties posted retail sales of more that $100 million. Wake County led all counties by a wide margin posting sales of almost $5 billion.

To make inter-county comparisons of retail sales, per capita sales were calculated by dividing the gross retail sales by the estimated permanent population. The per capita retail sales figure for the A/P Study area was $8,819. One coastline county (Dare), one sound county (Pasquotank), and four drainage basin counties (Nash, Pitt, Wake, and Wilson) exceeded the study area figure.

Dare County, with $18,637 in per capita sales, clearly led all counties in the study area and the state. Among the remaining coastline and sound counties with significant recreational activity, only Carteret and Beaufort posted per capita sales figures of over $8,000. Bertie, Camden, Pamlico, Perquimans, and Tyrrell Counties all showed per capita sales of less than $4,000.

While the revenue figures for Dare and Carteret Counties are truly remarkable, a closer examination of the differences between Dare and Carteret Counties are instructive. Remembering that lodging receipts are 17 percent of total travel expenditures, we find that Dare's 1987 lodging receipts ($67.8 million) were 2.5 times greater than Carteret's receipts ($26.4 million). Accordingly, the 1987 estimated total travel revenue figure for Dare County is 2.5 times greater than that for Carteret County.

Gross retail sales for 1987 were $430.1 million for Carteret County as compared to $372.6 million for Dare County. Comparing retail sales on a month to month basis indicates that for both counties the lowest sales figures were for February and the peak figures were for August. Carteret County's February retail receipts ($21.8 million) were almost twice those for Dare County ($11.0 million). However, Dare County's August sales receipts ($58.6 million) were 29 percent higher than Carteret's ($45.5 million). While Carteret County's retail were 109 percent higher in August than in February, Dare County's retail sales were 433 percent higher in August than in February.

Comparing the travel expenditures estimates and retail sales for Dare County seems to indicate that the overwhelming majority of retail sales must be tourism generated, a questionable inference. Other information also supports the idea that the travel revenue estimates for Dare County may need to be revised. Specifically, other indicators of travel activity reveal little, if any, differences between the counties.

To briefly reiterate, comparison of the recreational infrastructures reveals there were 16,567 designated recreational units in Carteret County and 16,558 such units in Dare County, a difference of 9 units. Carteret County leads in two housing categories, i.e., private, seasonal units (+ 2252) and boat slips (+ 963). Dare County leads in two housing categories, i.e., motel/hotel rooms (+ 1354) and campsites (+ 1852).

In addition to the obvious differences in motel/hotel rooms and campsites, there must be significant differences in the rental of private, seasonal units. A much larger proportion of the private, seasonal housing in Dare County must be rented through rental management companies (thus qualifying as lodging receipts), while such housing in Carteret County must be privately rented by owners or occupied as second homes by owners. The latter must also apply to private seasonal units in other counties.

The overnight, recreational populations (total population - permanent population) for the two counties were also comparable. The recreation population figure for Carteret County was 67,321 people as compared to 64,581 people for Dare County, a difference of approximately 2,700 people. Again, it is difficult to imagine how this small population difference could translate into the large differences in travel expenditures for the two counties.

While we might question the magnitude of specific travel revenue estimates, there is no doubt that travel expenditures are a large and central part of the economies of the coastline and sound counties in the A/P Study area. Every indication points to a continuing growth in tourist related activity.

REFERENCES

Barrows, R. and W. Nilsestuen
1974 Recreation and Economic Development in the Kickapoo Valley. Staff Paper No. 70, Cooperative Extension Service, University of Wisconsin. Madison, Wisconsin.

Berry, B. and F. Norton
1970 "Theories and techniques for studying urban and regional growth," in Geographic Perspectives on Urban Systems. Englewood Cliffs, N.J.: Prentice-Hall Inc.

Bryant, E. and T. Napier
1981 "The socio-economic impact of outdoor recreation development: a literature review", in Outdoor Recreation Planning, Perspectives, and Research T. Napier, editor. Dubuque, Iowa: Kendall/Hunt Publishing Company.

Dailey, G. and R. Campbell
1980 "The Ozark-Ouachita uplands: growth and consequences", in New Directions in Urban-Rural Migration, D. Brown and J. Wardell, editors. New York: Academic Press.

Duvalis, J., C. Ching, G. Frick, and R. Christensen
1974 Economic Effects of Pawtuckaway State Park, Research Report No. 34. Durham, New Hampshire: University of New Hampshire.

Dwyer, J. and R. Epseth
1977 Improved Local Planning for Reservoir-Oriented Recreation Opportunities. Research Report No. 123. Urbana, Illinois: University of Illinois, Water Resources Center.

Frick, G. and C. Ching
1970 "Generation of local income from users of a rural public park", Journal of Leisure Research, 2: 260-263.

Garbacz, C.
1971 Ozarks: recreation and economic development", Land Economics, 47: 418-421.

Goldstein, S.
1976 "Facets of redistribution: research challenges and opportunities." Demography. 13: 423-434.

Johnson, J. and R. Perdue
1986 Marine Recreational Fishing, Marine Manufacturers and Marinas in North Carolina: An Economic Characterization. Raleigh, NC: University of North Carolina Sea Grant College Program. Working Paper 86-3.

Kenneth Creveling Associates
1982 Beach Communities and Oil Spills: Environment and Economic Consequences for Brunswick County, North Carolina. Raleigh, N.C.: North Carolina Department of Natural Resources and Community Development, Office of Coastal Management (CEIP Report No. 13).

Lee, E., H. Goldsmith, M. Greenberg, and D. Pittenger
1982 "Trends and prospects", in Population Estimates: Methods for Small Area Analysis. Beverly Hills, CA: Sage Publications.

Long, L. and K. Hansen
1977 "Migration trends in the United States." U.S. Bureau of the Census (unpublished).

McCarthy, K. and P. Morrison
1979 The changing demographic and economic structure of nonmetropolitan areas in the United States. Santa Monica, CA: The Rand Corporation, R-2399-EDA.

N.C. Department of Commerce
1988 "1987 North Carolina Travel Survey" (technical report) Division of Travel and Tourism, Raleigh, North Carolina.

N.C. Office of State Budget and Management
1988 "Provisional estimates of the population of North Carolina counties, July 1, 1987" Management and Information Services, Raleigh, North Carolina.

Perdue, R. and A. Coughlin
1987 "1987 Outer Banks Chamber of Commerce Visitor Survey", Department of Recreation Resources Administration, School of Forest Resources, North Carolina State University, Raleigh, NC.

Pittenger, D.
1976 Projecting State and Local Populations. Cambridge, MA: Ballinger Publishing Company.

Raymondo, James C.
1989 "How to estimate population," American Demographics. Vol 11, No. 1, pp. 46-49.

Smith, S.
1987 "Some thoughts on estimating temporary populations," Applied Demography. 3: 3-4.

Shryock, H., J. Siegel
1976 The Methods and Materials of Demography, New York, NY: Academic Press.

Tschetter, P. and J. Maiolo
1983 "The measurement of growth in recreational populations in coastal areas: a methodological problem", paper presented at Southern Sociological Society, Atlanta, GA.

Tschetter, P. and J. Maiolo
1984 "Estimation of the overnight recreational population in North Carolina's coastal counties, 1980", (unpublished report) Raleigh, NC: University of North Carolina, Sea Grant College Program.

U.S. Department of Commerce, Bureau of the Census
1982 User's Guide, Part B, 1980 Census of Population and Housing. Washington, D.C.: U.S. Government Printing Office.

Wardell, J. and D. Brown
1980 "Population redistribution in the United States during the 1970s", in New Directions in Urban-Rural Migration. D. Brown and J. Wardell, editors, New York, NY: Academic Press.

APPENDIX A
UTILITY COMPANIES SERVING COASTLINE AND SOUND COUNTIES

Carteret
- Carteret-Craven Electric Membership Corporation
- Harkers Island Electric Membership Corporation
- Carolina Power and Light Company

Currituck
- Albemarle Electric Membership Corporation
- North Carolina Power

Dare
- Cape Hatteras Electric Membership Corporation
- North Carolina Power
- Tideland Electric Membership Corporation

Hyde
- North Carolina Power
- Tideland Electric Membership Corporation

Beaufort
- Edgecombe-Martin County Electric Membership Corporation
- Carolina Power and Light
- City of Washington
- North Carolina Power
- Tideland Electric Membership Corporation
- Town of Belhaven

Bertie
- Edgecombe-Martin County Electric Membership Corporation
- Halifax Electric Membership Corporation
- North Carolina Power
- Roanoke Electric Membership Corporation
- Town of Windsor

Camden
- Albemarle Electric Membership Corporation
- North Carolina Power

Chowan
- Albemarle Electric Membership Corporation
- North Carolina Power
- Roanoke Electric Membership Corporation
- Town of Edenton

Craven
- Carolina Power and Light
- Carteret-Craven Electric Membership Corporation
- City of New Bern
- Jones-Onslow Electric Membership Corporation
- Tideland Electric Membership Corporation

Pamlico
- Carolina Power and Light
- Tideland Electric Membership Corporation

Pasquotank
- Albemarle Electric Membership Corporation
- City of Elizabeth City
- North Carolina Power

Perquimans
- Albemarle Electric Membership Corporation
- North Carolina Power
- Roanoke Electric Membership Corporation
- Town of Hertford

Tyrrell
- North Carolina Power

Washington
- North Carolina Power
- Tideland Electric Membership Corporation

Warren
- Halifax Electric Membership Corporation
- Carolina Power and Light
- North Carolina Power

APPENDIX B
CAMPGROUNDS, 1987

	Number of sites	Open year round
BEAUFORT COUNTY		
Private		
Billy-K Campground	20	no
Krek Vue	27	no
Pamlico Gardens	20	no
Riverside	150	yes
Twin Lakes	185	yes
Whichard's Beach	110	yes
Public		
Goose Creek	12	no
TOTAL	524	
CARTERET COUNTY		
Private		
A & J Overnight Park	10	no
Arrowhead Campsite	171	no
Bridgeview Woods	128	yes
Camp Ocean Forest	165	no
Cedar Creek	58	no
Cedar Point Beach	40	yes
Coastal Riverside	70	yes
Driftwood	65	yes
Emerald Isle	39	no
Fisherman's Inn	19	no
Goose Creek Resort	198	yes
Holiday Trav-l Park	300	yes
Indian Beach	92	no
Pender Park	150	yes
Salter Path	200	no
Soundview	48	yes
Sound Watch	28	yes
Tommie's Campground	45	no
Public		
Croatan National Forest	40	no
TOTAL	1866	

	Number of sites	Open year round
CRAVEN COUNTY		
Private		
Jellystone Park	80	yes
Neuse River	50	yes
Public		
Croatan National Forest	22	no
TOTAL	152	
CURRITUCK COUNTY		
Private		
Bells Island	95	yes
Hampton Lodge	220	no
TOTAL	315	
DARE COUNTY		
Private		
Anderson's	19	yes
Avon Pier	38	no
Beach and Bay	22	no
Bill and Barb's	20	no
Cape Hatteras KOA	430	no
Cape Woods	80	no
Collington Park	65	yes
Cozy Cove	88	yes
Cypress Cove	30	no
Frisco Woods	80	no
Hatteras Fishing Center	10	yes
Hatteras Sands	130	no
Joe and Kay's	70	no
Kinnakeet	60	yes
Kitty Hawk	100	yes
KOA Holiday	255	no
KOA Original	177	no
North Beach	110	no
Ocean Beach	215	no
Pea Island Resort	420	yes
Sandpiper's Trace	500	yes
Scotch Bonnet	50	no
Shallowbag Bay	10	yes
Surf-N-Sound	250	no
Village Marina	40	no
Public		
Cape Point NPS	202	no
Frisco NPS	127	no
Oregon Inlet NPS	120	no
TOTAL	3718	

	Number of sites	Open year round
GATES COUNTY		
Public		
Merchants Mill Pond	206	no
TOTAL	206	
HALIFAX COUNTY		
Private		
Enfield KOA	80	yes
Horne's Interstate	220	yes
Outdoor's World	260	no
Ponderosa	70	yes
TOTAL	630	
HERTFORD COUNTY		
Private		
Tuscarora Shores	125	no
TOTAL	125	
HYDE COUNTY		
Private		
Beachcombers	30	no
Big Trout	48	yes
Fisherman's Wharf	16	yes
Teeters	25	yes
White Plains	54	no
Public		
Ocracoke NPS	136	no
TOTAl	309	
JOHNSTON COUNTY		
Private		
Colonial RV	95	yes
Polka Dot Resort	100	yes
TOTAL	195	
MARTIN COUNTY		
Private		
Green Acres	175	yes
TOTAL	175	
NASH COUNTY		
Private		
College Park	15	yes
Nomad Overnight	10	no
TOTAL	25	

	Number of sites	Open Year Round
NORTHAMPTON COUNTY		
Private		
Clement's Overnight	60	yes
TOTAL	60	
PERQUIMANS COUNTY		
Private		
Hertford	46	no
TOTAL	46	
PITT COUNTY		
Private		
Contentnea	100	yes
TOTAL	100	
VANCE COUNTY		
Private		
Flemington Road	91	no
Lake Vance	40	yes
Tar Heel	65	no
Public		
Bullocksville	69	yes
County Line	75	yes
Henderson Point	79	yes
Hibernia	150	yes
Kimball Point	100	yes
Nutbush Bridge	109	yes
Satterwhite Point	115	yes
TOTAL	893	
WAKE COUNTY		
Private		
College Park	20	yes
Public		
William B. Umstead	28	yes
TOTAL	48	
WILSON COUNTY		
Private		
Kampers Lodge	100	yes
Rock Ridge	20	yes
TOTAL	120	

APPENDIX C
CAMPGROUND SURVEY
QUESTIONNAIRE

Facility_____

Location_____

1. What year did this facility start operation?_____

2. What is the present number of campsites?_____

3. On what basis are sites rented out?

_____ daily
_____ weekly
_____ monthly
_____ seasonal

4. If there is long term use, what is being used to occupy the campsite, e.g., trailers, RVs, etc.? _____

5. When are your peak periods of operation?_____

6. How much of your business is on weekends as compared to weekdays?_____

7. What proportion of campsites are occupied during a peak period?_____

8. What proportion of campsites are occupied during the summer?_____

Comments:

APPENDIX D
MARINAS, 1987

	Boat Slips			
	Transient	Seasonal	Dry Stack	Total
CARTERET COUNTY				
Anchorage Marina	15	115	--	130
Atlantic Beach Causeway Marina	--	12	--	12
Beacon's Reach Marina	--	40	--	40
Beaufort Docks	80	--	--	80
Beaufort Inn	15	--	--	15
Brandywine Bay Marina	--	40	--	40
Calico Jack's Marina	37	20	--	57
Captain Bill's	7	--	--	7
Charter Restaurant	5	--	--	5
Coral Bay Marina	--	16	200	216
Crow's Nest Marina		12	195	207
Discovery Diving Company	--	20	--	20
Dockside Marina	--	74	--	74
Dudley Marina	--	26	176	202
Fort Macon Marina	--	--	225	225
Harbor Master	--	30	--	30
Harborside Services Services and Hotel	2	--	--	2
Harker's Island Fishing Center	69	--	--	69
Island Marina	10	--	--	10
Morehead City Yacht Basin	15	57	--	72
Morehead Gulf Docks	--	9	--	9
Morehead Sports Marina	--	20	--	20
Radio Island Marina	--	--	275	275
Sanitary Restaurant	5	--	--	5
Sea Gate Association	--	56	--	56
70 West Marina	--	80	328	408
Spooners Creek Yacht Harbor	--	85	--	85
Spouter Inn Restaurant	3	--	--	3
Triple S Yacht Basin	--	67	--	67
TOTAL	186	1189	1399	2441
CURRITUCK COUNTY				
Coinjock Marina	20	--	--	20
Harrison's Marina	15	--	--	15
Tate's Marine Railway	10	--	--	10
TOTAL	45	--	--	45

	Boat Slips			
	Transient	Seasonal	Dry Stack	Total
DARE COUNTY				
Dough's Creek Marina	--	53	--	53
Hatteras Fishing Center	--	100	--	100
Hatteras Harbor Marina	23	23	--	46
Mann's Harbor Marina	15	--	--	15
Oregon Inlet Fishing Center	7	--	--	7
Manteo Town Dock	5	--	--	5
Pirate's Cove Marina and Yacht Club	--	72	--	72
Salty Dawg Marina	--	55	--	55
Village Marina	43	--	--	43
Willis Boat Landing	16	--	--	16
TOTAL	109	303	--	412
HYDE COUNTY				
Anchorage Inn	45	--	--	45
Community Store Docks	--	22	--	22
Dockside Restaurant	2	--	--	2
Jarvis Marina	4	--	--	4
Ocracoke Public Dock	40	--	--	40
TOTAL	91	22	--	113
BEAUFORT COUNTY				
Aurora Town Marina	10	--	--	10
Bath Guest House	6	--	--	6
Bath State Dock	4	--	--	4
Belhaven Marina	30	--	--	30
Carolina Wind (McCotter)	--	210	--	210
CeeBee Marina	--	15	--	15
East Carolina Yacht	--	42	--	42
Harbor Motel and Marina	--	30	--	30
Haven's Wharf	2	18	--	20
Jordan Creek Marina	--	40	--	40
Pamlico Plantation	--	175	--	175
Pantego Creek Marina	--	40	--	40
Pungo Creek Yacht Harbor	--	56	--	56
River Forest Manor	18	--	--	18
Twin Lakes Marina	--	30	--	30
Washington City Docks	12	--	--	12
Washington Yacht and Country Club	--	144	--	144
Whichard's Marina	--	15	20	35
TOTAL	82	815	20	917

	Boat Slips			
	Transient	Seasonal	Dry Stack	Total
CAMDEN COUNTY				
Paradise Marina	14	--	--	14
Pelican	--	24	--	24
TOTAL	14	24	--	38
CHOWAN COUNTY				
Cypress Point Marina	--	20	--	20
Edenton Marina	--	130	--	130
Edenton Public Docks	6	--	--	6
TOTAL	6	150	--	156
CRAVEN COUNTY				
Blackbeard Sailing Club	--	100	--	100
Duck Creek Marina	--	50	--	50
Eastern Carolina Yacht Club	--	60	--	60
Fairfield Habor Marina	--	240	--	240
River Bend Marina	--	75	--	75
Sheraton Hotel and Marina	20	136	--	156
Tidewater Marina	--	26	--	26
Yachting Center	--	--	20	20
TOTAL	20	687	20	727
PAMLICO COUNTY				
Deaton Yacht Services	--	20	--	20
Minnesott Beach Yacht Basin	--	130	40	170
Oriental Marina	15	--	--	15
Oriental Town Dock	5	--	--	5
Point Marina	--	22	--	22
R.E. Mayo Co., Inc.	5	--	--	5
Sea Harbor Marina	--	75	--	75
Whittaker Creek Yacht Harbor	10	140	--	150
TOTAL	35	387	--	422
PASQUOTANK COUNTY				
Elizabeth City Ship Yard	--	60	--	60
Mariner's Wharf Marina	--	14	--	14
TOTAL	--	74	--	74

	Boat Slips			
	Transient	Seasonal	Dry Stack	Total
TYRRELL COUNTY				
Alligator River Marina	30	--	--	30
Columbia Marina	--	14	--	14
Sawyer's Marina	--	30	--	30
TOTAL	30	44	--	74
WASHINGTON COUNTY				
Plymouth Municpal Dock	4	--	--	--
TOTAL	4	--	--	4

NEW MARINAS, 1988

	Boat Slips			
	Transient	Seasonal	Dry Stack	Total
CARTERET COUNTY				
Portside Marina	8	--	160	168
CRAVEN COUNTY				
Matthews Point Marina	--	60	--	60
Sheraton Hotel and Marina (expansion)	--	150	--	150

APPENDIX E
MARINA QUESTIONNAIRE

Facility_____

Location_____

Person(s) contacted_____

1. What year did this facility start operations?_____

2. What is the present number of boat slips?_____

3. Has the number of boats slips changed since the Marina first began operation? If so, when?_____

4. When are the peak period of operations?_____

5. What proportion of boat slips are occupied during the peak period?_____

6. What proportion of boat slips are occupied during the summer?_____

7. Comments: