

# **COASTAL NORTH CAROLINA SOCIOECONOMIC STUDY**

## **VOLUME I**

### **EXECUTIVE SUMMARY**

**Submitted By:**

**THE INSTITUTE FOR COASTAL AND MARINE RESOURCES  
AND THE DEPARTMENT OF SOCIOLOGY  
EAST CAROLINA UNIVERSITY  
GREENVILLE, NORTH CAROLINA**

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# **FINAL TECHNICAL REPORT**

**FOR THE**

**COASTAL NORTH CAROLINA SOCIOECONOMIC STUDY**

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**EXECUTIVE SUMMARY**

## **PROJECT STAFF**

The following persons participated in the development of this report:

### **East Carolina University**

**John R. Maiolo, Principal Investigator  
Edward W. Glazier, Project Manager  
Belinda Blinkoff, Field Researcher  
Robert Blinkoff, Field Researcher  
Barbara Garrity-Blake, Field Researcher  
Cindy Harper, Support Staff  
Mym Young, Staff Support**

### **Impact Assessment, Inc.**

**John S. Petterson, Principal Investigator  
Michael A. Downs, Program Manager  
John C. Russell, Regional Analyst  
Hal Edwards, GIS Systems Analyst  
Joel K. Bourne, Research Analyst  
Mari Rodin, Research Analyst  
Liesl Scherthanner, Field Researcher  
Daniel Lavin, Field Researcher  
Pamela Dziuban, Technical Writer  
Jennifer Wahlstrand, Technical Writer  
Robin E. Johnson, Administrator**

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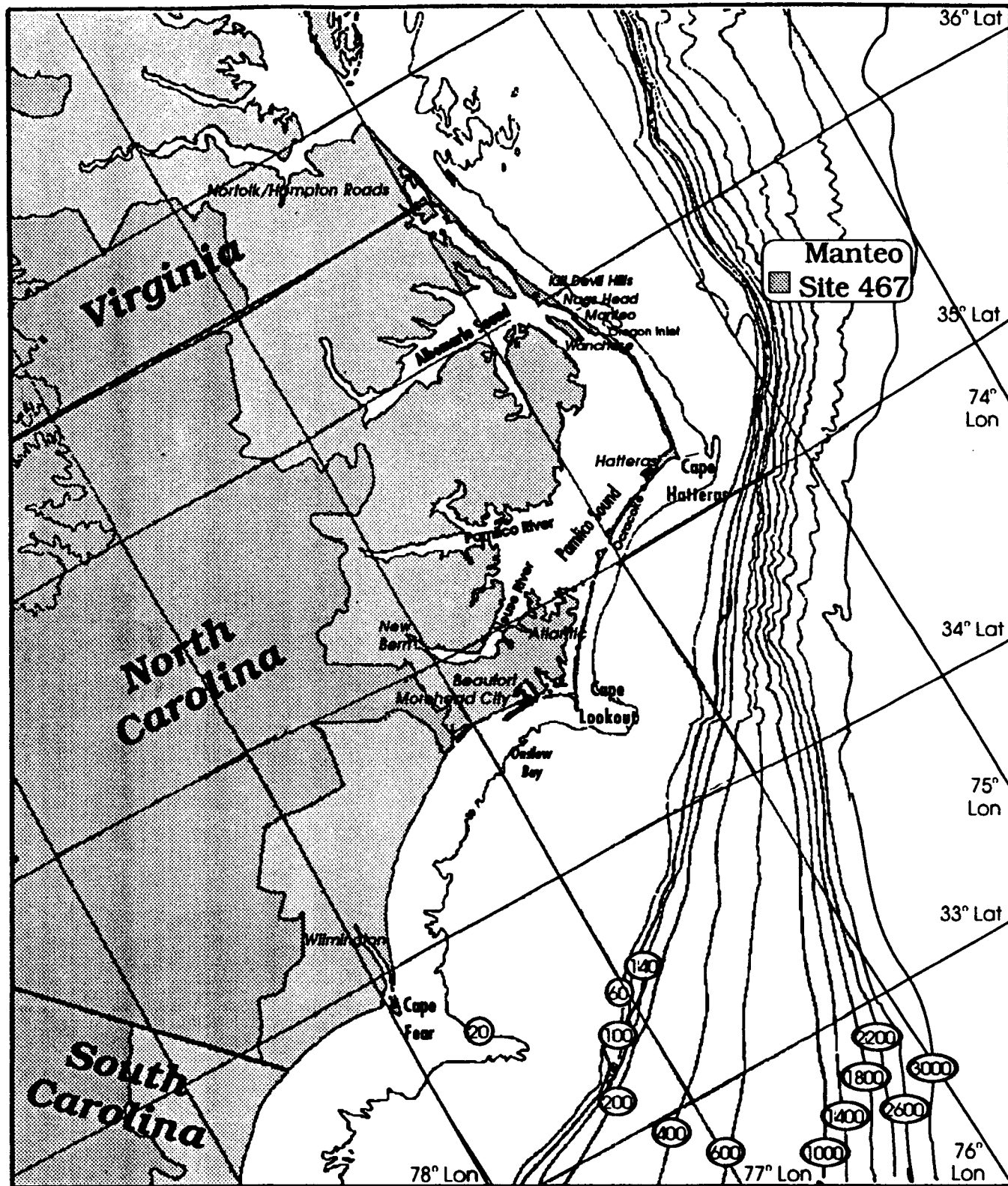
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Regional Overview



Ⓢ Water Depth in Meters

## INTRODUCTION

The Coastal North Carolina Socioeconomic Study is designed to collect, analyze and disseminate information about socioeconomic and sociocultural conditions along those portions of the North Carolina Coast susceptible to the potential effects of exploratory drilling at the Manteo Prospect. The Manteo Prospect is located in waters some 2,690 feet deep thirty-eight miles east of Salvo in a geologic zone thought to have a reasonable potential for discovery of natural gas or oil. If exploration were to go forward, Mobil would employ a drillship for a period of 114 days during what is considered the favorable weather window between the months of May and October (Minerals Management Service 1990:1-4). The reviewer is referred to the *Final Environmental Report on Proposed Exploratory Drilling Offshore North Carolina* (Minerals Management Service 1990) for further description of the proposed drilling operation and general description of the potentially impacted area.

The study follows the recommendation of the Environmental Sciences Review Panel (ESRP)<sup>1</sup> that current socioeconomic and sociocultural conditions among potentially affected populations should be documented prior to exploration for oil and/or gas along the North Carolina Outer Continental Shelf (OCS).

## RESEARCH OBJECTIVES

The objectives of the Coastal North Carolina Socioeconomic Study were to document conditions in the study area for a wide array of variables traditionally used as indicators of socioeconomic and sociocultural status. This information is intended to provide the sponsor with a "snapshot" of current sociocultural and socioeconomic conditions and trends within these areas. The information will assist decision-making processes undertaken by the federal government, assist county and local governments in planning activities, and will provide a means for monitoring and measuring change in the study area if OCS activity in North Carolina goes forward.

The North Carolina Environmental Sciences Review Panel was concerned that there was a lack of comprehensive socioeconomic studies in North Carolina. Connections or relationships among social scientific variables or between those and physical and natural scientific properties had not been fully characterized or analyzed. The panel also noted the lack of attitudinal or perceptual data or information. The following recommendations, made by the panel, constitute the study objectives and what the panel considered to be adequate information for the leasing stage at the Manteo Prospect.

(1) Base case characterization analysis should be carried out to include standard aggregate variables as population, employment and economic activity; characterization and structure of relevant industries; and characterization of the relationships among private and public sector entities in the affected areas.

(2) Detailed community studies should be done on the communities most likely to be affected by OCS development. These studies should include sociocultural variables, such as cultural traditions and psychosocial conditions, necessary to a contextualized understanding of the role and effect of potential OCS activities in these communities. The central purpose of this work would be to gain an understanding of how these communities function as coherent social, economic, cultural, and political systems.

(3) Aesthetic and perceptual issues studies should be performed for representative portions of the potentially affected populations. This research should be concerned with the perceptions of environmental conditions and values.

(4) Infrastructure studies should be performed in the potentially affected communities, focusing on the potential for changes in local and regional economic and political relationships.

(5) Comprehensive, longitudinal socioeconomic monitoring should be designed based upon base case characterization established socioeconomic variables. The variables should cover all of the above issue categories.

It should be noted that this research effort was explicitly not intended to be an "impact assessment" or "impact analysis." This effort, rather, provides the foundation upon which future impact assessment, if OCS activities proceed, may be based. The County and Communities Studies provide a qualitative and quantitative description of a range of socioeconomic and sociocultural indicators or variables in order to establish the context within which OCS-related changes could occur. The companion Socioeconomic Monitoring Plan provides a template for tracking change in a subset of these variables that, in the informed opinion of research team, will likely be: (1) potentially responsive to OCS-related activities; (2) socioeconomically and socioculturally significant at the community and/or regional level; and, (3) "trackable" in the sense of being both quantifiable and relating to information that can be efficiently obtained.



## OVERVIEW OF STUDY COUNTIES

The base case characterization covers Dare, Hyde, Carteret, Beaufort, and Pamlico counties. The primary reasons these five counties were chosen for study were: (1) their geographic proximity to the Manteo site; (2) their existing ocean use patterns that are known to include the offshore waters in the vicinity of the Manteo Prospect; and, (3) to allow for systematic comparison between coastal and inland trends, if such differences were observed. It is recognized that in this case there is no absolute distinction between coastal and inland; for example, while Dare, Hyde, and Carteret counties are situated on the coast, the inland counties of Beaufort and Pamlico have extensive sound and river shorelines and are also home to commercial fishermen who work the waters around the Manteo Prospect. Additionally, Carteret County was of specific importance to the study as a prospective location for an oil or natural gas landfall facility.

### **Physical Geography and Land Use**

The five study counties are located along the northern and central North Carolina coastal/sound region. Three of the counties, Dare, Hyde, and Carteret, have Atlantic Ocean coasts. Dare County, with approximately eighty miles of ocean coastline, is the northernmost of the counties. Hyde County, immediately south of Dare, borders the sea for roughly eighteen miles. Carteret County, southernmost of the coastal counties, has over 100 miles of ocean shore.

For all three "coastal" counties, the ocean coast is formed by barrier islands or banks separated from the mainland (or "inland") area of each county by a system of sounds, the largest of which is Pamlico Sound. While all three have extensive Pamlico Sound shorelines, the sound plays different roles in their layouts. In northern Dare County, itself in the northern reaches of the sound system, the Outer Banks are close to the mainland, and bridges have been built allowing easy traffic flow between mainland and island communities. As one moves south in Dare County, the sound grows ever wider. In Hyde County the sound remains wide for the length of the county and there is no direct connection between Ocracoke Island, which comprises Hyde's ocean coast, and the much larger mainland area. Carteret County, at the southern end of the Sound system, features a narrowing gap between the Outer Banks and the mainland as one moves south with island-mainland bridge connections once again made toward the southern end of the county.

Two of the counties, Beaufort and Pamlico, have no ocean shoreline. These are not what most persons would consider "inland" counties, however, since both have extensive shores on Pamlico Sound (and its tributaries). These two counties are located in the middle of the study region moving north to south; Beaufort is located west of Hyde, with Pamlico located immediately to the south of Beaufort and to the north of Carteret.

Physical environmental conditions in all of the counties are influenced by the Atlantic Ocean. Tidal waters shape ocean shore topographies and the wind and tide drive the estuarine waters against the land masses of the soundside counties. The ocean, while moderating winter temperatures, also can threaten coastal populations as strong tropical or extra-tropical weather systems track along the coast and propagate high winds and waves. The entire region is flat and low which contributes to flooding.

Major commercial land uses in the area include silviculture and agriculture. Overall, agricultural use of lands is decreasing in each of the counties. Extensive portions of all of the counties are inappropriate for commercial or residential development, due to fragility of ecosystems and regulatory restrictions.

Water and water quality is the subject of concern in the inland counties where farm runoff and industrial pollution often are perceived to be damaging the ecosystems of the Pamlico River and Sound. Fishermen in these areas claim fishing is poorer than it once was when the waters were "cleaner." On the other hand, it is also locally recognized that these industries give the regional economy diversity and a degree of stability in contrast to an overreliance on the fishing industry, which is an inherently volatile undertaking. Drinking water is an important issue threatening to limit growth in parts of the study area, particularly on Hatteras Island where the situation of limited drinking water supplies is clashing with desires to continue development.

## **Infrastructure**

In general, the infrastructure of populated coastal areas is more developed than that of less populated inland rural areas. This difference resulted as Dare and Carteret county governments accommodated tourists visiting coastal areas. Bridges, ferries, and other transportation-related infrastructure have been central in opening up coastal areas to tourism.

The infrastructure of many of the coastal communities has also been strained by the increasing number of visitors and residential growth encouraged by the earlier development of bridges, ferries, and roads. In Carteret County, the expanding coastal population has strained the capacities of the existing sewer system. Decision-makers must now take this factor into account when projecting the area's capacity to accommodate more residents.

## **Demography**

The counties in the study area are sparsely populated. In coastal counties, populations are typically the largest in the oceanside resort towns, although collectively significant populations are dispersed in the more rural inland sections as well. Beaufort and Pamlico are similar; population concentrations are found along Pamlico Sound and the Pamlico River,

and significant rural populations are dispersed throughout the remainder of the counties. The following figures are from the U.S. Bureau of the Census (1990).

Dare County's total population is 22,746, over half of whom live in the coastal communities of Nags Head, Kitty Hawk, Kill Devil Hills, Manteo, Southern Shores and Hatteras. Hyde County's population is much smaller than Dare's; it had only 5,411 residents in 1990. Around 700 persons lived in that county's single coastal community of Ocracoke. Carteret County has the largest population among the study counties with 52,553 persons in 1990. Of this total, around 20,000 persons lived in the coastal communities from Atlantic south to Pine Knoll Shores adjacent to Morehead City. The remainder of the population live in military or rural areas.

Beaufort County, also a largely rural county, has a relatively significant population center in "Little Washington." The total population in that county in 1990 was 42,283 persons, roughly 13,000 of whom lived in urban areas. The total population of Pamlico County was 11,372 persons, 7,584 of whom lived in unincorporated areas of the county.

The entire state's population increased 13% from 1980 to 1990. Coastal areas are growing in population whereas inland areas generally are not: Dare experienced a 70% growth between 1980 and 1990 while Carteret grew by nearly 30%; conversely, Beaufort and Pamlico grew at rates less than the state average, while Hyde lost residents (-8%), experiencing growth only on the immediate coast. Within Dare, communities immediately on the coast grew much faster than those inland. Where growth has occurred, the most significant factor is migration from other areas rather than natural population growth.

Urban-rural residence patterns in the counties are changing. In Beaufort County, the urban population is growing rapidly, while the rural population is decreasing. In Carteret County, both population segments are growing, but the urban population is growing at over twice the rate of the rural population which is reflected in the overall state population as well. In 1980, Dare had no urban areas, but by 1990 approximately 19% of county residents lived in urban areas. The entire counties of Dare, Hyde, and Pamlico remained classified as rural during the decade 1980 to 1990.

There is significant variation in spatial distribution between African-American and Euro-American persons in the study area. Census materials show large majorities of Euro-Americans in the immediate coastal communities; for example, the population of the Hatteras Island area is 99.98% Caucasian. One notable exception is in Carteret County where a sizeable African-American population lives in the Beaufort area. Correlated with this relative ethnic diversity, Beaufort is the only coastal area with a diversified economy.

Ethnic diversity varies considerably within the five counties. The two main ethnic groups represented are Euro-Americans and African-Americans. The portion of the population of Hispanic Origin approaches 1% in Carteret, Hyde, and Dare counties (similar to percentage seen at the state level). For all other counties, no non-Euro-American or non-African-

American group composes more than approximately one-half of one percent of the total population.

In only two counties, Beaufort and Carteret, did the total number of African-Americans increase between 1980 and 1990 and in all counties, African-Americans declined as a percent of the total population, a trend seen at the state level as well. In Beaufort and Hyde Counties, the relative decline was moderate, and African-Americans continue to comprise approximately one-third of the population. In Pamlico County, the African-American population component declined from approximately one-third of the total population to approximately one-quarter of the total population over the decade. In each of these three counties, African-Americans made up a larger proportion of the population than for the state as a whole. The African-American component of the total population of North Carolina was approximately 22% in 1980 and 22% in 1990.

For Carteret and Dare Counties, African-Americans made up a much smaller percent of the total population than in the other counties or the state as a whole. In Carteret County, African-Americans declined from approximately 9% of the population in 1980 to 8% in 1990. In Dare County, the decline was from approximately 6% to 4% over the same time period. Although the percent change of non-Euro-Americans and African-Americans appears to be growing significantly for the state and some of the counties, the total number of persons that comprise these categories are relatively small.

A trend toward an increase in seasonal housing units can be found at both the state and counties level, particularly in Carteret whose seasonal housing units have increased over 230% from 1980 to 1990. Dare County had a significant increase in both owner and renter occupied units during this period. While overall housing units have increased for the state and all of the counties, Hyde and Beaufort had the least increase in renter and owner occupied units and Pamlico had the least increase in seasonal units since 1980.

Of particular note is the relative and absolute decline of housing in the lowest value category in each of the counties. With one minor exception (one value cohort for one county) the rate of growth in housing increased with each progressively higher value category. As discussed in the county sections, this rise in housing values indicates a vital economy but does have negative consequences. For residents on low or fixed incomes, dramatically increasing housing assessments can result in untenable tax burdens. This increased net worth of individuals and families is irrelevant if they do not wish or are not able to sell their homes and move to lower priced real estate. This process of "gentrification" has been particularly evident in resort areas, such as Beaufort and the Hatteras Island communities, and is a cause of substantial concern for many long-term residents.

Annual population fluctuations in the five study counties is predominately influenced by tourism- and recreation-related seasonal populations. Seasonal housing units have increased over 46% in all of the counties from 1980 to 1990 with the exception of Beaufort County whose units have only increased by 11%. Carteret and Dare counties have the most seasonal

housing units for both 1980 and 1990 and have experienced the greatest increase in units during this period. Although Hyde County has the least seasonal housing units for 1980 and 1990 it has still witnessed a 46% increase in units during this period.

## **Economy**

The economy of Carteret County is the most diverse of the five study counties. In addition to the fishing and tourism, Carteret has a number of military facilities and manufacturing industries. Dare County relies on a combination of commercial fishing and tourism. Tourism is increasing in importance as the county's coastal communities grow. According to many fishermen, commercial fishing in Dare and other counties is waning in the face of competition and resource regulation.

Hyde County is one of the poorest in the state. Most revenue is generated in Ocracoke during the tourist season, although some agricultural and silvicultural activity occurs in inland areas. Agriculture is limited, however, by extensive wetlands. The situation could worsen if Ocracoke secedes from the county, as it has threatened, in search of additional government services.

The economies of Pamlico and Beaufort are primarily based on agriculture, silviculture, and commercial fishing. Some small communities along the river and sound are also seasonally popular for sailors and tourists. A significant mining industrial base is located in Aurora in Pamlico County. Both of these counties harbor fishing fleets that work in the sound, nearshore and offshore waters of North Carolina. Communities with fishing interests include Hobucken, Lowland, Vandemere, and Bayboro in Pamlico County, and Washington and Bayview in Beaufort County.

North Carolina employed 3,238,414 persons in 1990, representing a 24% increase since 1980. Of the five study counties, Dare experienced the greatest increase in employment levels (124%) and Hyde had the least increase in employment (2%) during this period. The retail trade industry remained the largest employer in the state and the study counties in 1990 with the exception of Hyde in which agriculture, forestry and fisheries constituted its largest employer, and retail trade was its second largest employer. Although agriculture, forestry and fisheries are important employers of local residents, their employment levels have generally decreased or remained relatively stable with the exception of Dare whose employment in this sector has risen by 48%. In addition, while mining generally decreased substantially in the state and study counties, it increased in Carteret County. It is important to note that while employment levels have risen in many industries from 1980 to 1990, employment as a percent of the total employed has often decreased. For instance, although employment in agriculture, forestry, and fisheries increased in Dare by 48%, it decreased from employing 8% of the total employed in 1980 to 5% of the total in 1990. Furthermore, significant increases in industry employment levels does not mean that employers have increased substantially as percentages of the total. While entertainment and recreational

services increased over 200% for Hyde and Carteret Counties, its percent of those total employed remained relatively stable.

The unemployment level in the counties is fairly low and consistent with state levels except for Hyde County with an unemployment rate almost double the state's. Hyde County also has, by a wide margin, the fewest number of employed persons. Carteret County has the greatest number of persons employed, followed by Beaufort, Dare, and Pamlico.

In 1990, North Carolina had over \$64 billion gross retail sales, a 91% increase in sales since 1980. This trend can be seen in all five counties as well, particularly in Dare County where sales increased over 300%. Beaufort had the highest gross retail sales in 1980 but was surpassed by Dare and Carteret Counties in 1990. Although Hyde County had the least gross retail sales in 1980 and 1990, it still experienced a 94% increase in this decade.

Significant changes occurred in agriculture from 1980 to 1990. For all the counties, the number of farms decreased substantially, as did the size of farm populations and the number of farming operators. Land in farms also decreased, but at a much lesser rate. This pattern is consistent with changes seen in the counties such as smaller farms failing or being consolidated into larger corporate farms and mechanization of farming tasks being increased. Changes over the decade in the amount of cropland harvested does not portray a consistent trend across the counties. Farm income rose in four of the five counties over the decade and stayed virtually unchanged in Pamlico and increases varied widely. Percentage increases in farm income inversely related to the total amount of farm income, number of farms, land in farms, farm populations, and farming operators. It should be noted that number of farms, land in farms, farm population, and farm operator variables are not independent of each other.

The average median family income in North Carolina for 1990 was \$32,400 which represented an 124% increase since 1980. This amount is slightly higher than the median family income in the five counties, with the exception of Dare, whose median family income is higher than the state by 8%. All of the counties experienced a significant increase in median family income from 1980 to 1990, as well as an increase in the average annual wage.

Although Carteret County had the greatest amount of personal earnings in both 1980 and 1988, Dare's increased the most during this period. Hyde County not only continues to have the least personal earnings of all the counties, but it has experienced the least growth as well. While there is variation between the counties, all of them experienced a substantial increase in earnings from 1980 to 1988.

The total number of persons in North Carolina whose incomes were below the poverty level in 1990 was 829,858 (approximately 13%). Although Pamlico and Hyde Counties had the lowest populations and the fewest persons for whom poverty status was determined, they had the highest percentage of persons whose incomes were below the poverty level (Beaufort also included). Dare County had the lowest percentage of persons in poverty, followed by

Carteret County. On a percentage basis, Beaufort, Hyde, and Pamlico counties had a much larger portion of their populations below the poverty level than the state as a whole. Of special note is the fact that the number of families below the poverty level decreased in two of the five counties, remained the same in one county, and increased only slowly in the other two.

### **Patterns of Government Service Delivery**

The geography and small populations in the five study counties make government service delivery a problem. Hyde's weak and undiversified economy compounds the difficulty. Nevertheless, the county governments provide a variety of services to their rural areas and unincorporated towns.

Most communities in the study counties are unincorporated. Unlike incorporated communities, unincorporated ones receive most governmental services directly from the county. This places the burden at the county rather than local level, while the benefits from county services accrue locally. This creates a disincentive to incorporate despite the increase in decision-making powers that it brings. County seats include: Swan Quarter for Hyde County, Manteo for Dare County, Beaufort for Carteret County, Washington for Beaufort County, and Bayboro for Pamlico County.

Total expenditures in North Carolina increased over 40% from 1980 to 1985 and almost doubled that from 1985 to 1990. Interestingly, while the percent change in expenditures of the counties from 1980 to 1985 were less than the state's total (with the exception of Dare), they were greater than the state's total from 1985 to 1990 (with the exception of Carteret). Of all the study counties, Dare had the greatest total expenditures in 1990 and the largest increase in expenditures since 1985. Hyde had the least expenditures in 1990 and Carteret experienced the least increase since 1985.

In 1990, the state's total revenues were approximately \$4 billion and were greater than the state's total expenditures. Only two of the five study counties, however, had similar trends. Both Carteret and Dare had greater total revenues than expenditures during this period, while Beaufort, Hyde, and Pamlico had greater expenditures than revenues. Dare had the greatest total revenues of all the counties in 1990 and experienced the largest increase since 1985. Hyde had the least revenues and Beaufort had the least increase in revenues since 1985.

Public school expenditures in North Carolina in 1990 totalled over \$4 billion. Of this amount, 23% of expenditures were locally funded. Beaufort and Carteret had the greatest public school expenditures while Hyde had the least. The five study counties provide between 17% and 20% of the total public school expenditures, with the exception of Pamlico whose local funding is only 12% and Dare whose local funding is 32%.

## **Tourism**

The study area's proximity to the Atlantic Ocean and the Albemarle-Pamlico Estuary, the second largest estuarine system in the United States, are factors in this industry. The second factor in this regional tourist system is the variety of activities which bring visitors to the area. A third integrating factor is the economic multipliers associated with the industry itself. As the area's tourism grows, businesses are formed, more people visit the area, and more people settle in the area, including an increasing number who choose the coast for retirement.

Certain tourist activities are common throughout the study communities and their consideration provides insight into the systemic nature of the area's tourist industry. The tourist industry has capitalized on the region's rich maritime history. In Dare County, "The Lost Colony," a play depicting the Roanoke Voyages and first settlements of Roanoke Island in the late 1600's, is a mainstay during the tourist season. Likewise, the restored U.S. Lifesaving Stations are important tourist destinations that capitalize on local history. Historic preservation districts in Dare, Hyde, and Carteret Counties are viable attractions as well. Several state parks were created to display the area's rich history including the Wright Brother's Memorial and Fort Macon State Park. The Maritime History Museum in Beaufort, and the Outer Banks History Center in Manteo also attest to the integration of maritime history, mystery, and myth as an important attraction to the region.

Lighthouses are part of this maritime history in North Carolina. Four lighthouses stand within the study region, two in Dare County, one in Hyde County, and one in Carteret County. Another lighthouse stands at the edge of the study region in Currituck County. The lighthouses are major attractions along the coast, and most have an adjoining museum to assist visitors with understanding the lighthouses and the area's maritime history.

More than a dozen parks and refuges dot the five study counties. Arguably the counties' tourist assets are Cape Hatteras and Cape Lookout National Seashores. Hatteras National Seashore covers some seventy-five miles and 30,000 acres in Dare County (North Carolina Travel and Tourism Division n.d.:111). Cape Lookout National Seashore covers fifty-five miles of coastline and is only accessible by boat (North Carolina Travel and Tourism Division n.d.:111). Because of this, Cape Hatteras receives the preponderance of visitors. In spite of the fact that the wildlife refuges provide only limited tourist access, spring and fall migrations of birds also bring a migration of visitors to see the diversity of species that pass through the area. The eco-tourism movement has spawned a new set of eco-tourist activities, such as kayaking in the refuges, and may, in the long run, increase refuge use.

The following examples of the numbers of visitors to selected parks indicates the sheer numbers of visitors to the area and the seasonality of tourism to the area. In 1992, 10,232 persons visited Jockey's Ridge State Park in January, and 137,316 persons visited the park in July. In January of 1992, 7,960 persons visited the Wright Brothers Memorial, and in July



1992, 78,174 persons visited the site. The National Seashore had 41,523 visitors in January of 1992 and 363,642 in July 1992 (Outer Banks Chamber of Commerce:1992).

Five ferries operate within the study region. The ferry system is not a tourist attraction per se because it provides essential transportation between Hatteras and Ocracoke. On the other hand, many visitors go out of their way to take the over two hour ferry ride from Ocracoke to Swan Quarter or Cedar Island as an alternative route home. In July of 1992, close to 150,000 people took the Hatteras Inlet Ferry, as opposed to January 1992 when only a little over 12,000 people used the same ferry (Outer Banks Chamber of Commerce:1992).

The ferries also represent the systemic nature of tourism in the region. The ferry service physically connects tourist destinations throughout the entire study region, making each county as accessible as the next. Other privately run ferry services work as National Park Service concessionaires filling in the gaps in the state run ferry service routes.

The five study counties do not benefit equally from tourism. Counties with an Atlantic coastline have higher levels of travel expenditures. Dare and Carteret rank highest in expenditure levels; in fact Dare ranks sixth and Carteret tenth among all counties in North Carolina. The other three counties rank significantly lower.

The highway system reaching the study region tends to channel visitors from the outside to one county or another. For example, the majority of visitors to Dare County and its beaches are from Virginia and states further north such as Maryland, New Jersey, and Pennsylvania because the road systems leading to these beach areas make this the shortest drive. North Carolina visitors to Dare County are primarily from the Northeastern Corridor of the state, because they live closest to the area. Many of these visitors also visit Hyde County via Ocracoke Island. The majority of the study area's visitors reside in central-eastern North Carolina or south-eastern North Carolina.

The growth of tourism is important to the region because it is a mainstay of the area's economy. Economic indicators show that tourism is growing in all five study counties and suggest that tourism-based development may soon be an economic reality even in the counties without an Atlantic coastline. Plans for large scale amusement parks, hovercraft ferry lines, and eco-tourist attractions have been mentioned in recent newspaper articles and plans for estuarine education centers and boat tours in wildlife refuges are already underway or are in the formative stages.

### **Use of Marine Resources**

Marine resources in the immediate coastal areas of the study counties are widely used for ocean sports and recreation, but the inland counties also offer a variety of recreational activities on the water. Commercial uses of the rivers, sounds, and ocean are also widespread in the region.

Transportation of commodities by water is a regionally important activity. The Intracoastal Waterway is an important transportation corridor that traverses the study area. The immediate coastal counties each have important points of access to the ocean. Beaufort Inlet in Carteret County is the deepest and is used by the largest vessels; Oregon Inlet in Dare County in a highly active ocean zone is a changeable and dangerous passage but is used by smaller vessels; Ocracoke Inlet in Hyde County is also relatively shallow and dangerous.

In 1991, The single top finfish landing in Beaufort County was the Spotted Seatrout which experienced a 471% increase since 1981. The Atlantic Menhaden was the largest catch in Carteret County but its landings decreased by 25% during this period. Dare's greatest finfish landing was the Bluefish which also experienced a decline of 31% since 1981. Although Fluke Flounders comprised the largest landings for both Hyde and Pamlico Counties, they experienced a 67% increase in Hyde and a 58% decrease in Pamlico. The single top shellfish landing in 1991 for all of the counties was Hard Blue Crabs which experienced an overall decrease since 1985 with the exception of Hyde in which they increased by 86%.

The size of the commercial landings differs greatly among the counties. For example, total landings for Carteret County, the county with the greatest volume of landings, are 31 times larger than landings for Beaufort County, the county with the least volume. Similarly, Carteret's landings are eleven times more valuable than Beaufort's landings.

Several significant changes occurred between 1981 and 1991. First, the rank order of counties for volume of finfish remained constant over the decade, except that Pamlico and Hyde switched third and fourth place positions. Neither, however, approached the volume of the largest producing counties. Second, the volume of finfish landings dropped for all counties, with declines ranging from 23% to 82%. Third, the value of finfish landings increased for some counties and decreased for others, ranging from a 52% decline in Beaufort to a 37% increase in Hyde. This change is inversely related to the total volume landed in 1991, i.e., the county with the least change in value is the county with the highest overall volume landed (Carteret); the county with the second highest volume landed had the next greatest change in value (Dare), and so on, through the county with the lowest volume landings experiencing the greatest change in value over the decade (Beaufort).

Shellfish landings follow a different pattern than finfish. The differences among counties total values are much smaller for shellfish than finfish. Landing rank was also more variable; only Beaufort County, fifth in shellfish landings in 1981, retaining its position. Also, volumes landed for shellfish showed both increases and decreases over the decade: the largest increase (Hyde County) was 113%, while the largest decrease (Beaufort County) was 28%. Shellfish landing values, however, were up for all counties, ranging between 14% and 270%. Shellfish landing values exceeded finfish landing values in all counties except Dare in both 1981 and 1991 and Pamlico in 1991.

When finfish and shellfish landing are combined total commercial fish landings show a decline of between 23% and 42% in every county except Hyde, which logged a 48% increase. The change in value of total landings over the period 1981 to 1991 show three different ranges. Beaufort County was virtually unchanged. Pamlico, Dare, and Carteret counties showed increases of 14% to 30%, respectively while Hyde County showed an increase in total value of 162% over the decade.

The total number of vessel registrations in North Carolina for 1991 was 278,598 which represented a 44% increase since 1980. Of this total Carteret had the most registrations of the study counties with a total of 7,403. Dare County alone exceeded the state's rate of growth in registrations with a nearly two-thirds increase, while the other counties grew at a pace that was slower than the states. Hyde County continued to have the least number of registrations in 1991 and showed virtually no change over this period.

In 1991 the state had a total of 19,811 commercial vessels licensed, and of this 47% were for pleasure uses. Similarly, Beaufort County had a total of 1,048 commercial vessels licensed in 1991, and of this 40% were for pleasure use. The largest number of vessels licensed during this period in Carteret, Dare, Hyde, and Pamlico Counties were for full-time uses.

Hyde County showed the greatest increase of any county in the number of full-time licenses; Carteret alone showed a decline. All counties showed a decline in the number of part-time licenses. For the pleasure class of license, only Dare County showed an increase over the decade. For all classes combined, only Dare and Pamlico counties showed an increase in licenses over this time period.

## OVERVIEW OF STUDY COMMUNITIES

Each of the seven communities described was selected for research on the basis of proximity to the Manteo Prospect and the associated potential for sustaining social or other human impacts as a result of OCS-related activity. Communities were chosen to represent the range of characteristics pertinent to understanding social conditions in the region. For instance, since fishing is one of the principal industries in the area, communities with individuals and families involved in both the commercial and recreational sectors of the industry were selected for study. Communities involved in tourism, another regionally important industry, and in a mix of tourism and fishing were selected. Population size was considered in selecting the study communities and those chosen represent the range of size typical in the region. Communities located adjacent to both the Atlantic Ocean and to the Pamlico Sound were chosen for study. Further, since each of these characteristics may be associated, individually or in combination, with the potential social impacts of oil and/or gas exploration/development, communities were also considered on the basis of potential for undergoing OCS-related change within specific components of the community. For instance, the potential for change associated with OCS landfall facilities and operations was also

considered. Communities were selected to represent the range of social variables that could be affected by landfall facilities.

The seven study communities are within the coastal region of central and northern North Carolina. Wanchese, Nags Head, and Hatteras are in Dare County; Ocracoke is in Hyde County; and Atlantic, Beaufort and Morehead City are in Carteret County. Wanchese is situated on Roanoke Island roughly five miles west of Nags Head on the northern Outer Banks. Hatteras is roughly sixty miles south of Nags Head on the southern tip of the Hatteras Island portion of the Outer Banks and Ocracoke is an island community located roughly thirteen miles south of Hatteras on the Ocracoke Island portion of the Outer Banks. Atlantic is on the mainland roughly five miles inland from Core Banks. Beaufort and Morehead City, separated by some two miles, lie inland from Shackleford and Bogue Banks barrier island systems. Although all of the study communities share close proximity to the Atlantic Ocean, only Nags Head, Hatteras, and Ocracoke are located directly adjacent to the sea.

Each study community is near large tracts of federal land. Wanchese is near Alligator River National Wildlife Refuge; Nags Head, Hatteras, and Ocracoke are situated within the Cape Hatteras National Seashore; Atlantic is adjacent to the Cedar Island National Wildlife Refuge; and Beaufort and Morehead City are next to the Rachel Carson National Estuarine Sanctuary. Such proximity to government-owned land constrains population growth. On the other hand, living adjacent to protected land is attractive to many residents and the parks and reserves are important factors in drawing tourists to the areas.

Although the seven study communities are situated in similar physical environments along the coastal zone, there are significant socioeconomic and sociocultural differences between them as evinced in the range of perceptions about the physical environment, community values, and pertinent social issues. The seven study communities can be thought of as existing in two distinct geographic zones -- north and south. Wanchese, Nags Head, Hatteras, and, to a lesser extent, Ocracoke, articulate in a social sense within the northern zone, largely because existing infrastructure makes it possible to travel between these areas with relative ease. Wanchese and Hatteras are linked in that Hatteras fishermen sometimes sell their catch to fish dealers in Wanchese since better prices are occasionally available there. There is also some linkage between Hatteras, other Hatteras Island communities, and Nags Head since Nags Head is base for a variety of amenities not available on the island. Hatteras residents are linked to Ocracoke residents through employment in the ferry system. The distance between Ocracoke and Atlantic, Beaufort and Morehead City discourages social interaction. The Downeast communities are socially linked, however. Atlantic residents frequently travel to Beaufort and Morehead City to acquire goods and services not available in town. Beaufort is linked to all Downeast communities in that it is the county seat and the center of government. Beaufort and Morehead City are closely related by virtue of their close proximity. While social interaction within, and to a more limited degree between, both the northern and southern zones does occur, each of the communities nevertheless maintains a

degree of independence and inherent prevalent industries and sociocultural histories serve to differentiate them.

Despite the fact that Wanchese and Nags Head are close in a physical sense, the social and cultural climates in these communities are vastly different. Wanchese is almost exclusively tied to the commercial fishing way of life and the economy of that community reflects trends in the fisheries. Resource availability, competition between commercial and recreational factions, and a changing fisheries regulatory structure are the primary sources of change to this small town. Residents perceive their town to have a relatively closed social system. That is, differentiate between "outsiders" and long term residents. This is unlike the situation in nearby Nags Head where, in summer at least, it is difficult to contact anyone who has lived in the community for all of their life or anyone who values long-term residence. Unlike Wanchese, permanent residents of Nags Head seasonally experience dramatic population change as tourists come to visit the community's beaches, restaurants, and other attractions. Fishing is experienced in a recreational rather than commercial sense and is just one of many attractions for living in the area. The principle agent of change for Nags Head is the fact that the area is perceived as a fun place to visit and live. Seasonal variation is the norm for this community and is generally accepted by permanent residents who welcome the revenue generated by tourism.

A major issue in Wanchese which affects a number of residents involved in commercial fishing is the stabilization of Oregon Inlet. Many see their livelihoods threatened by the shoaling inlet since fishing vessels have a tough time navigating in these dangerous waters. Residents have argued for stabilization for many years and feel that jetties placed on both sides of the passage would be effective. Some scientists are ardently opposed to the placement of hard structures in the surf zone, claiming that they would increase erosion down current, i.e., on Hatteras Island. These assertions have been grasped by many citizens, especially those with interests (such as homeowners) in preventing erosion downstream. Federal approval and funding for the project has been slow to arrive. At present, Wanchese residents wait for jetties that may never be built.

In Nags Head, residents and planners are struggling to handle the impacts of phenomenal growth in the 1980's, while retaining the identity of the community as an attractive beach resort. Residents are determined to avoid having the town become "another Virginia Beach," yet development pressures are strong in the community and there is still land available for further development.

Hatteras Village combines the kind of fishing lifestyle attributable to Wanchese with the tourist-oriented economy notable in Nags Head. Like Nags Head, Hatteras is a popular vacation spot for persons from distant locations. Thus, there is a vast difference between seasons in this community as the local fishing population winters and works in a relatively deserted town while employees in the summer tourist industry may find themselves unemployed with time on their hands.

In both Nags Head and Hatteras, there are ongoing and increasingly cogent disputes between recreational anglers and commercial fish harvesters. The beach haul-net issue has pitted the visiting recreational surf fisherman against the resident commercial harvester. This fishing strategy involves setting a net some distance offshore then hauling the net back onto the beach. Recreational anglers feel that the commercial fish harvester takes too big of a haul (at the expense of the angler) and wastes too many non-commercially viable fish. They have begun a campaign to outlaw use of such nets close to the shoreline. The commercial fishers argue that their practice is traditional and that the angler has no right to change an age-old and effective method of fishing. The perception that the problem has to have a solution suitable to one side or the other has led to extreme emotional reactions on both sides.

Hatteras Island's main problem is water availability. Water supplies, if not properly managed, could eventually constrain population growth in the area. This issue is actually an island-wide concern since the available water supply is located within an aquifer under Buxton Woods, a maritime forest in Buxton. The local water association distributes water to the surrounding municipalities and desires to increase its production capacity by tapping into the aquifer in other parts of the forest. Part of the forest is privately-owned and an environmental preservation group has been formed to encourage land owners to resist development. The group is seen as extreme by many residents but since some of the members are respected long-time residents, outward friction is mitigated.

Ocracoke is, in many ways, similar to Hatteras. It has a long history as a fishing village but is developing increasingly important links to tourism. The island is an attractive spot for seasonal vacationers and the permanent population is comprised of long-time residents and newcomers. Families who trace their ancestry to early island settlers may consider newcomers as such no matter how long their period of residence on the island; this is one indicator of a social system with restricted access.

On Ocracoke, residents are concerned about increasing development and its impact on the fragile natural resources of the island, particularly water quality, which has deteriorated substantially over the last decade. Lack of strict zoning or subdivision ordinances has resulted in inconsistent land use, with commercial areas adjacent to residential areas, sometimes threatening the "fishing-village charm" of the community. The lack of a central sewage treatment system and a rapidly growing seasonal population has overburdened existing septic systems, causing some groundwater contamination.

Atlantic is relatively isolated both in geographic and social terms. Yet, while Ocracoke's seclusion is in fact an attractive quality that brings visitors, Atlantic is not located on the immediate coast but rather inland, and increased tourism to the area is unlikely in the near future. Fishing is the economic mainstay of this community and, like Wanchese, change is most directly linked to changes in the fisheries. As noted above, there is no observable social or infrastructural linkage between Atlantic and Wanchese or other communities in the northern part of the region. Atlantic is tied to communities farther south and west.

A sewage disposal plan was perceived as a substantial threat in Atlantic. The recent plan to pipe treated sewage from Atlantic Beach to nearby Open Ground Farms upset local residents, who felt county planners were favoring the wealthier beach towns over their rural fishing community. The treated sewage was to be used as fertilizer but residents of surrounding communities feared runoff could contaminate the surrounding estuaries and fishery nursing areas. The issue remains unresolved. This is also an important issue to residents of Beaufort since commercial fishermen here also fear contamination.

Beaufort and Morehead City are closely related both geographically and socially. The communities are situated adjacent to the Atlantic Ocean and the beach towns situated on the narrow barrier islands of Bogue Banks. This serves to increase the number of beach-loving visitors that travel to the area during the warm months. Area history also brings visitors. The communities have larger permanent populations than the other study communities and the more urbanized nature of the area speaks to the variety of local job opportunities. Despite the importance of tourism, both of these towns have diversified economies. Much economic activity is based on the proximity of the communities to the ocean since import and export of products is facilitated by the presence of Beaufort Inlet. An important issue in Morehead City is related to the diminishing number of available jobs. Informants perceive a need for manufacturing and other blue collar positions to mitigate a faltering local economy.

## OVERVIEW OF AESTHETIC AND PERCEPTUAL ISSUES STUDIES

Research into aesthetic and perceptual issues was conducted in the seven study communities. Three principal domains of perception were investigated: (1) residents views about the qualities or attributes that make their area a desirable place to live; (2) ideas about uses of the environment; and (3) perceptions about what constitute potential sources of change to the area.

Understanding prevalent environmental values requires an understanding of how the natural surroundings are used. Residents of Wanchese see the most common uses of the local environment as those related to commercial fishing, including crabbing and clamming. It is not surprising, therefore, that the construction of jetties is perceived to be the event most likely to change the community if it were to occur. Residents believe that jetty construction will stabilize Oregon Inlet and increase the capability of the local fleet to reach productive fishing grounds. Years of work on the ocean have given many Wanchese residents reverence for the forces of nature and respect for fishermen and others who have spent their lives on the water. Prowess in fishing and fortitude in the face of the powerful forces of nature contribute to a sense of community identity held by residents. Many residents also value family ties and see the community as one of hard working fishermen and supporting families. Residents perceive stricter fishing regulations has having the potential to negatively affect the community. Hurricanes are also feared.

Among informants in Nags Head, surf fishing is believed to be the most common use of the environment, followed by sun bathing and surfing. These findings reflect the recreational atmosphere of this resort community and justify the belief that hurricanes have the greatest potential to change the community. This is logical since a major hurricane could indeed disrupt all recreation in the area. Overdevelopment is also considered to be a factor that could change the community and this agrees with findings that suggest citizens and government officials are working to mitigate the negative impacts of development and preserve the natural beauty of the area.

In Hatteras, commercial fishing and tourist activities such as visiting national parks are thought to be the most common uses of the environment. This mix of uses reflects the primary economic sectors in the community. As in Nags Head, hurricanes and overdevelopment are considered to have the greatest potential to change the community. Hatteras residents value the natural environment both for its peaceful beauty and for the power it holds. Fortitude is highly valued in this community and the ability to survive cold winters, rough weather, hurricanes, and many seasons on the island is highly respected. Commercial fishermen in Hatteras take pride in their stoicism and also feel they are contributing to society by bringing seafood to the public.

Despite the fact that the commercial fishery in Ocracoke is relatively small, informants in this community consider this to be one of the common uses of the environment. Similar to the other immediate coastal communities, recreational activities -- swimming and surf fishing -- were also considered to be common uses. Overdevelopment is seen as an important source of change here as well, as is relaxation of environmental regulations. Ocracoke residents are a mixed breed of long time residents and new arrivals, but both groups share values that prioritize a beautiful island environment.

In Atlantic, residents see commercial fishing as the most common use of the natural surroundings. This supports observations that indicate that life in the community revolves around the commercial fishery. Perceptions about sources of change to the community are also linked to the fishery, and residents cite farm runoff, sewage problems, and red tide as most important. As is the case in Wanchese, the small town atmosphere and the existence of family ties are judged to be accurate descriptions of the community and important to the local population. Unlike residents of the communities where tourism is part of the economy, many residents of Atlantic value the natural environment more for what it offers in terms of subsistence or commercial products than for its natural beauty. This is also apparent among the commercial fishing sector in the other communities where residents see themselves as being rightful heirs to the traditional harvest of living marine resources.

Boating and sun bathing are seen as common uses of the environment in Beaufort, as is commercial fishing. This mixture of uses reflects the fact that the environment is valued for both recreational and commercial possibilities and justifies the perception of residents that overdevelopment and poor management of natural resources have the greatest potential to



change the community. The natural beauty of the area is highly valued by residents as is its proximity to the ocean and sound environments.

In Morehead City, offshore recreational fishing is seen as the most common use of the environment, followed by boating and commercial fishing. Hurricanes, relaxation of environmental regulations, and overdevelopment are seen as the primary potential sources of change to the community. Residents of the area value their proximity to the ocean and sounds and the ability to live a water-related lifestyle.

In sum, residents of all the communities value the proximity of their homes to the ocean and sounds. The ability to live water-related lifestyles is also universally important. The commercial fishing sectors of all the communities share ideas about the worth of their work as harvesters of the ocean's natural resources but place less emphasis on the area's natural beauty. Clean water and air are valued among members of this group, but these appear to be valued more as indicators of the natural resources upon which their livelihoods rely. They also value the ability of their kind to withstand the forces of nature and they respect the power of the wind, tides, and waves. This is especially evident in the communities of Wanchese, Hatteras, and Atlantic. In communities where tourism is important, the natural beauty of the area is highly valued. Residents recognize the need to preserve the natural beauty of the area and insure that the environment can continue to be used for recreational purposes. Among the possible sources of human-caused change to the communities, overdevelopment is seen as most threatening. This is true of both tourism-oriented sectors and fishing sectors since both are subject to economic problems should the areas get too crowded and experience problems associated with excessive growth such as water pollution. Hurricanes are also seen as a universal threat -- all residents seem to recognize the power of nature to transform the social and physical landscape of the communities.

## OVERVIEW OF INFRASTRUCTURE STUDIES

Physical and service-related infrastructure were examined in both the county and community studies. Given the dependence of social systems upon physical infrastructure (bridges, roads, water supplies, communications networks, marine facilities, etc.) and upon service infrastructure (local and regional government, social services, medical services, etc.), these studies are an important part of the research objective to characterize current social and economic conditions in the study area. The county and community volumes provide detailed description of the current status of these infrastructural conditions throughout the study area. Perceptions about infrastructure-related issues also are explored at the community level.

## OVERVIEW OF SOCIOECONOMIC MONITORING

This study has isolated a number of socioeconomic variables as significant indicators of the current status of the study area. These should thus be considered for longitudinal monitoring purposes at both the county and community levels of analysis.

The demographic variables determined to be significant are the following:

- total population
- median age
- percent of persons sixty-five or older
- ethnicity by percent
- total households
- average number of persons per household
- percent owner-occupied units
- percent renter-occupied units/vacancy rate
- number mobile homes
- number units vacant for seasonal use
- seasonal variation in population
- current local population issues

The economic variables determined to be significant are the following:

- changes in property values
- tourism-generated revenue
- commercial fisheries landings and values
- sources of local employment
- seasonal variation in local economy
- current local economic issues

The infrastructure variables determined to be significant are the following:

- education
  - facilities
  - number of local students
  - programs
- social services
  - coverage area
  - usership
- marine facilities
  - number by type
- water and sewer system
  - related problems
- solid waste disposal
  - related problems
- current infrastructure-related issues
  - land use patterns
  - land ownership

- zoning and land use
- special policies
- hazard areas
- visual considerations
- current land use-related issues

The sociocultural variables determined to be significant are the following:

- lifeways, lifestyles
  - intracommunity variation
- social structure
  - importance of kinship ties
  - social stratification
  - community factions
- aesthetic values/perceptions
  - locally-defined and prioritized aesthetic values/perception of risk issues
  - perceived quality of place
  - perceived common uses of the environment
  - perceived sources of change to the community and environment
  - locally-defined and prioritized social and cultural issues
  - perceptions about physical changes to the community
  - perceptions about changes to the environment
  - perceptions about changes in the fishing industry
  - perceptions about changes in property value

1. The Environmental Sciences Review Panel (ESRP) was appointed in December 1990. The Oil Pollution Act (OPA) of 1990 directed the Secretary of the Interior, in cooperation with the State of North Carolina, to appoint this panel to assess existing information necessary for the Secretary to make decisions regarding permitting, leasing, exploration and development offshore North Carolina.