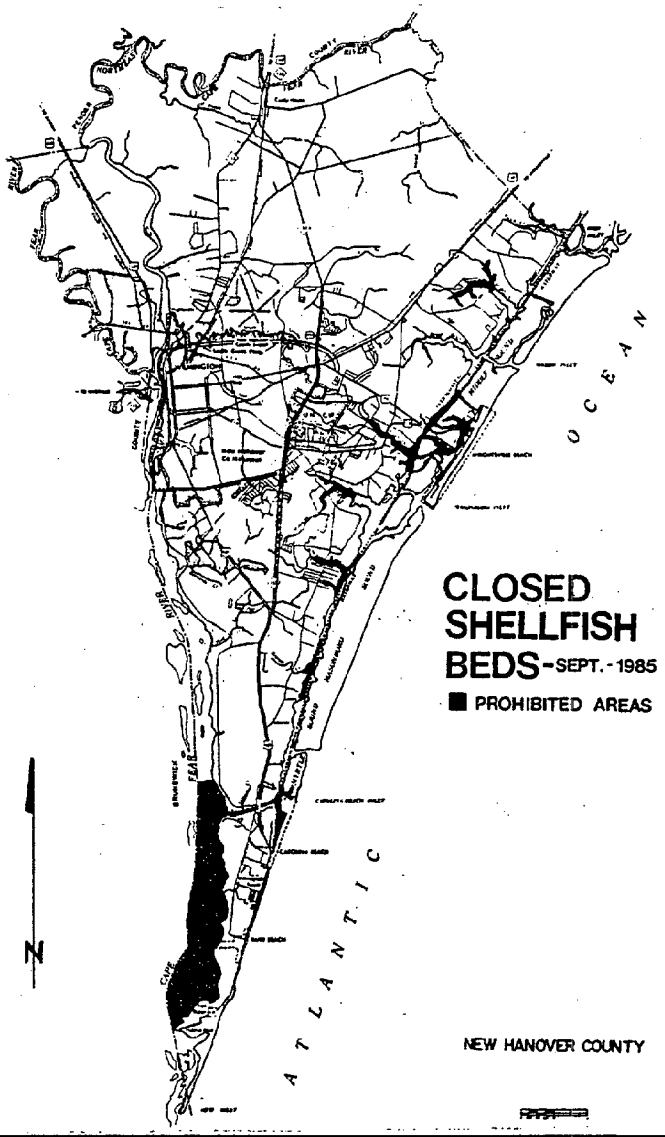
ENVIRONMENTAL RESOURCES AND CONSTRAINTS IN NEW HANOVER COUNTY



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Report No. 8

Technical Report No. 8

1986 Wilmington-New Hanover County Land Use Plan Update

ENVIRONMENTAL RESOURCES AND CONSTRAINTS IN NEW HANOVER COUNTY

November, 1985

Prepared by the New Hanover County Planning Department

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ENVIRONMENTAL RESOURCES AND CONSTRAINTS IN NEW HANOVER COUNTY

The purpose of this technical report is to describe and discuss those environmental resources and constraints in New Hanover County that will be instrumental in shaping the direction, type, and rate of growth in the County. This report examines water resources, fragile areas, hazard areas, soils, and resource production areas.

I. WATER RESOURCES

Water resources in the County can be broken down into groundwater and surface water systems, although it is important to note that water moves with limited restrictions between the two systems. Approximately 60% of the population of New Hanover County receives their water supply from groundwater and 40% those receives theirs from the Cape Fear River.

(A) Groundwater

(1) Physical Characteristics

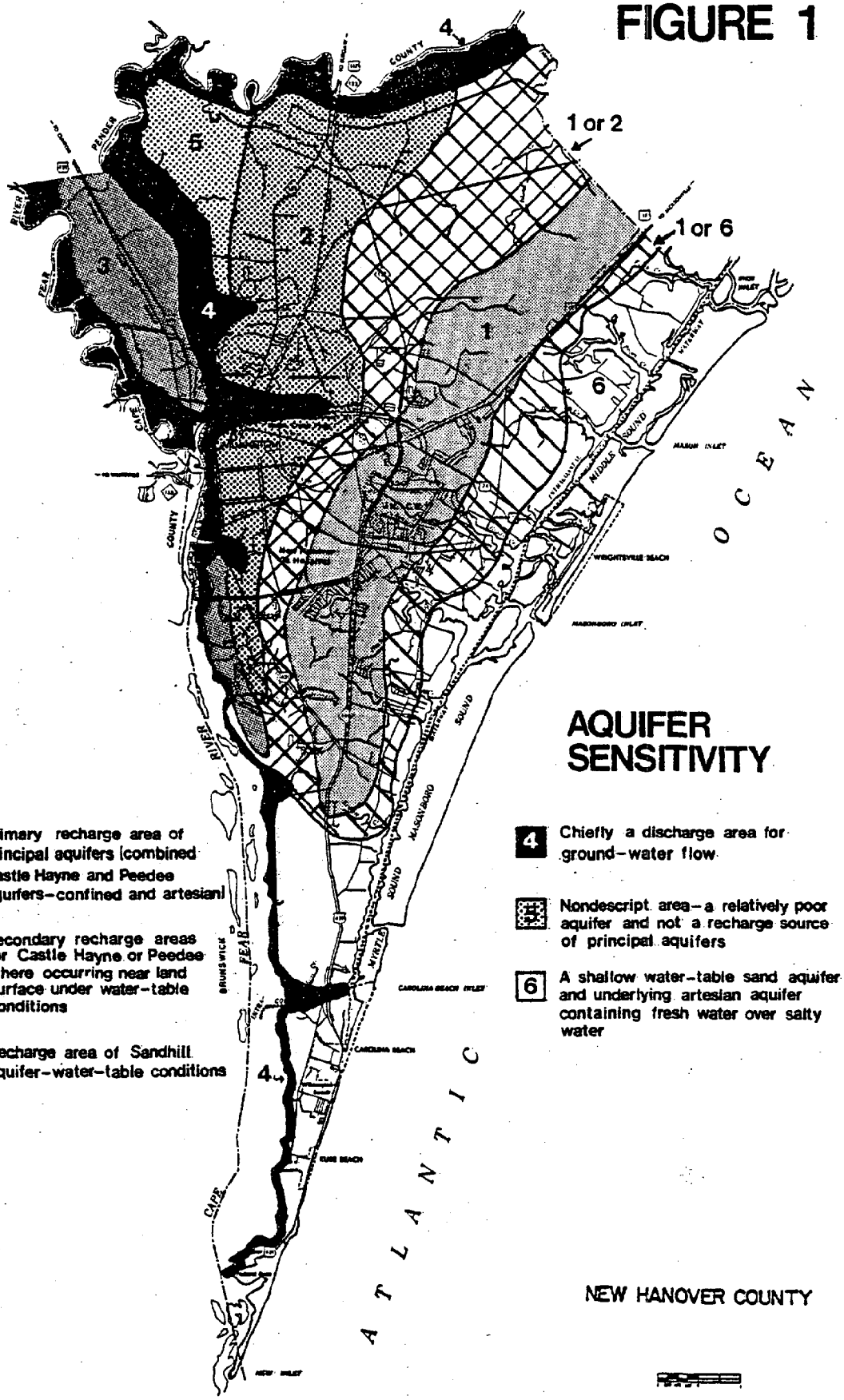
The County's groundwater system consists primarily of a surface, unconfined aquifer and two deeper, confined aquifers. The unconfined aquifer is generally sandy and ranges in depth from zero to approximately 75 feet. The confined aquifers, known as the Castle Hayne and Peedee aquifers, are composed of limestone and sandstone, respectively. These confined aquifers slope down from where they outcrop in the general area around Highway 117 and Castle Hayne (delineated as area 2 in Figure 1), to a depth of two hundred feet along the coast. The degree of connectivity between these aquifers varies considerably.

(2) Yield and Hydraulic Characteristics

Very little information is available on water yield from the unconfined surface aquifer. As a general rule, the water yield from a shallow well is enough to supply a single family residence on a 1/3 acre lot. Although the storage potential of the unconfined aquifer is small relative to the confined aquifers, it is extremely transmissive and a large well can produce up to several hundred gallons per minute (gpm) on a 24 hour sustained yield.

The confined aquifer can produce similar amounts on a 24 hour basis, with artesian wells occurring occasionally in the deeper parts of the confined aquifers. It has been roughly estimated by N. C. Department of Natural Resources and Community Development staff from the Groundwater Section that approximately 45,000,000 gallons per day are available on a continually sustained basis for the entire County. Sustained yields in any one area of the County may be between 200,000 to 1,000,000 gallons per day per square mile. If it is assumed that the average per capita use is approximately 135

FIGURE 1


1 or 2
1 or 6
OCEAN
ATLANTIC
AQUIFER SENSITIVITY
1 Primary recharge area of principal aquifers (combined Castle Hayne and Peedee aquifers–confined and artesian)
2 Secondary recharge areas for Castle Hayne or Peedee where occurring near land surface under water-table conditions
3 Recharge area of Sandhill aquifer–water-table conditions
4 Chiefly a discharge area for ground-water flow
Nondescript area–a relatively poor aquifer and not a recharge source of principal aquifers
6 A shallow water-table sand aquifer and underlying artesian aquifer containing fresh water over salty water
NEW HANOVER COUNTY

gallons per day (gpd) the County's groundwater system could theoretically support a maximum population of approximately 333,000.

(3) **Groundwater Quality**

Presently, the County's groundwater system is relatively free of pollution with several exceptions. The aquifer system for the Flemington area has become polluted, resulting in the County's provision of a small 280,000 gpd system for that area. In addition, the groundwater around one manufacturing firm along the Northeast Cape Fear River has become contaminated, although the contaminated area has been closely monitored and is presently contained.

The natural quality of the unconfined surface, aquifer system is extremely variable. Generally, it is characterized by the presence of carbon dioxide and sodium, resulting in an acidic, soft, and slightly corrosive water quality. Iron content can range from none to high, with the lower content existing near streams or areas of discharge. The deep, confined aquifers are characterized by the presence of calcium bicarbonate, resulting in a typically hard quality of water with a basic ph.

The deep aquifers have a primary and a secondary recharge area as shown on Figure 1. The primary recharge area is where the greatest quantity of recharge takes place. The secondary recharge area, however, is significantly vulnerable to pollution because of the presence of nearly exposed strata that could serve as a direct and rapid conduit of pollutants into the entire aquifer system. It becomes extremely important, therefore, to closely control and monitor development activities within the secondary recharge area.

A bond referendum for a Countywide water system using the deep aquifer system failed in 1979. If such a system was eventually developed, however, it has been proposed that the wells be located in the east central part of the County.

(4) **Groundwater Classes**

The State has classified all groundwaters in the State for purposes of monitoring and regulation. The different classes are defined in terms of depth, salinity, and best possible use. The classes in New Hanover County include the following:

(a) GA: These waters can be best used for drinking and food preparation without treatment, except to correct naturally ocurring conditions. They have a chloride content less than 250 milligrams/ liter (mg/l) and generally occur at depths greater than 20 feet below the surface. It should be noted that a study is underway by the State to determine if the GA groundwater in the polluted Flemington area should be downgraded to a GSA-restricted class.

(b) GSA These waters are similar to GA waters except they have a chloride concentration greater than 250 mg/l, and cannot be used for drinking without reduction of salinity.

(c) GB: These waters occur between the surface and 20 feet below the surface. Although considered to be of drinking water quality, the best use of GB waters is that of recharge to the GA waters. GB waters are very vulnerable to pollution because of their closeness to the surface and "...should be considered a cycling zone for removing most or all of the contaminants from the water..." (N. C. Admin. Code T15: 02L.0201(3)(b)). GB waters, however, are classified as GA waters in coastal areas where no GA waters exist due to salinity influences. This situation may occur in only very small areas in the southern part of the County.

(d) GSB: GSB waters are identical to GB waters except GSB waters possess a chloride content greater than 250 mg/l.

The N. C. Department of Natural Resources and Community Development (DNR&CD) have developed extensive standards for regulating pollution of these different water classes. These standards deal with maximum allowable concentrations of heavy metals, bacteria, and synthetic organic compounds. These standards essentially allow for no degradation of GA or GSA waters and limited degradation of GB and GSB waters provided no significant threats occur to public health.

(5) **Other Reports**

The groundwater system in the County has been described in further detail in two earlier reports:

-"Geology and Ground Water Resources of New Hanover County, NC" Bain, G. L., USGS, G W Bull. 17, 1970

-"New Hanover County Aquifer Management Program", LeGrand, H., and New Hanover County Planning Department, 1982.

(B) Surface Waters

(1) The Cape Fear River

(a) Quantity of Use by the City

City of Wilmington residents and certain residents in the unincorporated County are presently served by a municipally owned and operated water system utilizing raw water from the Cape Fear River pumped from King's Bluff, approximately 23 miles northwest of the City. The capacity of the City's pumping system and filtration plant is 15 million gpd. This system presently is operating at approximately 75% capacity, satisfying demands ranging generally from 8.5 million to 13 million gpd. It is anticipated that the system shall need to be expanded due to recent annexations, extensions of water lines beyond the City, and projected commercial and industrial growth.

The lower Cape Fear River Basin, which serves as the watershed for Wilmington's drinking water, covers an area of 6,142 square miles in 19 coastal counties. According to the 1980 census, the population of this basin was 665,593.

(b) River Quality

Several water quality studies have been done on the lower Cape Fear River. In a 1982 study, "North Carolina Water Quality Inventory", by the N. C. Division of Environmental Management (DEM), the lower Cape Fear River Basin was found to have a generally low water quality compared to other river basins in the State. Table I gives Water Quality Index (WQI) scores for four sites near the County. The WQI is a rating based on the parameters of temperature, dissolved oxygen, ph (acidity), fecal coliform, nutrients, organic toxicity, and inorganic toxicity. The WQI has a range of 0 to 100, with any score greater than 20 indicating a violation of standards for the parameters. A score of 1 to 20 is considered "good".

It is difficult to generalize from these ratings because of sampling techniques. For instance, if the sample was taken during high flow conditions, the pollutants' concentrations would be reduced and the WQI would be better than normal.

It does appear, however, that water quality on the Northeast and Cape Fear Rivers cannot be considered completely "good". DEM cited a lack of adquate dissolved oxygen in the water and the presence of inorganic toxics as being problem elements at these stations. Inorganic toxics include zinc, lead, copper, mercury, cadmium, chromium, and arsenic.

In 1984, a study was done by the School of Public Health at UNC-CH titled "A Survey of Potential Population Exposures to Chemical Contaminants Present in Unprotected Surface Water Supplies in North Carolina" (UNC-WRRI-84-213). This study

Table 1
WATER QUALITY INDEX (WQI) SCORES FOR STATION NEW HANOVER COUNTY

STATION	YEAR	AVERAGE ANNUAL WQI	AVERAGE WORST THREE MONTHS
Cape Fear River near Kelly, NC	1980	26	37
	1981	26	27
Northeast Cape Fear River at Castle Hayne, NC	1980	22	37
	1981	18	43
Northeast Cape Fear River at US 421 Bridge at Wilmington	1980	37	43
	1981	38	49
Cape Fear River several miles south of Wilmington	1980	NA	NA
	1981	35	63
Cape Fear River at Snow's Cut	1980	48	57
	1981	30	37

indicated that the Cape Fear River Basin was second highest out of 17 North Carolina river basins studied in terms of the number of point source pollutant discharges (e. g. factory or sewer pipe discharge).

More specifically, in terms of the number of point source discharges upstream, the City of Wilmington is sixth highest out of 156 communities that use surface water supplies. These discharges include 49 (27 major and 22 minor) municipal discharges, 96 (22 major and 74 minor) industrial discharges, and 151 miscellaneous discharges, for a total of 296. For purpose of comparison, Charlotte has 122 upstream discharges, Greensboro has eight, and Raleigh has 37.

In addition to examining point source discharges, this UNC-CH study estimated that the Cape Fear River Basin is second highest out of the 17 river basins studied in terms of the estimated annual use of agricultural pesticides in its basin. This amount equals approximately 4,814,000 pounds per year or nearly 18% of the total used in the State.

It is important to note that this UNC-CH study does not attempt to go beyond estimating the number of point source discharges and the amount of agricultural pesticides used within the river basin. No effort is made to measure their impact on the water supply systems. These impacts are a function of distance between the discharge point and the receiving water supply, the type of discharge, and flow conditions. For instance, approximately 45% of the pesticides used are herbicides, which tend to break down fairly rapidly.

(c) Drinking Water Treatment

The City of Wilmington presently uses a multi-step treatment process for the City's drinking water supply. Alum is added to remove mud and other solids. Lime is added to reduce the acidity. The water is filtered in several separate steps to further reduce turbidity. Chlorine is added in two separate steps to eliminate bacteria. Fluorine also is added for dental care. A phosphate compound is added to reduce the waters corrosiveness. It is important to note that the City constantly monitors the water to ensure that applicable maximum standards for certain pesticides and heavy metals are not exceeded. It is also important to understand that, according to the City, no problems have been encountered in meeting these standards.

(2) Additional Quality Factors

Additional water quality constraints strongly influence the intensity and location of future growth. Maintenance of an adequate level of surface water quality is extremely important to the County's economy and environment. Finfishing, shellfishing, and clean water for recreational activities help support the area's high quality of life enjoyed by residents and tourists.

Figure 2 depicts the location of primary nursery areas (PNAs) in the County. These areas have been designated by the State as being highly productive for juvenile habitat for marine species. Destruction of these beds, either physically by dredging and filling or by pollution, reduces the attractiveness of the County and eliminates economically valuable sport and commercial fishing.

Figure 3 indicates where shellfish beds have been closed in the County as a result of pollution, primarily excessive fecal coliform counts. These closed beds tend to be near the most developed areas of the waterfront, e. g. near dense subdivisions, marinas, and sewage outfalls. There are basically three sources of pollution that influence water quality: septic system pollution, urban runoff, and point source discharges.

(a) Septic System

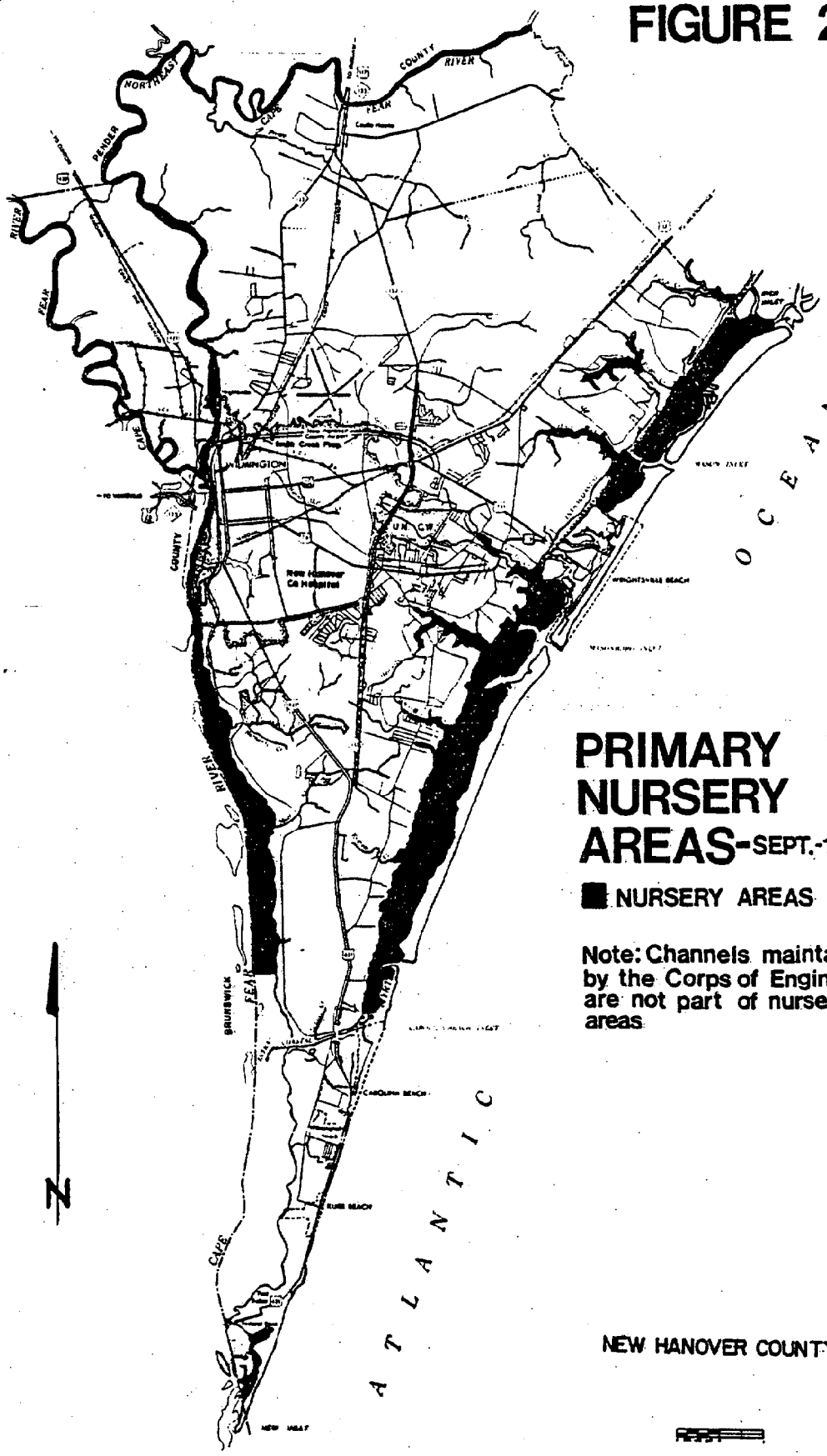
Septic system pollution results from old septic systems that were inadequately designed or placed in poor soils and from septic systems that have failed due to poor construction or clogged lines. The result is leaching of untreated domestic waste into the surface waters. The primary indicator of septic system pollution is the presence of fecal coliform.

In a 1982 report, "The Impact of Septic Tanks in Shellfish Waters", the N. C. Division of Environmental Management (DEM) demonstrated on New Hanover County creeks that shellfish beds tend to become closed if septic system density exceeds one system per seven acres. It is important to note that construction of the Countywide sewer system should help to eliminate this problem.

(b) Urban Runoff

Urban runoff pollution is a rather broad term used to describe a number of sources and types of pollution. Urban runoff includes the washing off of petroleum products, animal wastes and other debris off of roads, parking lots, and roofs; runoff of lawn pesticides and fertilizer; and the intrusion of large "slugs" of freshwater from impervious surfaces which upset the estuarine salinity balance. A special case of urban runoff is marina operations which not only involves pollution and freshwater intrusion from impervious surfaces, but also petroleum product leakage and wastewater flushing from boats.

FIGURE 2


NORTHEAST CAPE FEAR RIVER
PENDER COUNTY
CAPE FEAR RIVER
WILMINGTON
NEW HANOVER COUNTY
BRUNSWICK COUNTY
CAPE FEAR
OCEAN
ATLANTIC
N
PRIMARY NURSERY AREAS-SEPT.-1985
NURSERY AREAS
Note: Channels maintained by the Corps of Engineers are not part of nursery areas
NEW HANOVER COUNTY

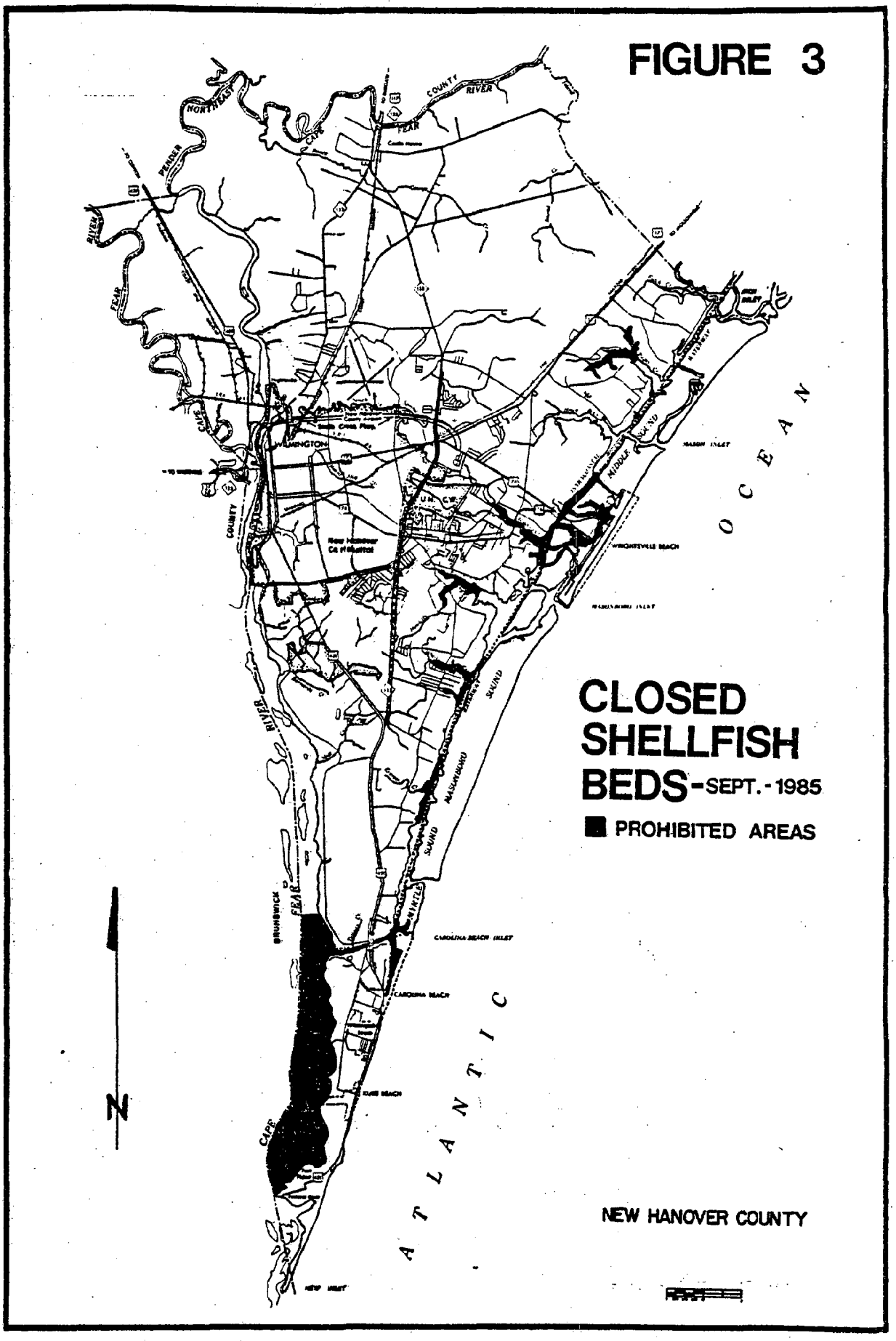


FIGURE 3
CLOSED SHELLFISH BEDS-SEPT.-1985
PROHIBITED AREAS
NEW HANOVER COUNTY
ATLANTIC OCEAN
WILMINGTON
BRUNSWICK
CAPE FEAR RIVER
NORTHEAST
PENDER
COUNTY
MASONBORO SOUND
MIDDLE SOUND
MYRTLE SOUND
CAROLINA BEACH
N

Urban runoff has been drawing major attention from regulatory agencies in recent years as state coastal water quality continues to decline. The N. C. Division of Environmental Management has been evaluating the use of "best professional judgements" (BPJ's) in examining stormwater management plans for waterfront development requiring Coastal Area Management Act (CAMA) permits. The BPJs being considered include no more than 10% effective impervious surface, adoption of the 100 year storm for design purposes, and systems for physical treatment of stormwater.

The N. C. Coastal Resources Commission (CRC), which is responsible for the CAMA permitting of coastal and estuarine development, has recently adopted strongly worded water quality policies. These policies include:

"Development within Areas of Environmental Concern shall not be permitted if such development has a high probability of degrading the water quality...so as to preclude any existing use of the water...at every possible opportunity, existing development shall be upgraded to reduce discharge of pollutants."

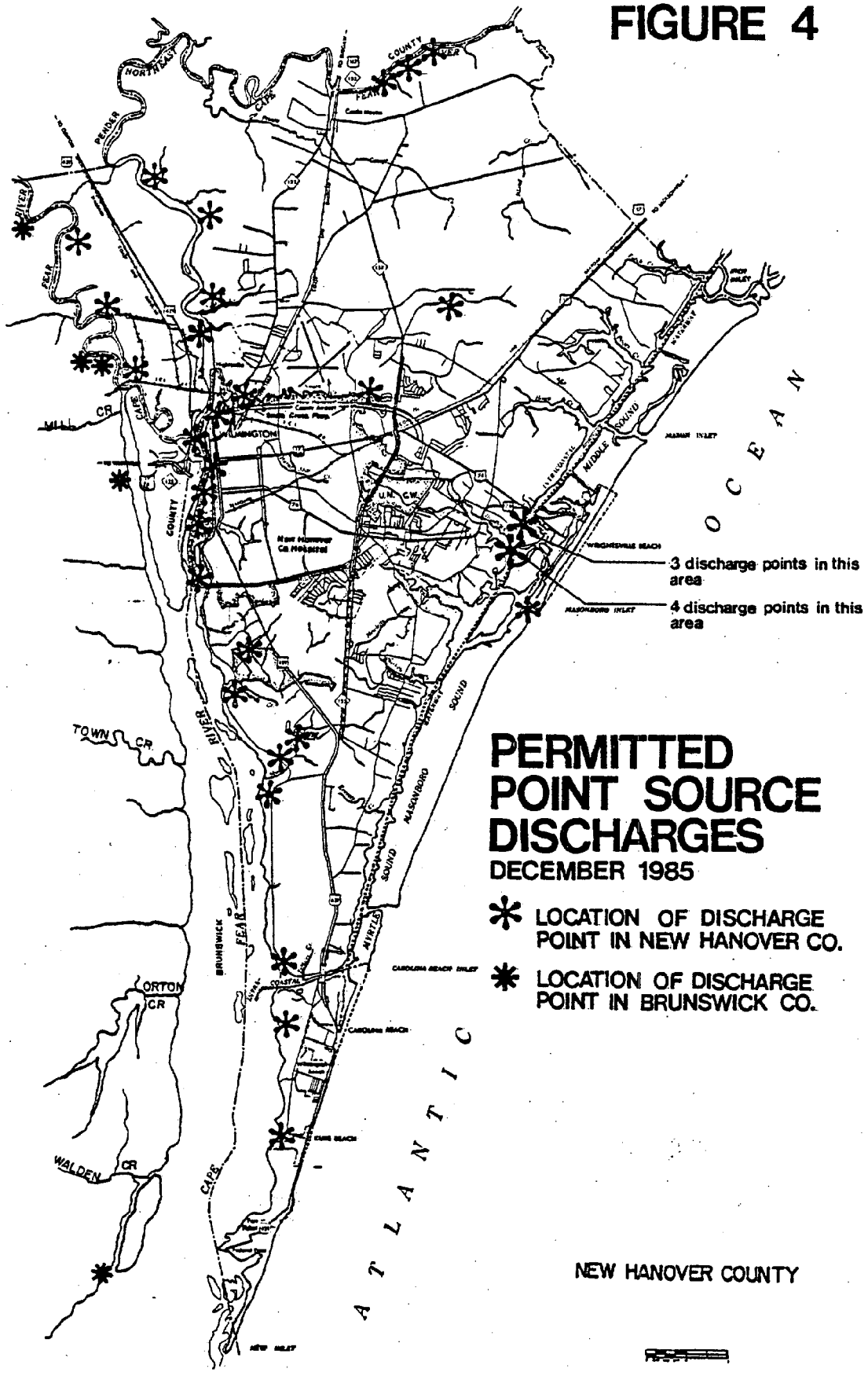
The CRC is also examining the adoption of such water quality standards as requiring minimum setbacks of 50 feet; vegetative buffers 30-50 feet wide, 15% maximum impervious surface, and extension of the CRC's jurisdiction from 75 feet to 200 feet inland of the mean high water line. The CRC has also begun the process of examining standards for marinas.

New Hanover County adopted in 1984 a Conservation Overlay District (COD) for the Zoning Ordinance. This COD should significantly reduce urban runoff pollution because of its standards for stormwater retention, buffer strips, and the preservation of wetlands in their natural state.

(c) Point Source Discharges

Point source discharge locations are shown in Figure 4. Approximately two-thirds of these discharge points are from local industries, including several from utilities. Approximately one-third handle domestic wastes from subdivisions or from municipalities. As indicated on the map, five of the points are located in Brunswick County.

FIGURE 4


NORTH EAST CAPE FEAR RIVER
COUNTY
PENDER
RIVER
CAPE FEAR
MILL CR
WILMINGTON
COUNTY
New Hanover Co Hospital
U.N.C.W.
INTRACOASTAL WATERWAY
MIDDLE SOUND
MASON INLET
OCEAN
WRIGHTSVILLE BEACH
MASONBORO INLET
3 discharge points in this area
4 discharge points in this area
TOWN CR
RIVER
SOUND
MASONBORO
BRUNSWICK
CAPE FEAR
COASTAL
MYRTLE
CAROLINA BEACH INLET
CAROLINA BEACH
ORTON CR
WALDEN CR
CAPE
ATLANTIC
KURE BEACH
NEW INLET
PERMITTED POINT SOURCE DISCHARGES
DECEMBER 1985
LOCATION OF DISCHARGE POINT IN NEW HANOVER CO.
LOCATION OF DISCHARGE POINT IN BRUNSWICK CO.
NEW HANOVER COUNTY

The greatest concentrations of discharge points are located along the Cape Fear River near Wilmington and on the sound adjacent to Wrightsville Beach. These latter ones are in the process of being disconnected and tied into the County sewer system for eventual treatment at the City's Southside Treatment Plant, with discharge into the Cape Fear River.

(3) Surface Water Quality Classes

The State has classified the water quality of different surface waters of the County, as shown in Figure 5, with regard to regulating discharges. Class SA waters, presently the highest quality classification available for saline waters in the State, have a best usage of shellfishing or swimming. Class SA waters essentially cover the entire sound area of the County.

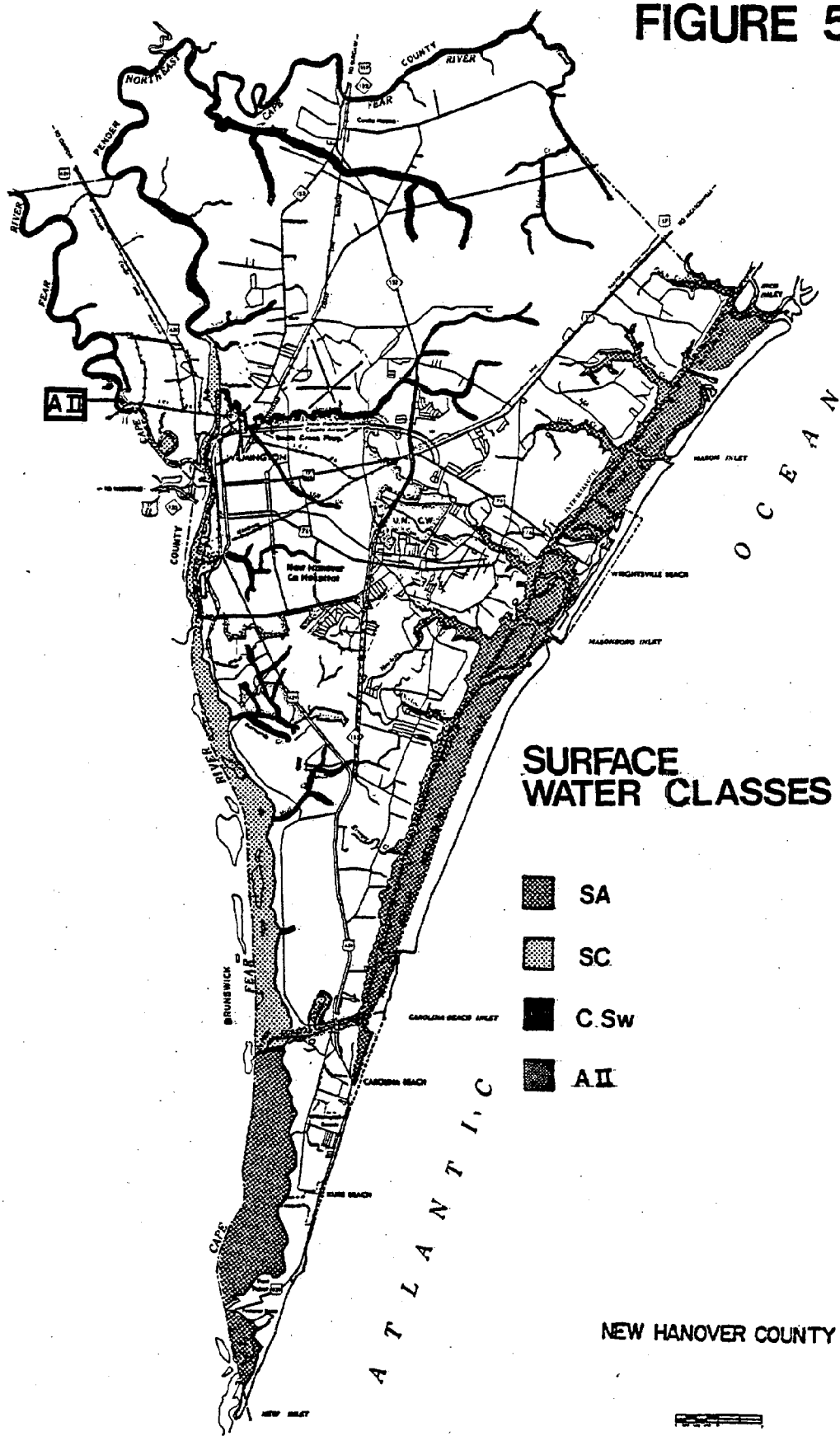
Class SC waters allow fishing and secondary recreation but not shellfishing or swimming due primarily to an increased presence of sewage wastes and associated bacteria in comparison to SA waters. Class SC waters are located on the Cape Fear River between Wilmington and the SA waters south of Snow's Cut.

Class C Swamp waters are similar to SC waters except C Swamp waters are not as saline but may be more acidic due to the natural occurrence of swamp drainage.

The County has one occurrence of Class A-II waters on Toomers Creek north of the City. This class means that the waters of Toomers Creek would serve as an alternate source of drinking water for the City, assuming adequate treatment was provided.

It is important to note that it is likely that Primary Nursery Areas (PNA's) will be adopted by the Environmental Management Commission as a new class of water. This class, which will be mapped based on existing designation of PNAs by the Marine Fisheries Commission, will overlay the present classes of water in the County. This class will provide added protection for important finfish and shellfish production areas in the County. It should also be noted that the Town of Wrightsville Beach has recently successfully had the sound waters behind the Beach reclassified from SC to SA, but is now contemplating a downgrading of that classification. Carolina Beach is presently attempting, however, to reclassify its sound waters from SA to SC.

FIGURE 5


SURFACE WATER CLASSES
SA
SC
C.Sw
A II
NEW HANOVER COUNTY
OCEAN
ATLANTIC
A II

II. FRAGILE AREAS

Fragile areas in the County cover a wide range of environmental resources, such as the Primary Nursery Areas discussed in the previous section. The County has established a Conservation Overlay District in the County Zoning Ordinance to help protect fragile areas, primarily through required preservation of 50% to 100% of the area, buffer strips, and drainage controls. The fragile areas have been mapped on aerial photos at a scale of 1"=400'. The COD includes the following fragile areas, referred to as conservation resources in the Zoning Ordinance. These resources are more fully described in the County Planning Report, "Conservation Resources in New Hanover County", prepared by a wetlands consultant, David Dumond.

(A) Swamp Forests

Swamp forest communities occur along all major and many minor freshwater streams and rivers of the County. Swamp forests are also associated with pocosins located at heads of streams. Much of the swamp forest is subject to tidal influence. The major tracts of swamp forest in the County are along the Northeast Cape Fear River and its tributaries.

Swamp Forest generally has a high organic soil. Characteristic species include cypress, red maple, black gum, sweet gum, and swamp chestnut oak.

(B) Pocosins

Pocosins, meaning "pond on a hill", are probably the greatest acreage of any natural vegetation in the County. Pocosins include Carolina Bays, transition areas between swamp forests and upland areas, and any other broad, level terrain where water is perched. Although the soil type may vary considerably, the County has expressed concern for those pocosins overlying highly organic soils.

Pocosin vegetation usually consists of a scattered or diffuse canopy of pond or longleaf pine and a varied inventory of largely evergreen shrubs and briar, including fetter bush, red bay, sweet bay, and others. Venus fly traps and pitcher plants can be found in pocosins.

(C) Savannahs

Savannahs, relatively rare in the County, are characterized by longleaf pine and wire grass. Periodic fires are instrumental in preventing this vegetation type from becoming pocosin. Venus fly traps, pitcher plants, orchids, and other relatively rare herbaceous plants are associated with savannahs.

(D) Ponds

Natural ponds are found throughout the County where underlying marl has dissolved and the surface has slumped into the water table. Often less than an acre in size, they contain rare and diverse combinations of plants. Some County ponds contain loose water milfoil and dwarf bladderwort, both listed as threatened species in North Carolina. These natural ponds are exceedingly fragile and vulnerable to impacts from recreational vehicle use and indiscriminate drainage.

(E) Fresh Marsh

Fresh water marsh occurs along the Northeast Cape Fear River and its tributaries and is associated with natural ponds. This type of marsh is characterized by pickerelweed, cattails, water willow, and other relatively salt intolerant species.

(F) Brackish Marsh

Brackish marshes integrade between freshwater and saltwater marshes. They include most of the Cape Fear River marshes from Ness Creek south to Snow's Cut and are dominant at the headwaters of generally saline creeks such as Hewlett's and Whiskey Creeks. The characteristic species, in rough order of decreasing salinity preference, are black needle rush, sawgrass, giant cordgrass, cattails, tearthumbs, and others. Brackish marsh also encompasses the old rice fields north of Wilmington that were cultivated in the 1700s and 1800s.

(G) Barrier Island - Beach Complex

The barrier island - beach complex represents the linear shoreline islands fronting the Atlantic Ocean. They are composed of unconsolidated sand and, therefore, are unstable and vulnerable to hurricanes and natural erosion processes. Vegetation is generally sparse, consisting of such grass species as sea oats, beach grass, and coarse panic grass on the seaward dunes. Scattered woody vegetation, including yaupon, wax myrtle, and red cedar, may be found in more sheltered areas further back from the ocean.

Barrier Island - beach complexes include Zeke's Island and Masonboro Island, which are part of the Natural Estuarine Sanctuary Program, the beach area south of Kure Beach, and Figure Eight Island. Zeke's Island is technically part of Brunswick County but is more accessible from New Hanover County.

(H) Maritime Shrub Thicket

These thickets of shrubby vegetation are characterized by an alternately wet and dry environment, subject both to storm and spring high tides and to salt spray. The typical species is wax myrtle, with some silverling, lobbolly pine, yaupon and live oak. These thickets also contain the northernmost extensions of the natural range of cabbage palm.

(I) Salt Marsh

Salt marsh occurs in the regularly saltwater flooded muck soils of estuarine streams and behind barrier islands. These well documented productive systems are characterized by smooth cordgrass, salt meadow cordgrass, salt grass and other saline tolerant species.

(J) Primary Nursery Areas

Primary Nursery Areas, discussed in an earlier section of this report, overlay much of the salt, brackish, and fresh marsh in the County. The location of Primary Nursery Areas are determined by the N. C. Marine Fisheries Commission.

(K) Animal and Plant Natural Areas of Special Significance

This class of fragile area includes important breeding animal locations (four sites), important animal and plant species locations (14 sites), potential natural areas (14 sites), and important community complexes (12 sites).

(L) Significant Historical/Archeological Sites

The County has hundreds of these sites where either Native Americans or early settlers left evidence of their existence. Based on information provided by the N. C. Department of Archives and History, however, only 25 have been designated as significant. These sites tend to be located along the streams and rivers of the County.

(M) North Carolina Areas of Environmental Concern (AEC's)

It is important to note that many of the above described fragile areas are simply a different classification scheme of the different Areas of Environmental Concern (AEC's) created under the N. C. Coastal Area Management Act (CAMA). These AEC's, which are described in more detail in Subchapter 7H of the N. C. Department of Natural Resources and Community Development regulations (Title 15), include:

(1) The Estuarine System

The Estuarine System is a complex highly productive biotic system that contributes enormous social, economic, and biological values to North Carolina. This system includes the following:

a. Coastal Wetlands - These Wetlands include any marsh subject to regular or occasional tidal flooding. They have tremendous value in contributing vegetative material to the foodchain, filtering pollutants, and other functions.

b. Estuarine Waters - These are the sounds and creeks of the County that serve as the bonding element of the entire estuarine system, supporting the finfish and shellfish populations.

c. Public Trust Areas - These include waters of the Atlantic Ocean under State jurisdiction and the lands under these waters. These areas hold valuable resources and are rightfully open to the public for recreation, navigation, and other activities.

d. Estuarine Shorelines - Estuarine shorelines include the land 75 feet landward of estuarine waters. This area is important because of its vulnerability to flooding and erosion, and the influence of shoreline development activities on the estuarine system.

(2) Small Surface Water Supply Watersheds

These water bodies are specifically designated for possible use as public water supplies. Toomers Creek, as previously discussed, has been classified as A-II by the N. C. Division of Environmental Management for this purpose.

III. HAZARD AREAS

Hazard areas are defined as those locations in the County where development should be controlled due to the existence of natural or man-made dangers to human safety. Hazard areas in the County include Ocean Erodible and Inlet Hazard Areas of Environmental Concern (AECs), floodplains, the County Airport, and certain industrial areas. The AECs' and floodplains have been discussed in greater detail in Phases One and Two of the County's Hurricane Plan.

(A) Ocean Erodible and Inlet Hazard AEC's

The Ocean Erodible and Inlet Hazard AEC's are defined and regulated primarily by the State by means of the Coastal Area Management Act (CAMA). The Ocean Erodible AEC is defined as that area between the mean low water line and a distance landward from the first line of vegetation equal to 60 times the natural erosion rate, plus this distance equal to the erosion caused by a 100 year storm. Inlet Hazard AEC's are delineated on an individual basis depending upon the stability and migration rate for the inlet. These AEC's are defined in more detail under subchapter 7H of the N. C. Department of Natural Resources and Community Development regulations (Title 15).

Construction, density, and setback standards are fairly strictly established and enforced by the State. The County has also established setback, density, and use standards for these areas.

(B) Floodplains

Floodplains in the County can be generally grouped into the following classes:

V zone - The V zone is the most hazardous zone. It is defined as those areas which would be flooded by a 100 year storm and which would be subject to the battering and erosive actions of waves.

A zone - The A zone encompasses those areas which would be flooded by a 100 year storm but not be subject to wave action.

B Zone - The B zone encompasses those areas which would be flooded by a 500 year storm.

New Hanover County has adopted a Floodplain Ordinance regulating use and construction within the A and V zones. The County's Zoning Ordinance also restricts development within these hazard areas. The County's floodplain maps have been recently revised, with the major change being a change of V zones along the sounds to A zones. The City adopted Floodplain Management Regulations in 1978, which are due to be revised in 1986. Similar to the County's ordinance, construction standards are established according to the type of development - residential or non-residential. The City's Zoning Ordinance includes a Floodplain Overlay District imposing the requirements of these regulations within the designated floodplains.

(C) New Hanover County Airport

The County Airport poses a threat to development through the potential for airplane crashes mainly within designated flight zones. It is important to note that development, in turn, poses a threat to air traffic both by the intrusion of towers or other tall structures into the flight zones; by the need to minimize excessive airplane engine noise during landing and taking off over developed areas, which may impact the safe operation of airplanes; and by the use of lighting or signals that could interfere with airplane navigation.

The County, therefore, has created Airport Residential and Industrial Districts. Both districts restrict the density and height of development, and restrict the use of pulsating lights or similar devices interferring with navigation. The erection of tall structures in the County must also comply with Federal Aviation Agency regulations. The City has an Airport Industrial District within its Zoning Ordinance.

It should be noted that a commercial airstrip associated with a subdivision has been constructed in the southern part of the County between U. S. Highway 421 and River Road. The County has not adopted regulations specifically controlling airparks or uses surrounding this or other potential commercial or private airstrips.

(D) Industrial Hazards

Industrial hazard areas generally result from the presence of volatile or toxic chemicals in quantities sufficient to pose fire or health hazards to residences. These hazard areas tend to be concentrated along the Cape Fear and Northeast Cape Fear Rivers, as indicated by the existing land use study. Most major industries, such as General Electric, have developed plans and procedures in case of emergency.

The transportation of volatile or toxic chemicals can also pose hazards to residences. Major highways and rail lines serve as the primary conduits for these hazards. These highways include US 74-76, US 421 north of Wilmington, I-40, and US 17. The rail line looping through the City of Wilmington also poses a potential risk.

The New Hanover County Department of Emergency Services presently has a "Hazardous Materials Plan" which is being updated. This plan essentially serves as a reference for activating response teams and procedures in case of a disaster.

Presently, nearly any industrially zoned area in the County could pose a potential threat depending on the use and associated material usage. The County, however, attempts to buffer these areas from high density residential areas through transitional zoning of commercial, light industrial and low density residential uses. Wilmington attempts to provide transitional zoning designations of light industrial or commercial zoned areas.

IV. SOILS

The suitability of soils for septic systems historically has been a major factor in determining the density of development in New Hanover County. The construction of a Countywide sewer system as planned over the next 10 years, however, will eliminate soil suitability for septic systems as a major constraint to development. Although certain highly organic soils may pose construction difficulties, these may generally be overcome through certain engineering and land modification practices. Detailed information on County soils may be obtained from a previous Technical Report, prepared as part of the 1981 Land Use Plan Update, called "Classification of Soils in New Hanover County for Septic Tank Suitability". This report classifies all soil types in the County with regard to septic system suitability as being suitable; suitable with moderate limitations; severely limited; or unsuitable. Generally, the more unsuitable soils tend to be found in the flat, wet parts of the County along drainage ways. Additional information on soil types can be found in the U. S. Soil Conservation Service report, "Soil Survey of New Hanover County, North Carolina", which discusses soil productivity, permeability, and other factors.

V. RESOURCE POTENTIAL AREAS

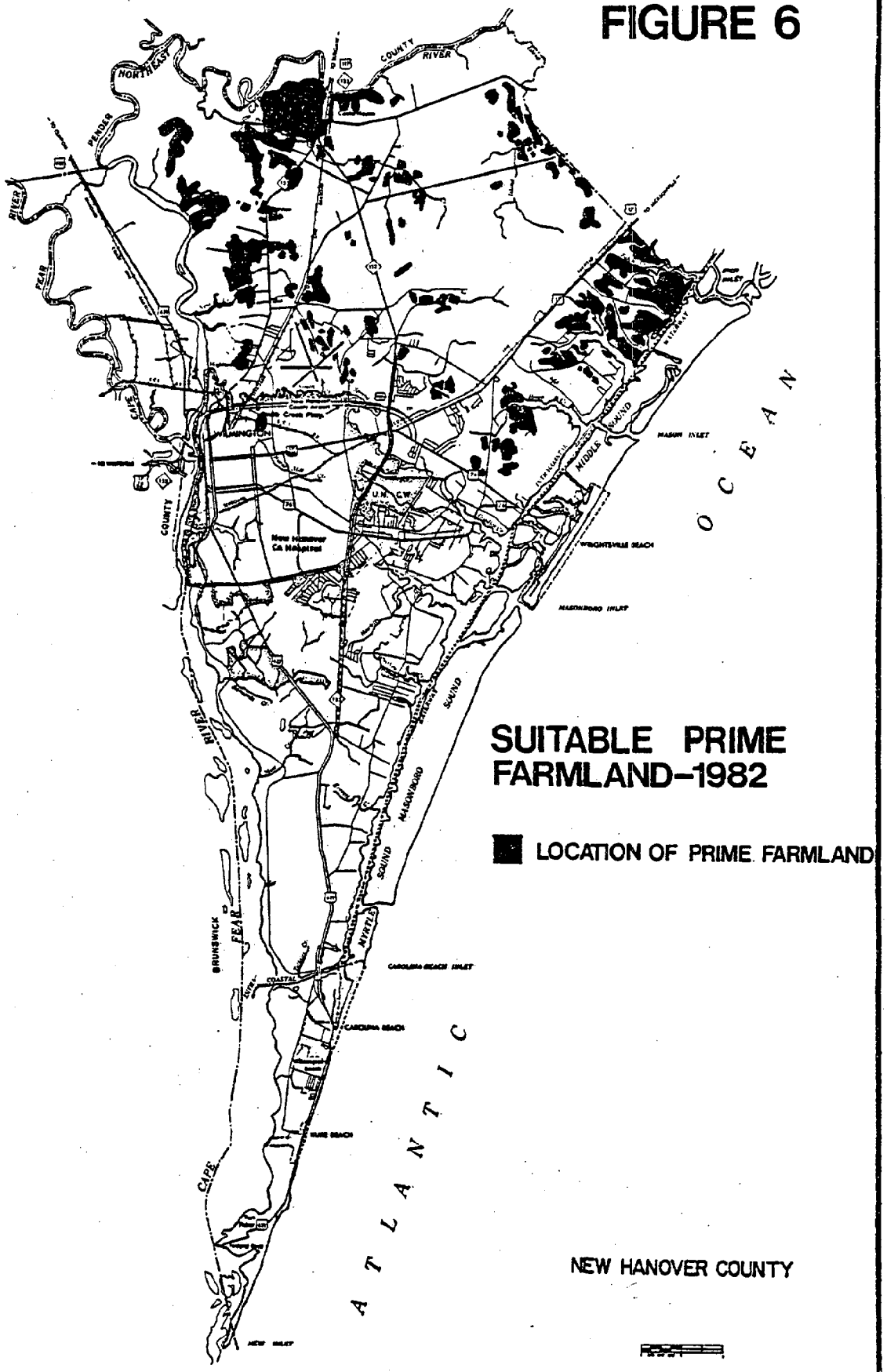
Resource potential areas refer to those lands other than those previously discussed that have value to the County in terms of their natural characteristics. They include prime farmland, mineral sites, and publicly owned land used for low intensive outdoor recreation.

(A) Prime Farmland

Prime farmland, as specified by the Governor's Executive Order No. 96, includes land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. These characteristics include the presence of proper climate, soil, and water table conditions for a specified portion of the growing seasons. These conditions are described in greater detail in U. S. Department of Agriculture Regulations (DR9500-3).

In New Hanover County, Craven, Kenansville, Norfolk, Onslow, and Wrightsboro soil types can meet these conditions. Figure 6 depicts the location of the County's prime farmland that consists of at least one of these soil types, is 10 acres or greater in size, and is undeveloped, based on a 1982 survey. Most of this land is located in the Castle Hayne area or in the northeast corner of the County.

FIGURE 6


NORTHEAST
PENDER
COUNTY
RIVER
RIVER
FEAR
WILMINGTON
COUNTY
OCEAN
MASON INLET
MIDDLE
SOUND
WRIGHTSVILLE BEACH
MASONBORO INLET
RIVER
SOUND
MASONBORO
SOUND
BRUNSWICK
FEAR
COASTAL
CAROLINA BEACH INLET
CAROLINA BEACH
CAPE
ATLANTIC
NEW INLET
SUITABLE PRIME
FARMLAND–1982
LOCATION OF PRIME FARMLAND
NEW HANOVER COUNTY

(B) Mineral Resources Sites

The County's major mineral resource sites are along the Northeast Cape Fear River. These limestone deposits support several major cement and crushed stone manufacturing firms. In addition, several small borrow pits have been located around the County.

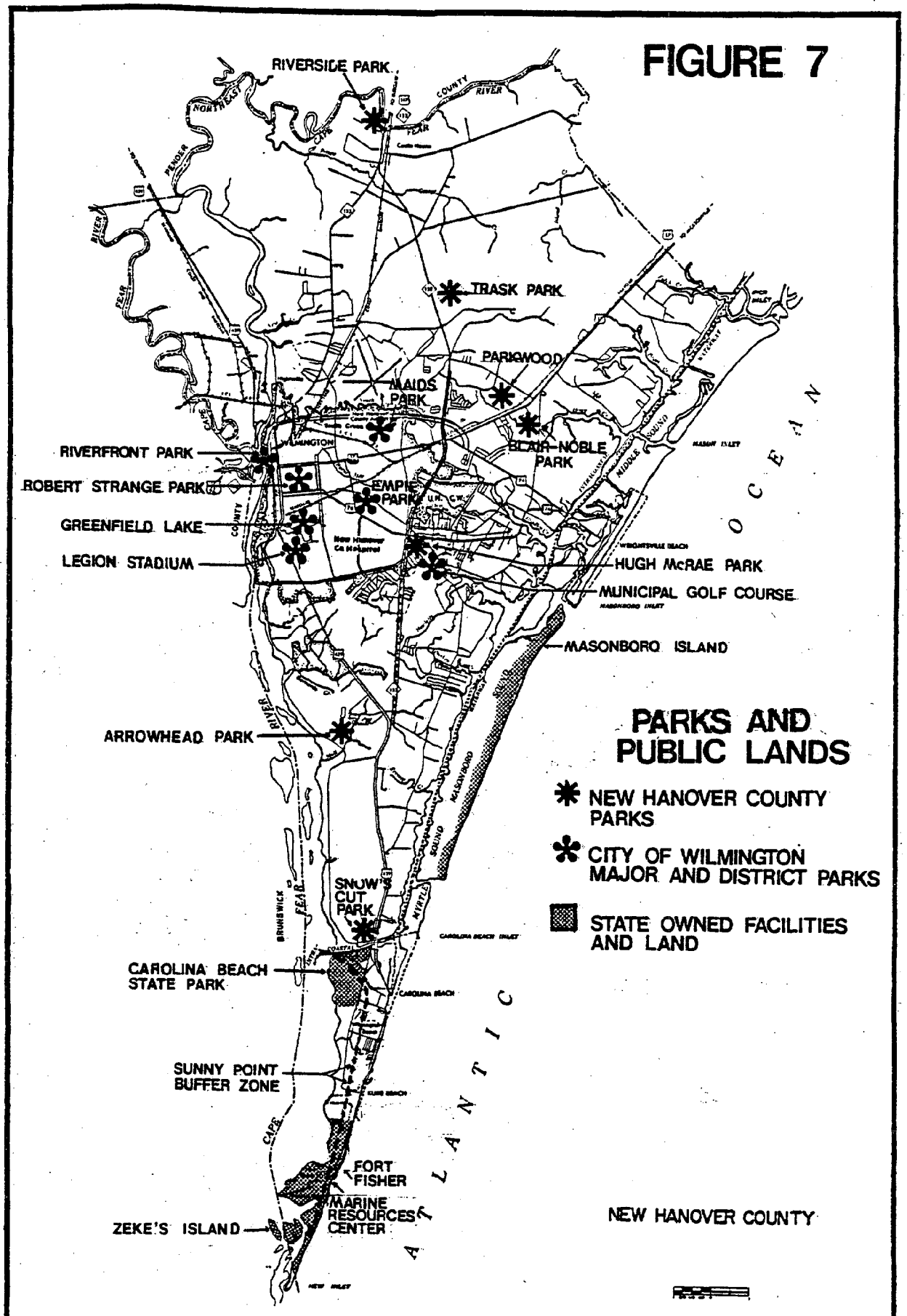
(C) Public Land

Public low intensive recreational use lands in the County include several large County and City Parks, as indicated in Figure 7. Hugh McRae Park, including an adjoining tract of County property across College Road, is probably the least developed of the City and County Parks consisting of large areas of wooded land.

Masonboro Island and Zeke's Island, perhaps the two most significant, low intensive use public lands available to the County, are managed as part of the Natural Estuarine Sanctuary Program. Masonboro Island is entering the final stages of appraisal and acquisition for inclusion into the Program. Both Sanctuaries provide education and research opportunities, in addition to low intensive recreational uses.

State facilities and land also include Ft. Fisher, the Marine Resources Center, and the undeveloped lands surrounding these facilities in Federal Point. In addition, the existence of a buffer area for the Sunny Point Military Terminal also limits intense development in the Federal Point area.

FIGURE 7


RIVERSIDE PARK
TRASK PARK
PARKWOOD
MAIDS PARK
BLAIR-NOBLE PARK
RIVERFRONT PARK
ROBERT STRANGE PARK
GREENFIELD LAKE
LEGION STADIUM
HUGH McRAE PARK
MUNICIPAL GOLF COURSE
MASONBORO ISLAND
ARROWHEAD PARK
SNOW'S CUT PARK
CAROLINA BEACH STATE PARK
SUNNY POINT BUFFER ZONE
FORT FISHER
MARINE RESOURCES CENTER
ZEKE'S ISLAND
OCEAN
ATLANTIC
PARKS AND PUBLIC LANDS
NEW HANOVER COUNTY PARKS
CITY OF WILMINGTON MAJOR AND DISTRICT PARKS
STATE OWNED FACILITIES AND LAND
NEW HANOVER COUNTY

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