Coastal Zone Management Program

WASHINGTON COUNTY

NORTH CAROLINA

1988

COASTAL ZONE
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LAND USE PLAN UPDATE

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WASHINGTON COUNTY LAND USE PLAN - UPDATE

1985

PREPARED FOR: WASHINGTON COUNTY BOARD OF COMMISSIONERS

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WASHINGTON COUNTY, NORTH CAROLINA
LAND USE PLAN: 1985 UPDATE

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INTRODUCTION

Washington County, located on the Roanoke River and Albemarle Sound, is a rural area primarily dependent on agriculture and the manufacturing of wood products for its livelihood. This County is one of the official "coastal counties" least affected by marine influences. When compared with Outer Banks counties such as Dare and Currituck, striking a "planning horizon" of 10 years has been used.

Although Washington County is a small, rural county with very limited revenues, it has been a leader in the northeastern portion of the State in the general field of developmental controls. Presently, we are one of the few northeastern counties with an "in-house Planning staff. Further, a Subdivision Regulations Ordinance, Mobile Home Park Ordinance, Comprehensive Building Code Program, and Coastal-Minor Development Permit Officer are in place.

However, over the last several years, Washington County has also built an extensive but modestly financed economic development program. Local elected officials have repeatedly stated that developmental regulations should not stop industrial and commercial growth but should influence the quality of location planning, and construction. Also, there is an ongoing program to clarify and simplify developmental regulations. Additionally, we recognize the statutory requirements to adopt and update a County Land Use Plan. More importantly, we are convinced that from a basic community planning (Throughout this document the term "community planning" will be given roughly the same meaning that the term "city and regional plan" has been given in city planning literature) prespective, the Land Use Plan should be the sturdy foundation upon which developmental regulations, and economic growth policies are built.

PRESENT POPULATION AND ECONOMY

The 1980 decennial census population listed the official total population of Washington County at 14,801. This compares with a 1970 official population of 14,038. The 1980 population figure is the most current benchmark in a long term trend of slow but steady population growth in Washington County. This county has not experienced the recent increases in the rate of growth experienced by many of the coastal counties. Conversely, Washington County did not suffer from dramatic population losses like many of the eastern counties experienced in the 1940's and 1950's. It is our position that the lack of substantial population growth since 1960 [1960 official total - 13,488] has been caused by a slow rate of industrial growth. During the 1940's and 1950's substantial industrial growth did occur in Washington County However, this industrial growth was partially offset by the reduced demand for agricultural semi-skilled and unskilled labor. All across North Carolina the decades of the 40's and 50's were characterized by rapid mechanization of the agricultural industry.

If we carry our analysis one step further, the primary reason for the lack of substantial industrial growth has probably been the relatively poor highway system. We fully acknowledge that from an agricultural and residential standpoint, local roads have been improved dramatically. However, from a regional perspective, the lack of four lane highways and limited access features have severely limited industrial growth. Of course there are other causal factors such as labor force characteristics and public schools capital facilities.

From a demographic standpoint, in recent years a relatively high rate of natural increase has prevented actual reductions in population.

FUTURE POPULATION AND ECONOMY

Before proceeding to offer our official population projections some discussion of the nature of population projections is in order. We remain aware of the importance of population and economic forecasting but we must also remain aware of the difficulties associated with such a process. This sort of forecasting is difficult for all local governmental units but it is even more difficult and subject to inaccuracies in the smaller communities. In small communities population projections are even more difficult to make confidently due to the lack of a substantial base number with which to work. To illustrate this point, if a new manufacturing industry with a workforce of 200 causes a population increase of 350 this one new plant location could alter the total county population by 2.4%. If the same new plant location was to occur in Wake County, the change would hardly be noticeable (Draft Land Use Element, Town of Richlands, Jack Di Sarno, June 1980, Pages 36 and 37.)

The official population estimate provided by the North Carolina Department of Administration for 1995 is 16,504. This would represent an increase of 1,703 people or 11.5% over the 1980 Census figure. The next Land Use Plan update presumablely will be due in July of 1990. The Department of Administration's population projection for July of 1990 is 16,019. The projection by the Department of Administration for July of 1985 is 15,433. Throughout this analysis, we will use an average household size of 3.1. This average household size has been derived from the 1980 Census. If we combined the average household size with the projected increase in population of 1,703, we would pro-

ject an increase of approximately 550 households through the 10 year planning horizon. If we were then to assume that all of the 550 families would live in subdivisions (and certainly they would not) then we would expect to see approximately 225 acres of land converted to residential development. We arrive at this estimate by assuming a residential lot size of 20,000 square feet and the expression of converted acreage is based on a "Florida Acre." A Florida acre equals 40,000 square feet. A substantial portion of the new housing starts now and in the future are mobile home units. Although we normally think of mobile home building sites as being much smaller than "stick built" sites, in Washington County, the average mobile home building site located outside of a mobile home park is running approximately 30,000 square feet. In the last four and a half years, there has been only one platted mobile home park and this one was only 10 units. Hence, our average residential lot size of 20,000 square feet is actually a very conservative estimate. Without a Zoning Ordinance, the Subdivision Ordinance then becomes the major density controlling device.

We can expect to see development, especially residential development to continue to occur along road frontage. This is partially the result of the very strict road paving requirements of the Subdivision Regulations. We will also continue to see new mobile home building sites be located in the more rural areas of the county in a scattered pattern. This is partially because of the zoning restrictions on mobile homes in Plymouth and Roper.

Between 1975 and 1980 there were 2404 outmigrants and only 1682 inmigrants for a net migration of -722. (1980 Census and Population - Supplementary Report: "Gross Migration for Counties 1975 - 1980, Pg. 201). The largest single age group in terms of net outmigration was the 20 year old to 24 year old grouping with a new migration of minus 197. This datum appears to confirm the lack of industrial growth referred to above.

From a regional perspective, Washington County shares borders with six other counties - Martin, Bertie, Tyrrell, Hyde, Chowan and Beaufort. From 1970 to 1980 the average population growth for the surrounding six counties was +7.7%. For the same period, Washington County's population was only 5.4%. Again, looking at the surrounding six counties, if we throw out the high (Chowan County +16.7%) and the low (Bertie County +2.4%) we still have an average rate of growth of 6.7% for the ten year period.

Within the geographic confines of Washington County the population movements are extremely nominal. In 1970, Lees Mill Township contained 24% of the total county population and in 1980 it still contained 24%. For the same period, Plymouth Township declined from 54% to 53%. Scuppernong declined from 12% to 10% and Skinnersville Township increased from 10% in 1970 to 13% in 1980.

There are three municipalities in Washington County. Plymouth located at the western end of the county is the county seat and as of 1980 contained 31% of the total county population. The corresponding figure for 1970 was 34%. See Figure 1. Roper located in central Washington County experienced an increase in population from 649 in 1970 to 795 in 1980. Its percentage of the total county population remains relatively unchanged at 5%. The municipality of Creswell actually declined in

FIGURE 1

PERCENTAGE OF POPULATION BY TOWNSHIP

AND MUNICIPALITY

	1970 POPULATION	PERCENTAGE OF COUNTY POPULATION	1980 POPULATION	PERCENTAGE OF COUNTY POPULATION
Washington County	14,038		14,801	
Lees Mill Twsp.	3,407	24%	3,589	24%
Roper	649	5%	795	5%
Plymouth Twsp.	7,512	54%	7,789	53%
Plymouth	4,774	34%	4,571	31%
Scuppernong Twsp.	1,733	12%	1,540	10%
Creswell	633	5%	426	3%
Skinnersville Twsp.	1,386	10%	1,883	13%

SOURCE: 1980 CENSUS

population according to the official census totals from 633 in 1970 to 426 in 1970. As we might expect, the percentage of the total county population residing in Creswell declined from approximately 5% in 1970 to approximately 3% in 1980. In the area of social characteristics, in 1970, white persons made up 58.5% of the population compared with 56.4% in 1980. Likewise, nonwhites constitutes 41.5% of the total county population in 1970 compared with 43.6% in 1980. Although the nonwhite category includes five ethnic classifications the predominant classification is black. In 1980 the census reported 6410 in the black ethnic category in Washington County. The next largest subgroup within the nonwhite category was Korean with 21 individuals. The largest subgroup under the caucasian category is mexican with 78 persons. Finally, the distribution of the Washington County population by age changed markedly between 1970 and 1980. See Figure 2 . In all the age groupings, 19 years of age and under there are small decreases. In the age groupings from 20 years of age to 44 years of age there had been moderate increases. In the age groupings from 55 years old to 65 years of age and over dramatic increases from 1970 to 1980 have occurred. For example, in 1970 there were only 420 individuals in the 65 and over grouping while the 1980 census showed 1529. The two most obvious implications for this data are that we could see a slow but steady growth in public school enrollment should the trends of the past continue on into the future. However the most striking implication is that Washington County should plan for changes associated with a "graying" population. Specifically, if the trend of 1970 to 1980 continues into the future there should be increased demand for rest home and nursing home beds and health care services.

Washington County presently operates one of the most extensive Senior Citizens Programs in Northeastern North Carolina. Assuming federal funding remains in place, the county should experience little difficulty in adding to the number of home delivered meals for elderly shut-ins. The Plymouth Housing Authority has a good supply of housing units specially constructed for elderly persons located on the western end of Water Street in Plymouth. There are some minor service delivery impacts which a larger elderly population could affect. The Sheriff's Department might need training to make the department somewhat more sensitive to security needs of elderly people living alone. This could include crime prevention services. Another needed service is a call-in service where a volunteer organization would be responsible for calling each elderly person living alone in Washington County. Without such a service, these individuals, sometimes are literally stranded due to their isolation when an unusual problem occurs.

Figure 2

AGE DISTRIBUTION

	1970*	1980**
Under 5	1367	1195
5 - 9	1560	1158
10 - 14	1678	1513
15 - 19	1457	1429
20 - 24	996	1297
25 - 29	849	1229
30 - 34	725	1098
35 - 44	1537	1564
45 - 54	1515	1401
55 - 59	709	769
60 - 64	529	619
65 & Over	420	1529

*1970 Census of Population, "General Population Characters - North Carolina," Pg. 150.

**Census of Population & Housing 1980, "Summary Tape File 3A-50," Pg. 1.

FIGURE 3

COMPARISON OF POPULATION TRENDS IN SURROUNDING COUNTIES

COUNTY	*1960 POP.	*1970 POP.	%CHANGE	°1976 POP.	%CHANGE	x1980 POP.	%CHANGE
Washington	13,488	14,038	+ 4.1	14,900	6.1	14,801	.7
Martin	27,139	24,730	- 8.9	25,200	1.9	25,948	2.9
Beaufort	36,014	35,980	- 0.1	38,800	7.8	40,355	3.9
Chowan	11,729	10,764	- 8.2	11,500	6.8	12,558	8.9
Bertie	24,350	20,528	-15.7	21,000	2.3	21,024	.1
Tyrrell	4,520	3,806	-15.8	3,800	-.15	3,975	4.4
Hyde	5,765	5,571	- 3.4	5,600	.52	5,873	4.6

SOURCE: °Profile Department of Administration - Update - 1978

xUS Census 1960 - 1970 - 1980

FIGURE 4

SUMMARY OF POPULATION TRENDS

BY COUNTY TOWNSHIPS

	1940	1950	% CHANGE FROM '40	1960	% CHANGE FROM '50	1970	% CHANGE FROM '60	1980	%CHANGE FROM '70
Washington County	12,323	13,488	+10%	13,488	0%	14,038	+ 4%	14,801	+ 5%
Lee Mill Twsp.	3,229	3,435	+ 6%	3,444	2%	3,407	- 1%	3,589	+ 5%
Roper	716	793	+11%	771	-3%	649	-16%	795	22%
Plymouth Twsp.	5,237	6,294	+20%	6,948	+10%	7,512	+ 8%	7,789	+ 4%
Plymouth	2,461	4,486	+82%1	4,666	+ 4%	4,774	+ 2%	4,571	- 4%
Scuppernong Twsp.	2,019	2,244	+11%	1,629	-27%	1,733	+ 6%	1,540	-11%
Cherry	108	73	-32%	61	-17%	No Record			
Creswell	459	425	- 7%	467	+10%	633	+26%	426	- 33%
Skinnersville Twsp.	1,838	1,207	-34%	1,467	+22%	1,386	- 5%	1,883	+ 36%

Notes: 1. 82% population increase for Plymouth from 1940 to 1950 due to annexation.

SOURCE: x U.S. Census

FIGURE 5

POPULATION PROJECTIONS

July 1, 1984	15,313
July 1, 1985	15,433
July 1, 1986	15,551
July 1, 1987	15,669
July 1, 1988	15,787
July 1, 1989	15,906
April 1, 1990	15,994
July 1, 1990	16,019
July 1, 1991	16,118
July 1, 1992	16,218
July 1, 1993	16,316
July 1, 1994	16,415
July 1, 1995	16,504*

*Official 10 Year Population Projection

SOURCE: Office Of Budget and Management
NC Population Projections - April 1984

Seasonal Population

We can see that major seasonal population variations can have intense negative and positive impacts on a community. For example, the storage capacity for central water systems must be designed based on seasonal population peaks . However, fixed costs such as insurance do not decline with water consumption. On the positive side, high levels of tourism can produce extremely high summertime sales tax collections. Seasonal populations in Washington County however, are nominal. We can neither validate nor refute the seasonal population estimate and projected seasonal population contained in the 1980 Land Use Plan. (See Figure 5 of the 1980 Land Use Plan)

Since 1980, there has been no change in the number of hotel and motel rooms. However, since 1980 there has been a very limited number of additional overnight accommodation rooms added through the "bed and breakfast" system. More importantly, a massive woods and peat fire in April of 1985 resulted in the total destruction of approximately 25 summer homes along the southern shore of Lake Phelps. Presently, we can not determine how many of these structures will be rebuilt with fire insurance settlements or other financing.

FIGURE 5 (1980 Land Use Plan)

ESTIMATED SEASONAL POPULATION

Motel/Hotel Units	60			280
Campsites	20	x	4.66 persons	93
Vacation Cottages (1970)	100		per household	466
	280 units			839 total tourists at an one time, 1970

PROJECTED SEASONAL POPULATION

1. 1970 estimate of tourist population: 839

2. 1970 estimate of tourists, Dare County: 23,720

3. Proportion of 1970 count, Washington County to Dare County 1:28 or 4%

4.

	Tourist Forecast, Dare County	Tourist Forecast, Washington County (1:28)
1980	35,106	1242
1990	48,481 to 70,000	1,715 to 2,476
2000	68,067 to ?	2,408 to ?

SOURCE: Dare County Data from Stephens Associates, 1974
Washington County Data, DNER estimates, 1975

From the figures shown, any estimate of tourism in Washington County has only represented a small impact on the local economy. A second indicator is travel spending. The higher estimates, however, are possible if growth along the Outer Banks occurs at the rate now experienced in areas such as Myrtle Beach, Virginia Beach or Ocean City.

Economy

The "Employment By Industry" Table in Figure 6 shows the change in employment of persons 16 years of age and older by industry by 1970 to 1980. The largest increase is in the wholesale trade industry which increased from 95 employees in 1970 to 233 in 1980. Two closely related groupings, "Educational Services" and "Public Administration", also showed sizable increases. The transportation category increased by a large percentage although the 1980 figure of 131 still accounts for a relatively small level of jobs. The percentage increase for transportation was 98.5% between 1970 and 1980. Only two groupings declined. Personal entertainment and recreational services declined from 357 in 1970 to 133 in 1980 and other professional and related services declined from 170 in 1970 to 116 in 1980.

Economist generally group industries into three extremely broad groupings: Agriculture, manufacturing and service industries. Basic economic theory also argues that generally speaking, all economies develop in a direct line from agriculture to manufacturing and then on to service industries as they grow in size and complexity. Many North Carolina counties such as New Hanover County and Wake County have clearly shifted from basic manufacturing work forces toward predominantly service industry work forces. Washington County on the other hand, is still in the process of shifting from an agricultural economy to an manufacturing economy. This is especially true if we confine our analysis to the geographic boundaries of Washington County. Since 1980, agricultural employment has declined due to a number of bankruptcy proceedings surrounding medium sized and small farms and a sizable lay off at one of the county's major corporate farms. Further, since 1980, the Plymouth Weyerhaeuser

FIGURE 6

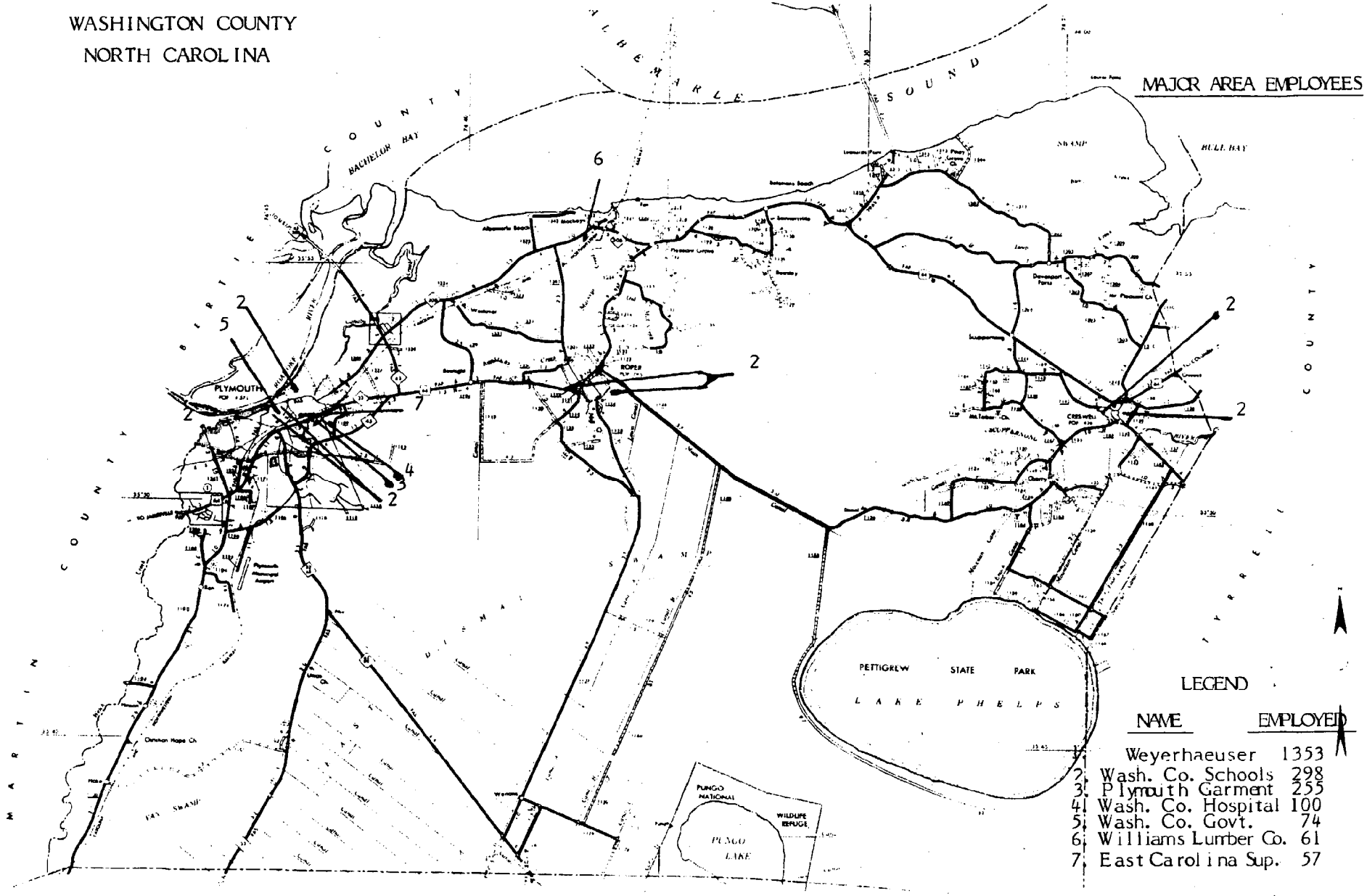
EMPLOYMENT BY INDUSTRY

	1970*	1980**
Agriculture, Forestry, Fisheries & Mining	462	557
Construction	276	285
Manufacturing		
Non-durable	1225	1317
Durable	586	820
Transportation	66	131
Communication, Other Public Utilities	37	38
Wholesale Trade	95	233
Retail Trade	557	674
Finance, Insurance & Real Estate	96	111
Business & Repair Services	59	65
Personal, Entertainment & Recreation Services	357	133
Professional & Related Services	115	202
Educational Services	273	512
Other Professional & Related Services	170	116
Public Administration	130	235

*1970 Census of Population "General Social & Economic Characters - North Carolina," Pg. 425

**Census of Population & History 1980, "Summary Tape File 3A-50," Pg. 4.

WASHINGTON COUNTY
NORTH CAROLINA



payroll has leveled off and cannot be expected to grow substantially through the end of the planning horizon. Presently, Washington County is extremely dependent on forestry and forestry related manufacturing. The economy of Washington County is extremely monolithic. Later in this document we will examine the need for industrial diversification. Although, over the last twenty five years Washington County has benefited tremendously from the growth in employment due to the Weyerhaeuser facility . Most of the capital investment has been located just across the county line in Martin County. An extremely slow rate of growth in capital investement in Washington County is one of the community's most pressing economic problems. This type of trend makes it extremely difficult for local govermental units to finance the inflated cost of doing business and/or enhancements in public services. In the absence of increased capital investments the only method to finance the increased cost of doing business or service improvements is by increasing the ad volorem property tax rate.

Agriculture

Presently, the entire agricultural economy of the United States is in a state of chaos due to intense political challenges to the traditional price support system. It is too soon to tell what the precise effect of basic policy changes by the Federal Government will be. The inability of First Colony Farms to secure environmental permits for two large projects has resulted in large layoffs and serious questions about the future of First Colony Farms.

Between 1970 and 1980, the number of farms declined from 800 to 350. However, by 1984 the number of farms recovered back to 812.

Between 1960 and 1974, harvested acreage rose 78% reaching 76,700 acres

Figure 7

RATES OF UNEMPLOYMENT FOR

WASHINGTON COUNTY AND OTHER AREAS

COUNTIES	AVERAGE RATE FOR 1974-1977	AVERAGE RATE FOR MOST RECENT YEAR YEAR 1984	AVERAGE RATE FOR MOST RECENT QUAR OF RECORD (1985
Washington County	6.2%	7.7%	6.8%
Beaufort County	4.5%	7.5%	8.3%
Bertie County	8.0%	10.8%	9.4%
Chowan County	6.8%	5.8%	6.6%
Hyde County	7.6%	12.8%	16.5%
Martin County	8.8%	9.8%	13.7%
Tyrrell County	10.0%	15.5%	16.7%
North Carolina	6.3%	6.8%	7.1%

SOURCE: NC Employment Security Commission
May 1985

Figure 8

RETAIL SALES

	1976-77 Retail Sales	1976 Population	
Washington Co.	$ 54,544,801	14,900	$3660.70/person
Martin Co.	93,249,272	25,200	3700.36/person
Beaufort	177,794,659	38,800	4582.33/person
Bertie	43,818,867	21,000	2086.60/person
Chowan	45,173,953	11,500	3928.16/person
Hyde	12,521,008	5,600	2235.89/person
Tyrrell Co.	9,615,670	3,800	2530.43/person

SOURCE: Washington County Land Use Plan (1980)

	1982-83 Retail Sales	1980 Population	
Washington Co.	$ 63,135,051	14,801	$4265.59/person
Martin Co.	116,978,108	25,948	4508.17/person
Beaufort Co.	249,856,730	40,355	6191.47/person
Bertie Co.	59,864,930	21,024	2847.46/person
Chowan Co.	70,885,156	12,558	5644.62/person
Hyde Co.	19,704,118	5,873	3355.03/person
Tyrrell Co.	14,122,494	3,975	3552.83/person

SOURCE: Counties of North Carolina Profile
September 1984

Figure 9

WASHINGTON COUNTY

ACRES HARVESTED

CROP	1979	1980	1981	1982	1983
TOBACCO	620	630	590	570	400
CORN FOR GRAIN	35,650	32,300	36,300	33,600	24,500
SOYBEANS	44,650	43,600	42,500	44,300	32,000
PEANUTS	3,070	3,050	3,200	2,680	2,720
COTTON	--	--	65	81	245
SWEET POTATOES	25	25	25	--	20
IRISH POTATOES	55	45	120	60	90
WHEAT FOR GRAIN	2,430	3,540	6,450	22,000	12,100
OATS	--	--	400	400	250
BARLEY	90	100	90	600	250
SORGHUM	90	70	260	720	440
ALL HAY	350	350	350	300	300
CORN FOR SILAGE	200	200	350	250	200

SOURCE: North Carolina Agricultural Statistics 1979-1982 Revised and 1985

Figure 10

CROPLAND UTILIZATION

YEAR	PERCENTAGE ACREAGE OF CORN	PERCENTAGE ACREAGE OF SOYBEANS	PERCENTAGE ACREAGE OF WHEAT	PERCENTAGE ACREAGE OF PEANUTS	PERCENTAGE ACREAGE OF OTHER (TOBACCO)
1960	42	42		8	8
1961	34	47		9	10
1962	32	51		8	9
1963	27	56		8	9
1964	27	54		8	11
1965	29	56	3	7	5
1966	29	59		6	6
1967	31	57		6	6
1968	28	62		6	4
1969	30	59		6	5
1970	38	53		5	4
1971	43	45		5	7
1972	42	46		5	7
1973	42	49		4	5
1974	44	46		4	6
1975	45	47		4	3
1976	52	42		4	1
1977	46	47		4	10
1978	46	47		4	2
1979	46	47		4	2
1982	32	43	21	3	.6
1983	27	36	13	3	.4

SOURCE: NCDA Land Utilization Survey, Washington County 1985

in 1977. By 1984 total harvested acreage had increased further to 90,000 acres. Corn and soybeans continue to be the two most important crops with wheat increasing in importance more than any other crop between 1979 and 1982. Livestock continues to be an important component of the agricultural economy. The importance of hog production is illustrated by the very large and modern Tyson Farms hog operation in eastern Washington County. In the last ten years, poultry production has been growing in importance. Several local farmers have contracts with Perdue or other poultry processers and we expect growth in this industry to continue. The county is also attempting to recruit a poultry processing company to build a production facility in Washington County. According to the Agricultural Extension Service, we have approximately 22 substantial poultry farms, the largest of which produces 400,000 chickens per year.

Water Resources

Several potential changes in the economy over the planning horizon could impact water resources substantially. One of the most certain changes will be dependent on future agricultural practices. Since 1981, several major farmers have examined the feasibility and showed continued interest in developing irrigation systems. In 1983, a 2" well with a depth of 200' was constructed on the Small's Farm near Mackeys. Washington County Government should informally monitor the future practices concerning popularity of irrigation in Washington County. On the other hand, several major farmers are installing or examining the possibility of installing flashboard riser structures which enables farmers to store large amounts of water during wet seasons for later use during dry periods. This new practice should also be carefully monitored and if it is successful, other area farmers should be encouraged to examine this possiblity. Agricultural runoff continues to be a water resource issue which is difficult to describe precisely. Research is presently underway at Tidewater Research Station and by other researches which may answer many of the questions surrounding agricultural runoff. Once again this research should be closely monitored.

The development of the Washington County Industrial Park may also have a impact on water resources. Presently, the county has a tentative commitment from an industrial prospect. This prospect plans to use only a nominal amount of water [approximately 1500 gallons per day]. Over the next two to three years, Washington County hopes to locate additional industries in the park. At the present time, preliminary estimates indicate a total daily water consumption estimate for the entire Industrial Park of approximately 25 to 30 thousand gallons per day. This is an extremely modest amount of water consumption.

The mid and long term future of peat mining in the Lake Phelps area is extremely difficult to predict. For example, if peat is mined for horticultural purposes the impact on water resources would probably be extremely limited. However, other types of potential development for example, electrical generation or methanol production could have a significant impact on water resources. In the event that such "heavier" types of development occur, water resources regulatory systems at the federal and state level are in place to address these issues. Finally, the construction of the Washington County Waterworks, which is presently underway should not significantly affect the total county water consumption. However, the widespread utilization of a central water system could actually result in water conservation. Most central water system customers become more aware of their consumption rates when they are on an individually metered supply. Also, it is generally assumed that a reduction in the number of wells utilized to serve a constant number of people results in a more efficient use of ground water.

EXISTING LAND USE

Compatibility Problems

Virtually all communities suffer from some level of land use compatibility problems. "New Towns" such as Columbia, Maryland have the fewest and least severe compatibility problems. However, rural counties such as Washington County generally are characterized by a significant number of land use compatibility problems. The 1976 Land Use Plan accurately cited the presence of livestock operations in close proximity to residential structures and churches. This problem is still present and generates some complaints concerning odor. For example, poultry operations are subject to significant losses of chickens during the warmest summer months. However, in many cases, these problems can be reduced or eliminated by improved farm management. When caucuses are disposed of consistent with regulations of the State Veterinanrian's Office, ordor is rarely a problem.

Further, the 1980 plan expressed concern over the possiblity of development occuring near the Plymouth Airport. This situation should be closely monitored and county officials should carefully consider any requests they might receive from the Town of Plymouth to provide zoning controls in the general area of Plymouth Airport.

In late 1984, Washington County was notified that the Federal Government was considering proposed military airspace changes in eastern North Carolina. Under the original proposal, a military aircraft would be permitted to fly at an altitude of approximately 100 feet. Specifically, the military proposed to expand areas R5301 and R5302 south of latitude 36° 0 minutes in the Albemarle

Sound southward toward Washington County. Washington County along with several other northeastern counties submitted written objections to the military proposals. Presently, a final decision has not been reached. If the airspace is expanded, it could result in increased noise and interference with normal civilian air traffic.

Finally, the citizen participation questionnaire used during the 1980 Land Use Plan Update documented concern by many citizens about esthetic problems related to some types of mobile home sites. This type of problem possibly could be reduced with a mobile home siting ordinance. Presently, the county administers a Mobile Home Park Ordinance but this ordinance only regulates mobile homes located within rental parks. Although the North Carolina State Building Code does regulate mobile home foundations it does not for example, require any skirting, landscaping or setbacks. More consistent enforcement of the existing mobile home revisions of the North Carolina State Building Code however, have resulted in limited structural and esthetic improvements in the area of mobile home siting. When the county receives proposed plats for large mobile home parks, it should consider the existing proximity to fire stations, water services, schools, sanitary sewers, and solid waste container sites.

Major problems from unplanned development and their implications for the future

Presently, Washington County seems to be a fairly typical rural community when it comes to measuring the magnitude of problems from unplanned development. A very typical problem and a persistent one is the odor problems which occur when residential development occurs near certain types of farming operations. Specifically, swine and poultry producers often find new home construction occurring "downwind." The North Carolina Supreme Court has given priority consideration to agriculture in these types of circumstances. However we have found that oftentimes these problems are exacerbated by poor farm management. They also seem to ebb and flow with the season. Odor problems generate many more complaints during the warmest months of the year.

These problems could be reduced and possibly even eliminated over a long time period with strict zoning controls. Up to this point, the Board of County Commissioners have indicated no inclination to enact a zoning ordinance. Short of zoning, more careful subdivision plat review can at least forewarn possible subdividers or posssibly indicate the need for buffer strips or other remedial measures. Many times simple compliance with existing agricultural regulations will reduce or eliminate the problem. Poultry producers are already regulated by waste disposal regulations which require prompt disposal with a minimum of three feet of cover. The county might also wish to require a disclosure statement on the face of the plat to encourage

the "buyer to beware."

Another problem in this category is the one of houses being too close to U.S. 64. This problem is especially severe in "the Pines" just east of Plymouth and in the neighborhood known as Macedonia. This is another problem which could be addressed by a zoning ordinance. The North Carolina Department of Transportation has a more liberal housing moving policy in those counties which require minimum setbacks in their zoning ordinances. The existing project widening U.S. 64 from two lanes to four near the junction of N.C. 45 just east of Plymouth has generated a lot of discussion on this topic. Since local officials are continuing to lobby for the widening of additional sections of U.S. 64, this problem could reoccur. In the absence of district type zoning, the county should explore a rural development ordinance which might limit its jurisdiction to minimum building setbacks and driveway controls. This might accomplish the end of maximizing house moving allowances by the Department of Transportation and preventing future reoccurrences of this problem.

The county has also documented recurring complaints from residents on unpaved secondary roads. Most of these homes have been built in previously undeveloped areas. The road paving point system used by the Transportation Department makes it very unlikely that many of these roads will not be paved in the near future. This is a growing problem since the county continues to petition the Department to add unpaved private roads to the State system. In many years, the addition of unpaved road mileage exceeds the mileage of dirt roads scheduled

for paving. This is an extremely difficult problem which even the strongest land use controls might not resolve. Once again, this is a problem which could be addressed by disclosure requirements.

The final major land use problem which has been indentified is the one presented by recurring woods fires in the Lake Phelps area. In recent years, woods fires and ground fires in Phelps Field have spread to the residential strip on the Washington County shoreline of Lake Phelps. In 1985, this resulted in the loss or severe damage of approximately thirty homes. This situation could reoccur since it is caused by normal seasonal conditions which occur in the spring. The North Carolina Division of Forest Resources through its county ranger, has attempted to inform property owners of the risks and educate them on alternatives for the future. Specifically, he has shown property owners how they can reduce their risks by keeping brush cleared away from their house and by purchasing low cost water pumping equipment. First Colony Farms has also made a sizeable investment in fire prevention improvements such as the addition of an elevated lookout tower. If all of the recommendations of the county ranger are implemented by property owners, the seasonal risk of fire should be somewhat reduced.

Washington County suffers from other types of problems related to unplanned development. These problems which are of a smaller magnitude than those discussed above include: the location of junk yards, the location of taverns near residential and religious property, and a possible problem from encroaching development around the Plymouth Airport on Morratuck Road and the Washington County Industrial Park. These lower level problems should be carefully monitored by the County

Department of Public Works & Planning.

Areas of Actual or Possible Change in Predominant Land Use

The most obvious location of change in predominant land use is the U.S. 64 corridor through and just east of Plymouth. In the last twenty four months, extensive commercial development has occurred in this area, including shopping center development, fast food businesses, and a proposed motel.

Secondary Road Number N.C. 149, more commonly referred to as Ken Trowbridge Road from the intersection of U.S. 64 to the Martin County boundary is an area also undergoing change. Twenty years ago this area was largely woodsland but several businesses and a small industry have been built here. Its close proximity to the Weyerhaeuser complex makes it a likely location for satellite businesses and industries. Presently, a large truck stop is being constructed on the corner of Ken Trowbridge Road and U.S. 64 and in recent years a commercial truck repair facility has been built. Commercial development related to the Weyerhaeuser facility will most likely continue.

Although the rate of land use conversion is less rapid, we should expect to see farmland converted to residential strip development on N.C. 32 just south of Plymouth and in the same general area on Long Ridge Road and Morratuck Road. This area could be very attractive because of its close proximity to services available in Plymouth and its rustic rural character. Problems associated with the farm economy are also a disincentive to continued agricultrual land use which traditionally has been the predominant land use in this general area.

Although the existing road network makes riverfront access limited, new residential development has accelerated on the Roanoke River just east of Plymouth, viz Roanoke Shores. Increased land use conversion from agricultural to residential on the Albemarle Sound shoreline will also continue. Limited road access is also a limiting factor here. All road frontage along U.S. 64 is likely to experience residential and small scale commercial land use conversion. The area in and near the Pea Ridge Y could see a somewhat higher than normal level of commercial development if the reconstruction of the Albemarle Sound bridge increases the traffic count.

Finally, toward the end of the planning horizon, we predict that residential growth will spill over from the Beaufort County portion of N.C. 32 into Washington County. The southern section of N.C. 32 is within a comfortable commute to employment locations in Beaufort County.

WASHINGTON COUNTY PLANS, POLICIES AND REGULATIONS

Regulations

Washington County Subdivision Ordinance - Initially adopted in June of 1977, subsequently amended in October 1977 and July of 1979, the ordinance requires the platting and approval of subdivided land in the County and Roper and Creswell. Minor plats are reviewed by the Subdivision Review Committee. Major plats are reviewed by the Washington County Planning Board and the Washington County Board of Commissioners. This ordinance is administered by the County Planner.

Mobile Home and Travel Trailer Park Ordinance - This ordinance regulates the planning and construction of mobile home and travel trailer parks throughout the County. The ordinance was adopted in July of 1974 and subsequently amended in July of 1979. This ordinance is enforced by the County Planner and the County Building Inspector.

Laws and Rules for Ground Absorption Sewage Disposal Systems - These regulations control the use of sanitary sewage disposal systems with 3,000 gallons or less design capacity serving a single or multifamily residence, place of business, or place of public assembly. The District Health Department is responsible for the administration of these regulations.

State Building and Electrical Codes - The codes call for the inspection of new construction to assure conformance with State standards. The Building Inspector is responsible for the permitting and inspection of such construction.

Flood Hazard Ordinance - A flood hazard study for the county has been completed. A new ordinance was adopted on 8-19-85. This ordinance designates the CAMA Permit officer responsible for program administration. The county is now in the regular phase of the program.

Plans and Policies

County Soil Survey - A detailed soil survey containing maps and soils information has been prepared by the Soil Conservation Survey.

Housing Survey - The Department of Natural Resources and Community Development inventoried the structural conditions of the county housing in 1973.

Community Development Program - Prepared by Williams and Works in 1976, the Program is a documentation of the need of low and moderate income citizens in Washington County.

Washington County Community Development Plan - This planning document was developed in order to provide the citizens of Washington County with a review of certain neighborhood, community, and county-wide improvements that are necessary to upgrade the overall quality of living. It is intended to be a planning guide by which certain actions and funds can be directed over the next decade.

Washington County Housing Plan - Prepared by the Community Development Office and adopted in December of 1977, the Housing Plan assesses the County's present and anticipated housing needs and proposes means by which to insure that these needs are met.

Implementation and Permit Enforcement Plan - The Plan is an outline for Washington County to follow in their efforts to properly guide growth and development in Areas of Environmental Concerns.

Washington County Land Use Plan - The initial plan was adopted in 1976 and included Roper and Creswell. The 1976 plan includes statistical information relative to population and economy, local goals and objectives concerning future growth, identification of areas suitable for future development and a plan by which future land use will be guided. The Plan was revised in 1980-81.

Washington County Land Use Element - This document addresses those requirements set forth by the Department of Housing and Urban Development under Section 701 guidelines. The purpose of the element is to provide direction for addressing land use concerns of Washington County and its citizens.

Land Use Element Region R - The main purpose of this document is to address, focus on and draw specific regional land use goals, policies, objectives and implementation procedures from the individual County CAMA Plans while leaving the more traditional detailed analysis and projections in the individual county land use plans. Ten counties constituting Region R, are addressed in this 1977 Plan.

Recreation Plans - Washington County Recreation Plan prepared by the Washington County Community Development office; Outdoor Recreation Potential for Washington County, N.C. prepared by Soil Conservation Service and U.S. Department of Agriculture; Statewide Comprehensive Outdoor Recreation Plan for North Carolina prepared by the State; An Appraisal of North Carolina's Potential for Outdoor Recreation Development prepared by USDA Soil Conservation Service: and Open Space-Recreation Plan Region R prepared by Albemarle Regional Planning and Development Commission--- Each document assesses the recreational resources within the County, projects future need in types of recreational

uses and proposes long range plans and goals. The plan prepared by the County is more explicit and detailed than Regional and State Plans.

Economic Development Plans - Washington County Overall Economic Development Plans, 1962, 1977; and Regional Overall Economic Development Plan, 1977-- Each plan lists recommendations for priority needs based on available data. The regional plan designates Plymouth and surrounding areas as a growth center and provides comparative data for surrounding counties.

Solid Waste Planning Study - The report was prepared to assist the County in evaluating the existing system of solid waste disposal, to review the adequacy of the present landfill site that is serving the County, and make recommendations concerning the feasibility of alternative sites. Preparation of the plan in 1979 was a joint effort between ARPDC, Talbot and Associates and the County Planning Office.

Water Feasibility Study For Washington County - The study, completed in 1975 includes information concerning groundwater resources, existing water facilities, population projections and present and future water requirements. A construction schedule is also included. This study was revised in October 1982, January 1984 and November 1984. The project is presently in the construction phase.

Albemarle Area Resource Conservation and Development Plan of North Carolina - The plan, prepared by the Albemarle Resource Conservation and Development Council, provides guidance in the use and development of our natural resources. It was completed in 1977.

Shoreline Erosion Inventory - A study prepared by the Soil Conservation Service in 1975, the erosion inventory lists the physical factors associated with shoreline erosion in fifteen coastal counties, and attempts to assess the magnitude of the problem.

Pettigrew State Park Master Plan - The Division of Parks and Recreation has outlined plans for the expansion of recreational facilities at Pettigrew Park along Lake Phelps.

Lake Phelps Lake Management Study - Also prepared by the North Carolina Division of Parks and Recreation, this 1980 report provides background information on the Lake Phelps area, and proposes a plan for the management of the lake level.

Transportation Development Plan - This is a brief five year Transportation for the purposes of coordinating Human Services Agency's client transportation and for achieving the most cost efficient transportation services.

Ground Absorption Regulations (Septic Tanks) - Washington County's Public Health programs are administrated on a regional basis by the Martin-Washington-Tyrrell Counties Health Department. A staff of two sanitarians receives and reviews applications for ground absorption (septic tank) systems. The applicable permit is known as the Improvements Permit.

Soil Erosion And Sedimentation Permits - Presently, all enforcement is at the State Government level and assigned to the Washington, North Carolina Field Office of the North Carolina Department of Natural Resources and Community Development (See Division of Land Resources).

Airport Plan - The County is working with the Town of Plymouth to secure Federal funds to lengthen the existing 3700 foot paved runway to approximately 4500 linear feet in order to serve corporate jets.

Transportation Improvement Plan - With the completion of the Albemarle Sound Bridge, the County's emphasis is on securing State funding for four-laning U.S. 64 from Plymouth to Columbia.

Effectiveness

Most policies are working fairly well. However, the County is concerned about State proposals to strengthen ground absorption (septic tank) regulations, and would probably resist such efforts. Also, the Director of Public Works and Planning is urging the Federal Emergency Management Agency to develop specific flood elevations and eliminate the use of "unnumbered A zones" to remove their artificial inflation of insurance premiums. The County has just recently revised its Mobile Home and Travel Trailer Park Ordinance and Subdivision Regulations reducing road paving requirements and accelerating the process procedurally, responding to local arguments that these ordinances were preventing sound real estate development.

FEDERAL LICENSES AND PERMITS

Agency	Licenses and Permits
Army Corps of Engineers (Department of Defense)	- Permits required under Sections 9 and 10 of the Rivers and Harbors of 1899; permits to construct in navigable waters. - Permits required under Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972. - Permits required under Section 404 of the Federal Water Pollution Control Act of 1972; permits to undertake dredging and/or filling activities.
Coast Guard (Department of Transportation)	- Permits for bridges, causeways, pipelines over navigable waters; required under the General Bridge Act of 1946 and the Rivers and Harbors Act of 1899. - Deep water port permits.
Geological Survey Bureau of Land Management (Department of Interior)	- Permits required for offshore drilling. - Approvals of OCS pipeline corridor rights-of-way.
Nuclear Regulatory Commission	- Licenses for siting, construction and operation of nuclear power plants; required under the Atomic Energy act of 1954 and Title II of the Energy Reorganization Act of 1974.
Federal Energy Regulatory Commission	- Permits for construction,

operation and maintenance of interstate pipelines facilities required under the Natural Gas Act of 1938.

- Orders of interconnection of electric transmission facilities under Section 202(b) of the Federal Power Act.

- Permission required for abandonment of natural gas pipeline and associated facilities under Section 7C (b) of the Natural Gas Act of 1938.

- Licenses for non-federal hydro-electric projects and associated transmission lines under Sections 4 and 15 of the Federal Power Act.

Department of Natural Resources and Community Development Division of Land Resources	- Permits to alter or construct a dam (G.S. 143-215.66). - Permits to mine (G.S. 74-51). - Permits to drill an exploratory oil or gas well (G.S. 113-381). - Permits to conduct geographical exploration (G.S. 113-391). - Sedimentation erosion control plans for any land distrubing activity of over one contiguous acre (G.S. 113A-54).
Department of Natural Resources and Community Development Secretary of NRCD	- Permits to construct an oil refinery.
Department of Administration	- Easements to fill where lands are proposed to be raised above the normal high water mark of navigable waters by filling (G.S. 146.6(c).
Department of Human Resources	- Approval to operate a solid waste disposal site or facility (G.S. 130-166.16). - Approval for construction of any public water supply facility that furnishes water to ten or more residences (G.S. 130-160.1).

STATE LICENSES AND PERMITS

Agency	Licenses and Permits
Department of Natural Resources and Community Development Division of Health Services	- Permits to discharge to surface waters or operate waste water treatment plants or oil discharge permits; NPDES Permits, (G.S. 143-215) - Permits for septic tanks with a capacity over 3000 gallons/day (G.S. 143-215.3). - Permits for withdrawal of surface or ground water in capacity use areas (G.S. 143-215.15). - Permits for air pollution abatement facilities and sources (G.S. 143-215.108). - Permits for construction of complex sources; e.g. parking lots, subdivisions, stadiums, etc. (G.S. 143-215.109). - Permits to construct non-domestic wells to pump less than 100,000 GPD (capacity use program) G.S. 215.12) - Permits for construction of a well over 100,000 gallons/day (G.S. 87-88)
Department of Natural Resources and Community Development Division of Coastal Management	- Permits to dredge and/or fill in estuarine waters, tidelands, etc. (G.S. 113-229) - Permits to undertake development in Areas of Environmental Concern (G.S. 113A-118). NOTE: Minor development permits are issued by the local government.

LAND SUITABILITY

Physical Limitations for Development

In it's natural condition, substantial portions of Washington County have clear physical limitations for development. However, with careful site planning and engineering, these limitations can be overcome in most instances. In addition to natural conditions, the layout of the state road system also is a limiting factor. For example, there are two massive rural portions of the county totally unserved by public roads. The first one is the area between NC 32 and SR 1127, commonly referred to as the east Dismal Swamp. The second is the general area between SR 1126 and US 64.

Finally, in a broader sense, we may also consider the lack of public utilities viz. water sanitary sewer and electrical has basic physical limitations to growth in general and industrial development in particular. Even in the area of public utilities, the limitations should not be overemphasized. The growing acceptance of land application wastewater systems, the construction of the county waterworks, and the ability of both electrical power companies to add to their distribution system demonstrate the adequacy of the basic infrastructure system to accommodate further growth.

Further, when we view these limitations from the perspective of the entire coastal area of North Carolina, this county is in a relatively advantageous position to support economic development.

Specifically, we can illustrate our thesis by: the present of the highly productive Castle Hayne aquifer, better drained soils, less erosion, and less servere flooding hazards.

Hazard Areas

Although Washington County does have relatively less intense flood hazard and shoreline erosion problems, extensive amounts of acreage are plagued by one or both of these natural forces. These two forces should be carefully considered in the planning and preliminary engineering stages of development.

Potential flood hazard areas were shown on a Department of Housing and Urban Development Flood Hazard Boundary Map dated June 9, 1978. This map has been somewhat refined and augmented by the draft Flood Insurance Rate Map which was issued by the Federal Emergency Management Agency on August 17, 1984. This map is available for public inspection in the Washington County Planning Department Office.

Further, on February 19, 1985, the Federal Emergency Management Agency released the base flood elevations for the unincorporated areas of Washington County. These elevations range from 5 feet above sea level along the Scuppernong River to 26 feet downstream of NC 32 along the Conaby Creek tributary.

The 1981 Land Use Plan accurately stated that Creswell and Cherry are two areas of the county experiencing major flooding problems. Flooding in Creswell will be substantially reduced upon completion of a dike construction project. This project was funded through the Soil Conservation Service - Resource Conservation and Development Program and is presently in the construction phase.

Further, efforts are underway to restore the stream-flow of the Scuppernong River. Presently, Washington County is actively considering official sponsorship of a Scuppernong River Section 205 Flood and Control Project (Army Corps of Engineers).

In conclusion, the flooding problems in Washington County, once again, when viewed from the overall coastal geography are relatively mild. However, extensive land area is involved. The most recent information from the Federal Emergency Management area shows that the entire county is limited to flooding zones A, A2, A3, A4, A5, A6, A7, A8, A9, B and C. Zone C is an area of minimal flooding. Washington County has none of the notorious V zones associated with the Outer Banks counties.

The county should not attempt to stop development in flood hazard areas but should encourage the wise use of flood hazard information in site development planning.

Generally, lot owners should seriously consider elevating houses on lots located in Zone A and to a lesser extent in Zone A2-A9.

Failure to comply with the flood mitigation regulations may cause problems in securing financing and/or flood insurance. Flood mitigation measures should be calculated into overall development cost.

Presently, Washington County is attempting to design a simple, yet efficient flood hazard regulation enforcement system through the Planning and Inspections Department.

The 1981 Plan also contained the following statement: "A Shoreline Erosion Study was prepared by the Soil Conservation Service in October of 1975 to determine the magnitude of the erosion problem..." The study referred to was the "Shoreline Erosion Inventory," USDA-Soil Conservation Service - Raleigh, North Carolina - October 1975.

The 1981 Plan also stated "the county's shoreline erosion rate of 4.5 feet per year ranks high compared to other coastal counties..." According to the Shoreline Erosion Inventory, this is a correct state-

ment. However, the "Inventory" was not a comprehensive examination of erosion rates in the fifteen county study area. One page one of the Inventory, we find the following statement: "No study was made of the shorelines directly exposed to the ocean or the soundside of the Outer Banks." In effect the inventory examined the most severely eroding areas in Washington County and some of the least severely eroding areas in Dare, Currituck and other counties.

Further, the manner in which the data is organized produces unusual results. For example, Reach Number One in the study along the Roanoke River was found to have no measurable erosion. When the average erosion rate was calculated, instead of factoring in an erosion rate of zero for Reach Number one, Reach Number One was not included. If we include an erosion rate of zero for Reach Number one, the erosion rate drops to 3.5 feet per year.

In conclusion, the Erosion Inventory is a very useful tool when studying the individual reaches of coastline in Washington County. The Study however, is of little value when attempting to assess the overall erosion problem for Washington County or for making county to county comparisions.

Potential land purchasers and developers should carefully examine the available data for site specific erosion information. The worst section of shoreline from an erosion standpoint are Reach Number Eight generally, and Lural Point especially, and Reach Number Two, especially the western most portion of the Albemarle Sound shore up to Albemarle Beach. We have identified no significant tract of land with a slope exceeding 12%.

Since 1981, additional bulkheading had been installed reducing the total amount of erosion taking place in Washington County. The

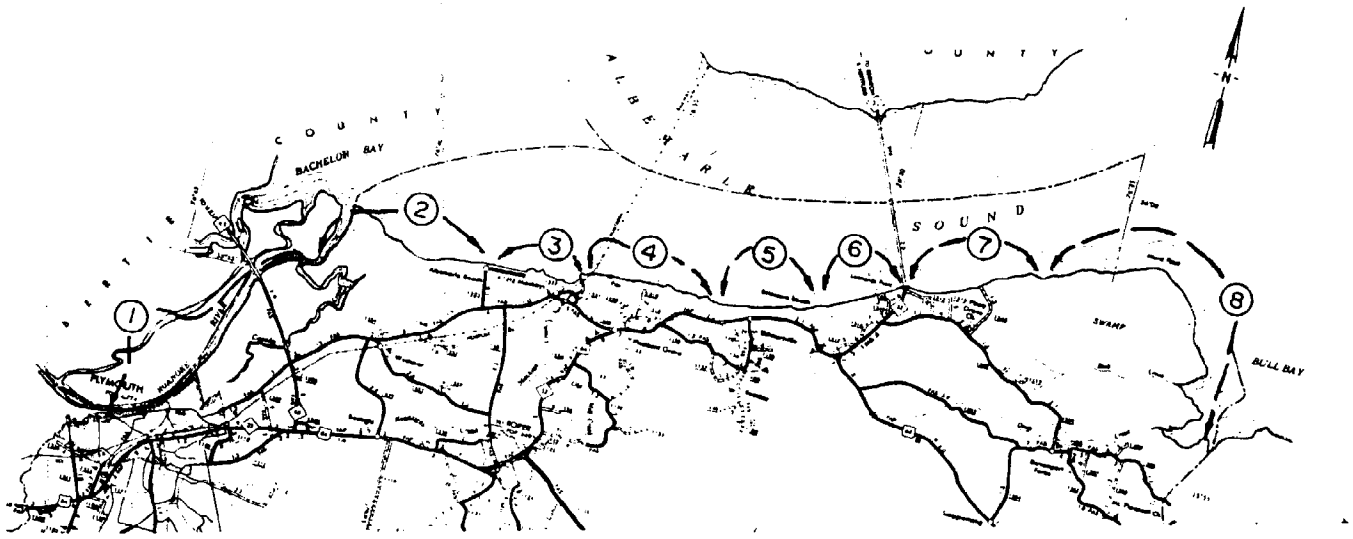
construction of the new Albemarle Sound Bridge will include a section of riprap which will have an erosion reducing effect at that location.

Construction of bulkheading can increase erosion on contiguous shorelines depending on the angle at which the waves strike the beach.

Developers and property owners should explore carefully the effect of Coastal Management regulations on bulkheading before investing in shoreline property. Generally, these regulations only permit the reclaiming of the equivalent of one year of erosion.

MAP 2

SHORELINE EROSION



LEGEND

—— (1) —— REACH

WASHINGTON COUNTY

NORTH CAROLINA

Manmade Hazards

Washington County, like many rural communities is relatively free of manmade hazards. The most obvious manmade hazard present is the transporting of chlorine gas by rail in and out of the Plymouth Weyerhaeuser facility. The Washington County Emergency Management Office has a Chlorine Spill Plan on file.

Grain elevators can also constitute manmade hazards since their contents are highly combustible. The Tyson Grain Elevator and Creswell Grain Elevator are the two largest facilities of this type in the county.

Helena Chemical Company, a chemical distribution warehouse on Folly Road is another potential manmade hazard. Further, Swain Gas Company, East Carolina Supply, and Plymouth Oil Company, all store commercial quantities of bottle gas and or oxygen. These three distributors are located on U.S. 64 west, Rankin Lane, and U.S. 64 east respectively. We are pleased to be able to state that all of the above companies have established reputations for civic responsibility and good management.

In recent years, a problem has occurred wherein local farmers have failed to empty large herbicide, pesticide and fertilizer containers and some have thrown these containers into local streams. This problem seems to have subsided somewhat in response to an extensive educational program by the local Agricultural Extension staff. This educational effort should be an ongoing one and should be continued throughout the planning horizon.

Defense Department changes in the military airspace in Northeastern North carolina will have some impact on Washington County. For a more thorough discussion of this possible hazard, see page 23.

Finally, this Land Use Plan functions as a primary data base containing a broad but relatively simple collection of socio-economic and physical data.

We have attempted to prepare this document consistent with the wishes of the citizenry and local elected officials yet we have also attempted to follow the statutory requirements of the Coastal Area Management Act and the accompanying guidelines found at 15 NCAC .0200.

Areas With Soil Limitations And Other Constraints To Development

Foundations

Extensive land area in Washington County is characterized by soils with naturally limited foundation capabilities. Some of these soils have low, low strength characteristics and some of the clays are the type that cause shrink-swell problems (See general soils descriptions). Most of the soils in Washington County are the type that are relatively deep. Shallow soils are not a major problem in Washington County.

Poorly drained soils are extensive throughout Washington County. In most cases however, these drainage problems can be overcome with appropriate planning, engineering and construction techniques.

In the case of residential development, these corrective actions may inflate the cost of residential development so high that it becomes prohibitive.

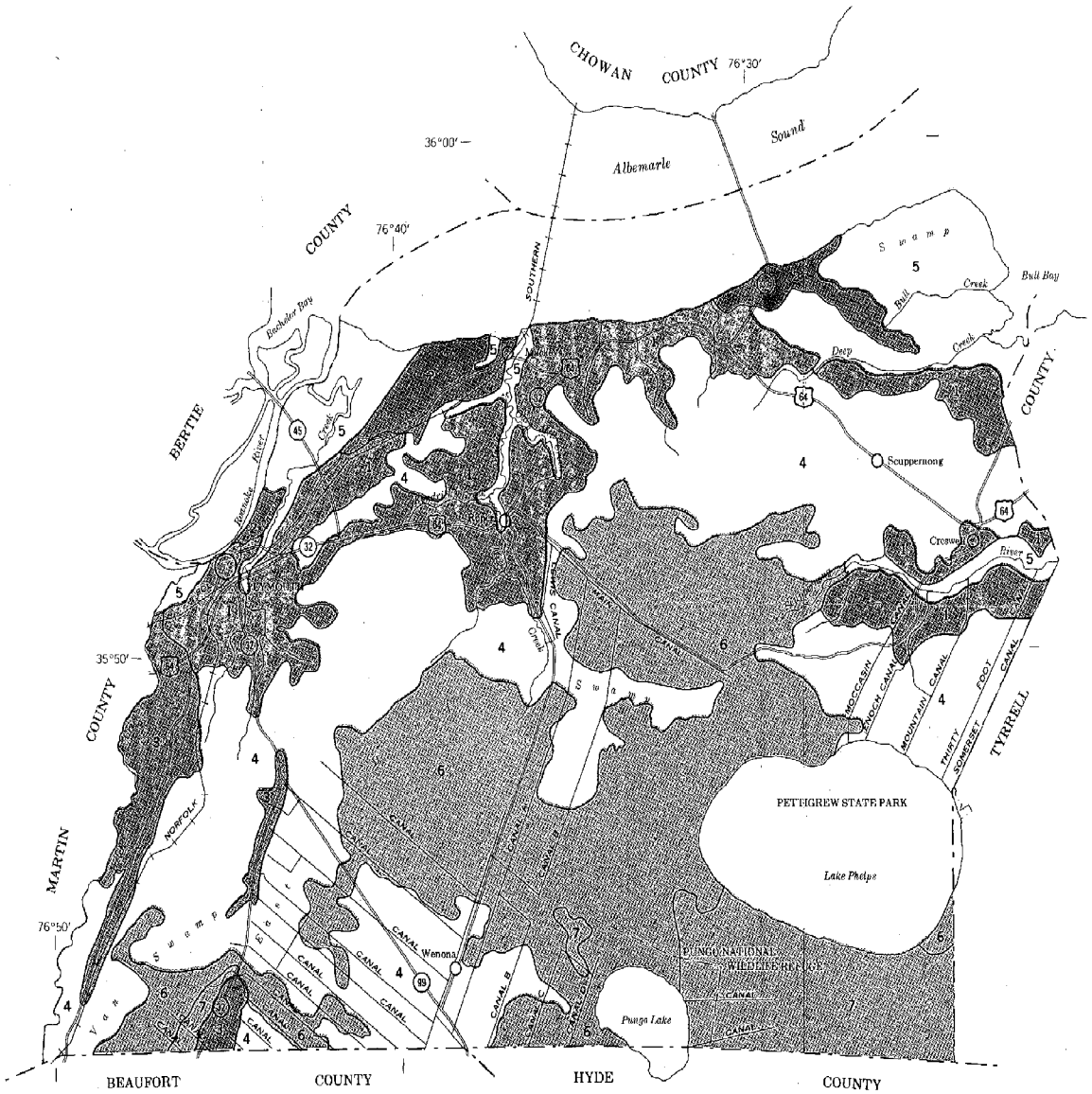
Finally, in their natural state, many of the soil types in Washington County have very poor ground absorption capabilities. In other words, they are poorly suited in their natural condition for the use of septic tanks. Once again these problems can be corrected but may drive up the cost of residential development to the point where the cost becomes artificially high or prohibitive.

Normally, the cost limitations for commercial and industrial development are not as critical as those for residential development.

Further, many times up industrial or commercial locational factors overide soil limitations. The most obvious problems related to the installation of septic tank systems are clay soils which do not allow effluent to move downward, sandy soils which permit effluent to move downward too fast and high water table.

Figure 11

SYMBOL	SOIL NAME	DRAINAGE	SOIL LIMITATIONS FOR SEPTIC TANK	SOIL LIMITATIONS FOR FOUNDATION	NUMBER OF ACRES
3	Altavista fine sandy loam	Fair	None	None	6,530
6	Arapahoe loamy sand	Poor	Severe	Severe	9,500
9	Argent silt loam	Poor	Severe	Severe	8,045
12	Augusta fine sandy loam	Poor	Severe	Severe	6,610
15	Belhaven muck	Poor	Severe	Severe	25,645
18	Bojac loamy fine sand	Good	None	None	1,220
21	Cape Fear loam	Poor	Severe	Severe	28,755
24	Conaby muck	Poor	Severe	Severe	3,600
28	Conetoe loamy sand	Good	None	None	3,365
35	Dogue fine sandy loam	Fair	Severe	Severe	2,650
38	Dorovan muck	Poor	Severe	Severe	17,600
39	Dorovan mucky silt loam	Poor	Severe	Severe	2,255
41	Dragston loamy sand	Poor	Severe	Severe	4,950
43	Fortescue silt loam	Poor	Severe	Severe	720
51	Hyde silt loam	Poor	Severe	Severe	5,010
94	Wehadkee silt loam	Poor	Severe	Severe	2,115
57	Pettigrew muck	Poor	Severe	Severe	6,310
60	Ponzer muck	Poor	Severe	Severe	1,120
63	Portsmouth fine sandy loam	Poor	Severe	Severe	20,000
71	Pungo muck	Poor	Severe	Severe	14,815
75	Roanoke loam	Poor	Severe	Severe	15,550
78	Roper muck	Poor	Severe	Severe	6,590
80	Scuppernong muck	Poor	Severe	Severe	2,040
86	Tarboro sand	Good	None	None	945
88	Tomotley fine sandy loam	Poor	Severe	Severe	3,825
90	Wahee fine sandy loam	Poor	Severe	Severe	4,140
92	Wasda muck	Poor	Severe	Severe	7,360
98	Wickham loamy sand	Good	None	None	3,425
				TOTAL	214,690



LEGEND

- AUGUSTA-ALTAVISTA-WAHEE: Nearly level, somewhat poorly drained and moderately well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands
- CONETOE-WICKHAM-TARBORO: Nearly level and gently sloping, well drained and somewhat excessively drained soils that have a sandy surface layer and a dominantly loamy subsoil or sandy underlying material; on uplands
- DRAGSTON-CONETOE-ALTAVISTA: Nearly level and gently sloping, somewhat poorly drained, well drained, and moderately well drained soils that have a sandy or loamy surface layer and a loamy and sandy subsoil; on uplands
- 4 CAPE FEAR-PORTSMOUTH-ROANOKE: Nearly level, very poorly drained and poorly drained soils that have a loamy surface layer and a loamy or clayey subsoil; on stream terraces
- 5 DOROVAN: Nearly level, very poorly drained soils that are dominantly muck throughout; on flood plains
- BELHAVEN-WASDA-ROPER: Nearly level, very poorly drained soils that have a mucky surface layer and a dominantly loamy subsoil; on broad, level flats
- PUNGO: Nearly level, very poorly drained soils that are muck to a depth of 51 inches or more; on broad, level flats

Compiled 1980

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE
WASHINGTON COUNTY BOARD OF COMMISSIONERS
NORTH CAROLINA DEPARTMENT OF NATURAL
RESOURCES AND COMMUNITY DEVELOPMENT

GENERAL SOIL MAP

WASHINGTON COUNTY
NORTH CAROLINA

N

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

Specifically, when these problems occur, side ditches will often lower the water table to an accetable level. Installation of a modified ground absorption system for example, a "mound system" will often permit a landowner to install an efficient on-site wastewater disposal system. The Tidewater Research Station near Roper has a statewide reputation for experiments with modified septic tank systems, especially the mound system. Property owners should make sure that innovative construction techniques do not reduce the disinfecting capability of the soil below acceptable public health standards.

General Soils Characteristics

[1]Augusta-Altavista-Wahee - Nearly level, somewhat poorly drained and moderately well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands. The soils in this unit are used mainly as cropland. In a few areas they are used as pasture and woodland. These soils are well suited to use as cropland and pasture and to woodland use, and they are suited or poorly suited to most urban uses. Wetness and permeability are the main limitations to use and management.

Conetoe-Wickham-Tarboro - Nearly level and gently sloping, well drained and somewhat excessively drained soils that have a sandy surface layer and a dominantly loamy subsoil or sandy underlying material; on uplands. The soils in this map unit are used mainly as cropland. In a few areas they are used as pasture and woodland. These soils are suited or well suited to use as cropland and pasture and to woodland use, and they are well suited to most urban uses. Leaching of plant nutrients, soil blowing, and droughtiness are the main limitations to use and management.

[1]Soil Survey of Washington County, North Carolina, US Department of Agriculture, Soil Conservation Service, December 1981 - Pages 5-7.

Dragston-Conetoe-Altavista - Nearly level and gently sloping, somewhat poorly drained, well drained, and moderately well drained soils that have a sandy or loamy surface layer and a loamy and sandy subsoil; on uplands. The soils in this map unit are used mainly as croplands. In a few areas they are used as pasture and woodland. These soils are well suited or suited to use as cropland and pasture and to use as woodland. They are well suited, suited, or poorly suited to most urban uses. Wetness, leaching of plant nutrients, soil blowing, and droughtiness are the main limitations to use and management.

Cape Fear-Portsmouth-Roanoke - Nearly level, very poorly drained and poorly drained soils that have a loamy surface layer and a loamy or clayey subsoil; on stream terraces. The soils in this map unit are used mainly as cropland. In a few areas they are used as pasture and woodland. These soils are well suited to most locally grown crops and pasture and to woodland, and they are poorly suited to most urban uses. Wetness and permeability are the main limitations in use and management.

Dorovan - Nearly level, very poorly drained soils that are dominantly muck throughout; on flood plains. The soils in this map unit are used almost exclusively as woodland. They are poorly suited to use as cropland and pasture, to use as woodland, and to most urban uses. Wetness, flooding, and low strength are the main limitations to use and management.

Belhaven-Wasda-Roper - Nearly level, very poorly drained soils that have a mucky surface layer and a dominantly loamy subsoil; on broad, level flats. The soils in this map unit are used mainly

as cropland. In a few areas they are used as woodland and wildlife habitat. If drained, these soils are suited or well suited to use as cropland and pasture and to use as woodland. They are poorly suited to most urban uses. Wetness and low strength are the main limitations to use and management.

Pungo - Nearly level, very poorly drained soils that are muck to a depth of 51 inches or more; on broad, level flats. The soils in this map unit are used almost exclusively as wildlife habitat and woodland. They are poorly suited to use as cropland and pasture, to woodland use, and to urban uses. Wetness, low strength, and logs, stumps, and roots are the main limitations to use and management.

Although the [2]"Soil Survey of Washington County is an excellent planning tool, the information does have limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for on-site investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

In conclusion, a basic point of emphasis is once again, that the soil limitations described herein refer to the soils in their natural conditions. With proper planning, engineering and construction techniques, these limitations can largely be overcome. The best

[2]Soil Survey of Washington County, North Carolina, US Department of Agriculture, Soil Conservation Service, et. al. - December 1981 - Page 34.

illustration of this is the Tyson Grain Elevator. This structure is probably the single heaviest structure in Washington County. However, it was built on a site with extreme soil limitations. This site contained Portsmouth-Cape Fear soils. Foundation for the structure consists of a 3 foot spread footing. Steel piling were not used, yet the structure has performed well.

The capability of coastal soils to accommodate on-site sewage disposal systems is limited. The ability of these soils to accommodate industrial wastewater is even more limited. However, the innovative land application systems recently approved by the United States Environmental Protection Agency do provide additional alternatives.

Presently, there are only three conventional wastewater treatment systems in Washington County. These three are those operated by the municipalities of Plymouth, Roper and Creswell. According to the 1984 North Carolina Profile for Plymouth, the town's wastewater system consisted of an areation type treatment plant rated at 800,000 gallons per date. According to the report, in 1984 there was an available surplus of 250,000 gallons per day. The corresponding profile for Roper dated 1984 described that town's plant as an extended areation plant with hydrologic capacity of 85,000 gallons per day and an available surplus of 10,000 gallons per day. For Creswell, the 1984 Profile describes a lagoon [pressure sewer] system with a hydrologic capacity of 64,000 gallons per day. This new system has an available surplus of 20,000 gallons per day according to the Department of Commerce.

Generally, all three wastewater treatment systems are in relatively good condition and are either new systems or systems which have undergone renovation through the Environmental Protection Agency 201 Wastewater Facilities Program. However, we can see from the data above that the ability to accommodate future growth is limited. For this reason and others, the county should pursuit a very careful approach when attempting to match new economic development with the service capacity of the three existing systems.

Further, the county should fully examine the possibility of planning for the use of automated package sewage treatment plants on receiving streams and on-site land applications systems.

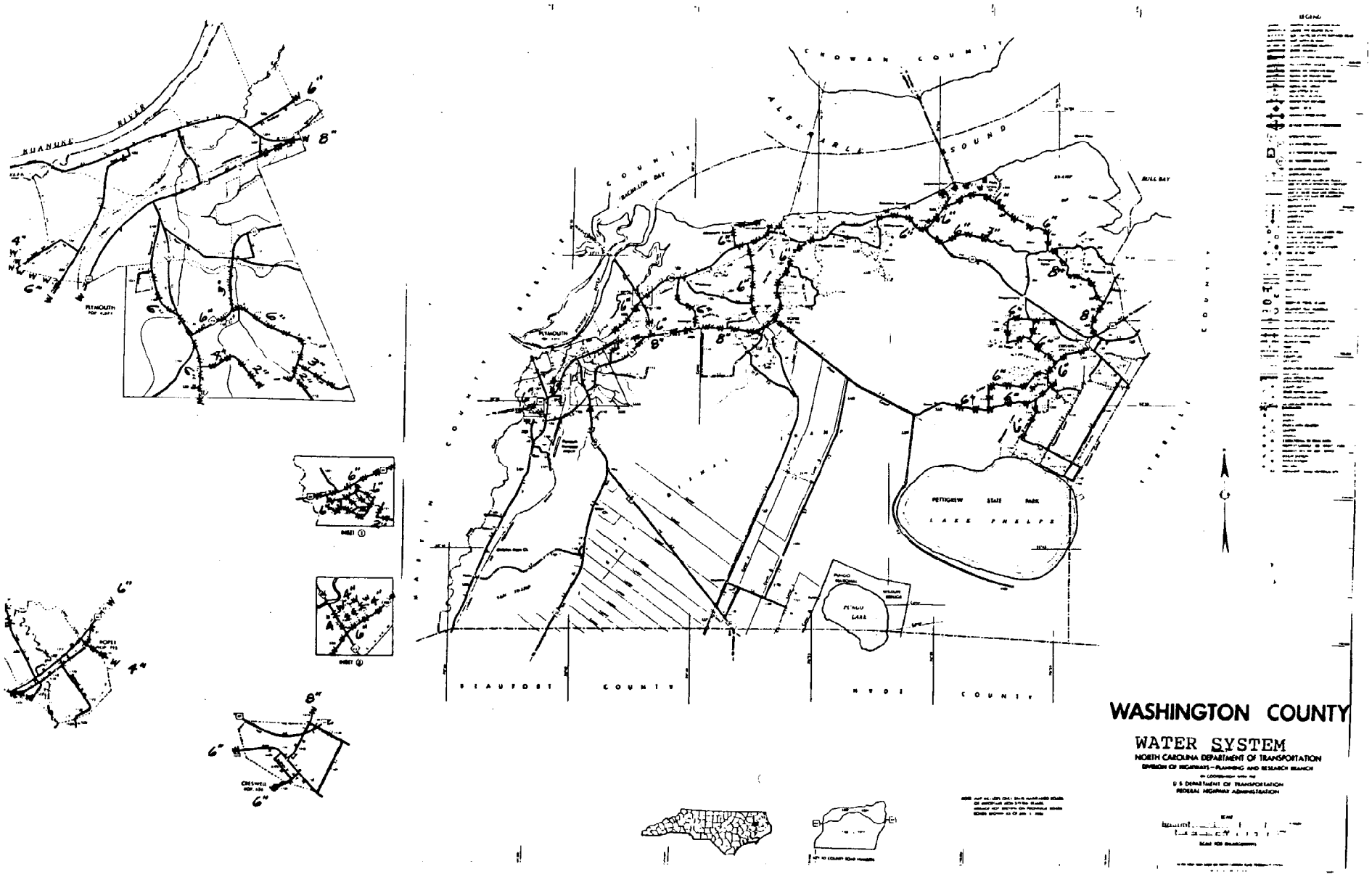
Water Supply

Virtually all communities have two basic sources of water. These two basic sources are ground water and surface water. Typically, in eastern North Carolina, water is supplied by ground water sources. This is also the case in Washington County. However, let us discuss very briefly the major bodies of surface waters in Washington County. The major bodies are: the Albemarle Sound, the Roanoke River, Phelps Lake and Pungo Lake. The Albemarle Sound, which is one of the largest sounds in the United States has great limitations for practical use due to its salinity. The Roanoke River is presently plaqued by overall water quality problems including turbidity and industrial wastes. Of course, this does not mean that it is scientifically impossible to treat water from these two sources for human consumption, but the expense would be prohibitive.

Phelps Lake have extremely high quality water but the recharge is basically from precipitation (See Heath, 1975). The county should however work toward maintaining water withdrawal structures for seasonal limited firefighting purposes.

Pungo Lake is a Federally protected resource and the legal and political barriers to water withdrawal are virtually exclusive.

Hence, we proceed to a discussion on ground water resources. There are four basic ground water sources in Washington County. These geological units starting with the one closest to the surface are the Quaternary deposits, the Yorktown formation, the Pungo River formation, and the highly productive Castle Hayne limestone (See Figure13). The Quaternary deposits includes surface soils and the underlying sediments to depths ranging from about 40 feet in western Washington County to



LOCATION AND SIZE OF MAIN WATER LINES

57-A

approximately 200 feet in the eastern part. (Hydrology Of The Albemarle-Pamlico Region, North Carolina, 9-75, By Ralph C. Heath, Page 28). This geological unit is composed of sand-silk clay and shells. Many shallow wells in Washington County go no deeper than the quaternary sediment. The quaternary sediment is approximately 40 feet thick in Washington County.

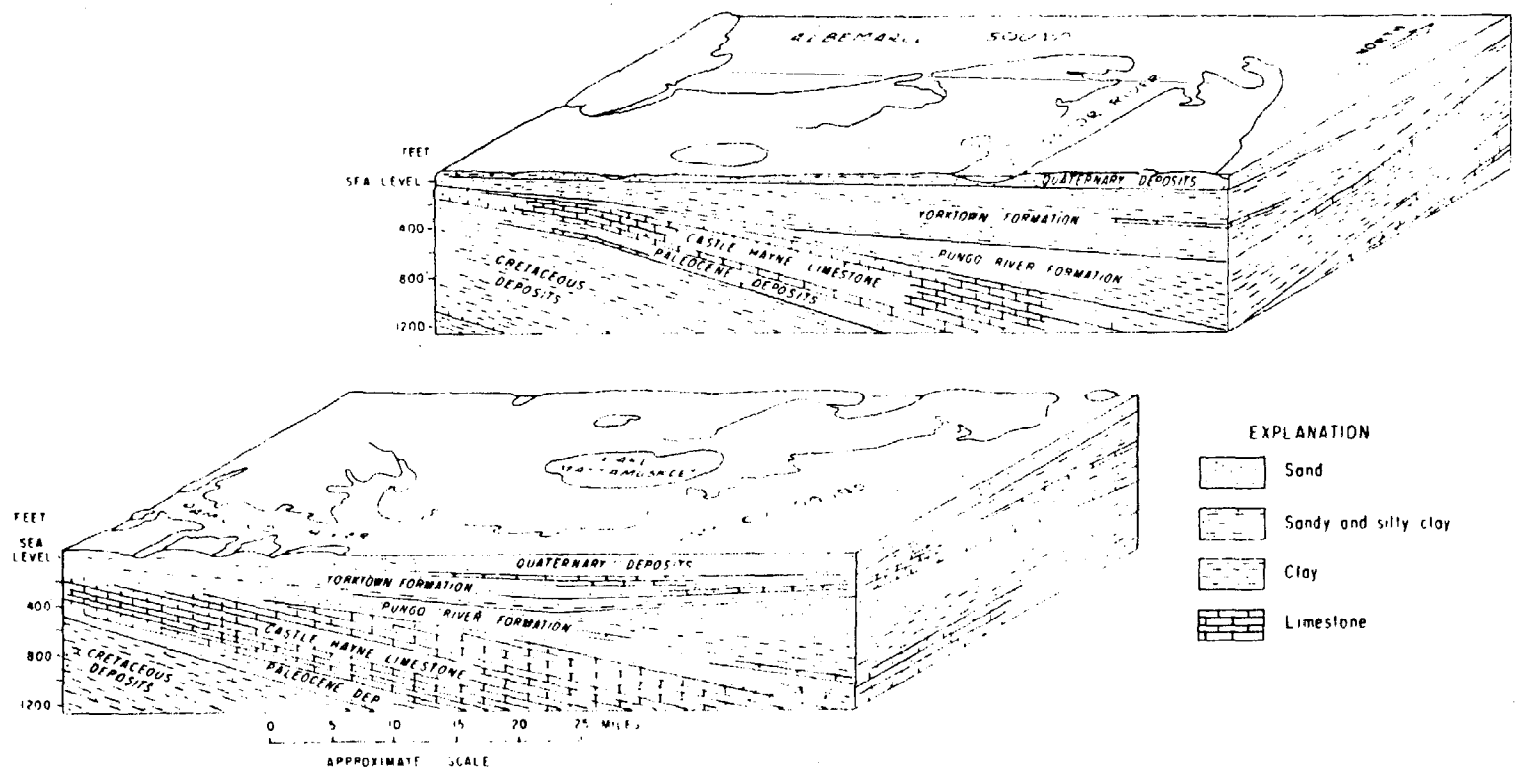
The Yorktown formation is about 150 feet thick in western Washington County. The Yorktown yields approximately 5 to 20 gallons per minute for wells approximately 2 inches in diameter and yields of 75 to 100 gallons per minute can be drawn from wells with diameters of 6 inches or larger. The sand and limestone portion of the Yorktown is the principle source of water.

The Pungo River formation is relatively unimportant as a source of water supply (Heath 1975). The top of the Pungo River formation occurs at less than 80 feet in western Washington County.

Finally, the Castle Hayne limestone is the most important hydrologic unit in North Carolina. It consists of limestone containing abundant casts and molds of molifs which grades downward into calcareous sand. It is approximately 100 feet thick in Washington County and curves at about 150 feet below sea level in western Washington County. At approximately the boundary of Tyrrell County, the depth to the top of the Castle Hayne aquifer is approximately 400 feet. The yield of wells located in the Castle Hayne depend on the thickness of the formation penetrated. Yields of several hundred gallons per minute are readily obtainable.

The Yorktown formation contains water less mineralized generally than that of the Castle Hayne aquifer. Groundwater in Washington County

Figure 12



--Block diagrams showing the relative position and generalized composition of the uppermost geologic units underlying the Albemarle-Pamlico region.

although not of uniform quality is satisfactory for most domestic uses. Water from the Castle Hayne limestone is sometime hard, high in iron and contains hydrogen sulfide.

Yorktown aquifer water ranges from hard to soft and generally contains iron. The Washington County Waterworks, at least in its initial phase of development will not have its own independent source of water but purchases water from the municipalities of Plymouth, Roper and Creswell.

Surface Water Quality

The North Carolina Department of Natural Resources and Community Development consistent with the guidelines of the United States Environmental Protection Agency maintains a water quality classification system which ranks fresh and salt waters according to their levels of pollution. The classifications are defined by types of permitted uses (See Figure 15). Bull's Bay contains the highest quality water in Washington County. According to some experts, water quality problems in the Albemarle Sound can largely be attributed to upstream problems in the Chowan River Basin.

Further, although some news media reports have speculated that water quality problems are largely the result of poor agricultural practices, there is considerable evidence to the contrary. Researchers R. W. Skaggs, J. W. Gilliam, T. J. Sheeks, and J. S. Barnes in a 1980 study seemed to disprove this notion. However, even this report points to the need to repricate the study and generally engage in comprehensive research on the subject. One of their basic findings is that ".... because of limited capacity of current canals, there may be little difference between runoff rates from developed and undeveloped lands during the largest runoff events" (Water Resources Research Institute Report No. 159 -Skaggs, Gilliam, Sheets, & Barnes, August 1980 - Page ii)

These researchers do caution livestock owners to take precautionary measures to prevent runoff from pastures into drainage systems or streams. Even here though, the problem is only severe when pastures are located close to shellfish waters and this would be an extremely rare occurrence in Washington County. But it could be a serious problem in communities to the east.

Air Resources

Both Federal and State air quality legislation regulates the emission levels of peat development activities in the study area. Pursuant to the Clean Air Act of 1970 as amended, the U.S. Environmental Protection agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for seven criteria pollutants. The latest version of these standards is shown in Table 1. The primary standards are designed to protect public health, while the secondary standards are intended to protect public welfare from any known or anticipated adverse effects. In heavily polluted areas, EPA has historically concentrated efforts on attainment of the primary standards.

Primary air quality standards are, in general, now being attained in most areas of the country. The notable exception to this trend is oxidants, with entire states not in attainment.

Congress included in the Clean Air Act Amendments of 1977 new rules for the prevention of significant deterioration (PSD) or air quality in areas attaining both primary and secondary NAAQS. These regulations apply to the study region because the air in this part of the state is cleaner than the NAAQS dictate. The PSD regulations identify levels by which pollutants may increase within three different class areas. The class areas are defined as follows:

- Class I applies to areas in which practically any air quality deterioration would be considered significant, and therefore little or no energy or industrial development is allowed.
- Class II applies to areas in which deterioration that would normally accompany normal, well-managed growth would not be considered significant.
- Class III applies to areas in which deterioration would be permitted in order to allow concentrated or very large scale energy or industrial development, as long as the NAAQS are not exceeded.

For each designation, maximum allowable increases over baseline concentrations are established for two of the seven criteria pollutants regulated by the NAAQS: sulfur dioxide (SO_2) and total suspended particulates (TSP). These allowable increments are defined for both a long-term (annual) average concentration and maximum concentrations over short periods of time. The values are shown in Table 2.

The Clean Air Act Amendments of 1977 automatically designated as Class I areas much of the park land and wilderness areas in the United States. The Swanquarter National Wildlife Refuge in Hyde County was included in this designation (The Design of a Planning Program To Help Mitigate Energy Facility-Related Air Quality Impacts in the Washington County, North Carolina Area - Rogers, Golden & Halpern, September 1982 - Pages 11 & 13).

As we can see, Washington County has two air quality limiting factors. The first is the presence of the Plymouth Weyerhaeuser Complex located just over the Martin County line. The primary impact of course, is on western Washington County. In the extreme eastern portion of the county, a limiting factor is the special designation for the Swanquarter Refuse and its accompanying Class I designation. However, research generated since the 1980 Land Use Plan by Peat

FIGURE 13

CLASS DESIGNATIONS FOR WATER QUALITY STANDARDS

FRESH WATERS

CLASS WS-I	-	Waters protected as water supplies which are in natural and uninhabited or predominantly undeveloped (not urbanized) watersheds; no point source discharges are permitted and local land management programs to control nonpoint source pollution are requried; suitable for all Class C uses.
CLASS WS-II	-	Waters protected as water supplies which are in low to moderately developed (urbanized) watersheds; discharges are restricted to primarily domestic wastewater or industrial non-process waters specifically approved by the commission; local land management programs to control nonpoint source pollution are required; suitable for all Class C uses.
CLASS WS-III	-	Water supply segment with no categorical restrictions on watershed development or discharges; suitable for all Class C uses.
CLASS B	-	Suitable for swimming, primary recreation and all Class C uses.
Class C	-	Suitable for secondary recreation and fish propagation.

TIDAL SALT WATERS

CLASS SA	-	Suitable for commercial shellfishing and all other tidal salt water uses;
CLASS SB	-	Suitable for swimming and primary recreation and all Class SC uses.
CLASS SC	-	Suitable for secondary recreation and fish propagation.

SUPPLEMENTAL WATERS

TROUT WATERS	-	Suitable for natural trout propagation and maintenance of stocked trout
SWAMP WATERS	-	Waters which have low velocities and other natural

characteristics which are different from adjacent streams.

NUTRIENT SENSITIVE WATERS - Waters requiring limitations on nutrient inputs

OUTSTANDING RESOURCE WATERS (CRW) - Unique and special waters of exceptional state or national recreational or ecological significance which require special protection to maintain existing uses.

Methanol Associates has demonstrated that when the finest available industrial technology is used, substantial heavy industrial development can occur and still remain within the confines of the Class I permitting regulations (See Figure 13).

Further, the Weyerhaeuser Company has made massive capital investments in recent years to reduce air quality problems associated with the Plymouth complex.

Figure 14

STREAM CLASSIFICATIONS

Name of Stream	Description	Classification		
		Class	Date	Index No.
ROANOKE RIVER	From 18 mile marker at Jamesville to Albemarle Sound (Batchelor Bay)	C Sw	9/1/57	23-(53)
Welch Creek	From source to Roanoke River	C Sw	7/13/80	23-55
Conaby Creek	From source to Roanoke River	C Sw	9/1/57	23-56
ALBEMARLE SOUND (Batchelor Bay)	West of line extending from a point of land on the southside of the mouth of Black Walnut Swamp in a southerly direction to a point of land on the east-side of the mouth of Roanoke River	B Sw	9/1/74	24
Eastmost River	From Roanoke River to N.C. Hwy. 45	B Sw	9/1/57	24-1-(1)
Eastmost River	From N.C. Hwy. 45, including cutoff between Eastmost River and Middle River to Albemarle Sound	B Sw	9/1/74	24-1-(2)
Kendrick Creek (Mackeys Creek)	From source to U.S. Hwy. 64 at Roper	C Sw	3/1/77	30-9-(1)
Kendrick Creek (Mackeys Creek)	From U.S. Hwy. 64 at Roper to Albemarle Sound	SC	7/1/73	30-9-(2)
Beaver Dam Branch	From source to Kendrick Creek	C Sw	9/1/74	30-9-3
Skinners Canal	From source to Beaver Dam Branch	C Sw	9/1/74	30-9-3-
Main Canal	From source to Kendrick Creek	C Sw	9/1/74	30-9-4

Canal B	From source to Main Canal	C Sw	9/1/74	30-9-4-1
Canal A	From source to Main Canal	C Sw	9/1/74	30-9-4-2
Lewis Canal	From source to Main Canal	C Sw	9/1/74	30-9-4-3
Bakers Swamp	From source to Kendrick Creek	C Sw	9/1/74	30-9-5
Pleasant Grove Creek	From source to Albemarle Sound	C Sw	9/1/74	30-10
Chapel Swamp	From source to Albemarle Sound	C Sw	9/1/74	30-11
Newberry Ditch	From source to Albemarle Sound	C Sw	9/1/74	30-12
Sleights Creek	From source to Albemarle Sound	C Sw	9/1/74	30-13
Bull Bay	Entire Bay	SB	7/1/73	30-14
Bull Creek	From source to Bull Bay	C Sw	9/1/74	30-14-1
Deep Creek	From source to Bull Bay	C Sw	7/1/73	30-14-2
Bunton Creek	From source to Bull Bay	C Sw	7/1/73	30-14-3
Moccasin Canal and connecting canals	From source to Scuppernong River	C Sw	9/1/74	30-14-4-2
Western Canal and connecting canals	From source to Scuppernong River	C Sw	9/1/74	30-14-4-3
Ten Foot Canal	From source to Western Canal	C Sw	9/1/74	30-14-4-3
Nine Foot Canal	From source to Ten Foot Canal	C Sw	9/1/74	30-14-4-3-1-1
Mountain Canal and connecting canals	From source to Scuppernong River	C Sw	9/1/74	30-14-4-4
Thirty Foot Canal	From source to Scuppernong River	C Sw	9/1/74	30-14-4-5

Old Canal	From source to Scuppernong River	C Sw	9/1/74	30-14-4-6
Phelps Lake	Entire Lake	C Sw	4/6/61	30-14-4-6

FRAGILE AREAS

In Washington County, fragile areas are limited to public trust waters, the estuarine shoreline and its adjacent waters, and coastal wetlands. From a regulatory standpoint, all of the fragile areas also are areas of environmental concern for construction permit purposes.

Public Trust

The major public trust waters are the Albemarle Sound including Bulls Bay, Lake Phelps, Pungo Lake, the Roanoke River, Scuppernong River, Welch's Creek, Conaby Creek, and Mackey's Creek. "Formally, public trust areas are 'all waters of the Atlantic Ocean and the lands thereunder from the mean high-water mark to the seaward limit of the States's jurisdiction; all natural bodies of water subject to measurable lunar tides and lands thereunder to the mean high-water mark; all navigable natural bodies of water and lands thereunder to the mean high-water level or mean water level as the case may be, except privately-owned lakes to which the public has no right of access; all water and artificially created bodies of water containing significant public fishing resources or other public resources which are accessible to the public by navigation from bodies of water in which the public has rights of navigation; and all waters and artificially created bodies of water in which the public has acquired by prescription, custom, usage, dedication, or any other means.'" For regulatory purposes, the final administrative authority on the extent of public trust areas is contained in a publication entitled: <u>North Carolina Fisheries Regulations for Coastal Waters, 1985,</u> as amended from time to time.

The water quality in public trust waters has declined in recent decades for a variety of reasons. Some local activities such as

logging have contributed to water quality problems. Other regional industrial activities are also suspect. According to many researchers, paper mills as far away as Virginia have had a direct negative influence on the water quality of the Roanoke River. The rapid growth of alligator weed in the Scuppernong River has impeded the natural flow and aggravated the siltation problem. The county presently is benefiting from a very active soil conservation service outreach program. The local SCS staff is encouraging farmers to convert to "low till" practices and to make sure that they are not applying more fertilizer than is necessary. The SCS has also cooperated with the Corps of Engineers and State government to attempt to reduce the alligator weed growth in the Scuppernong River. The county commissioners are also sponsoring a project to snag and clear within the Scuppernong. Hopefully, both of these projects will increase stream flow to produce a "flushing action." Both of the projects appear to be good examples of manmade efforts to help restore a stream to a more natural condition. Once the snagging and clearing project is complete, the county should establish a monitoring system to try to prevent a reoccurrence of the Scuppernong River problems.

The problems associated with the Albemarle Sound may be more complex but seem to be at least partially related to the same type of problems affecting the Roanoke River.

The county's two major lakes appear to be suffering from regional agricultural influences. The deposition of ash from wild peat fires is a seasonal influence. The county's best information indicates that the planting of natural vegetative wind breaks could help the windborne dust deposition problem. The efforts of the county forest ranger to prevent the reoccurrence of peat fires could also reduce

the seasonal ash deposition problem.

The county should continue to administer the minor coastal area management construction permit program at the local level. In 1985, the county adopted a Flood Mitigation Ordinance which also has the indirect effect of slowing growth adjacent to the public trust waters. Where it is practical to do so, the county should also attempt to educate developers on the need to be sensitive to public trust waters through its subdivision plat review process.

Estuarine Waters and Shoreline

This category of land and water represents an extensive geography in Washington County. Estuarine waters are "all water of the Atlantic Ocean within the boundary of North Carolina and all waters of the bays, sounds, rivers, and tributaries thereto seaward of the dividing line between coastal fishing waters and inland fishing waters. . . (G.S. 113A-113(b) (2). In Washington County, this generally means the southern shore of the Albemarle Sound from the Roanoke River to the Tyrrell County line, the portion of the Albemarle Sound in Washington County which is generally the southern half, the shoreline of the Roanoke River within Washington County (from a legal standpoint, the waters of the Roanoke River are within Bertie County). The estuaries functions as a link between open waters and the land and therefore should be analyzed and monitored. In a general sense, estuarine waters are usually considered to be salty waters capable of producing menhaden, flounder, shrimp, crabs, and oysters. These species are not generally found in Washington County however. Once again, the final administrative authority for determining the exact delienation of estuarine waters should be the North Carolina Fisheries Regulations for Coastal Waters which is cited above. The determination of the exact limits of the estuarine shoreline often require measurements in the field from mean high water.

In spite of the absence of the salt water species of fin-fish and shellfish, normally associated with estuarine waters, the county does possess significant stocks of bluegill, white perch, and other

pinfishes. Catfish, crappy, and redbreast are also prevalent. Large-mouth and small-mouth bass and striped bass are available but their numbers are significantly less. *Substantial problems are associated with the greatly diminished numbers of striped bass in spite of intensified efforts to restock the Albemarle Sound. The county should continue to carefully locally administer the minor CAMA construction permits. The Washington County permit officer should continue to coordinate with the Bertie County officer concerning development on the shoreline of the Roanoke River. The subdivision plat review and mobile home park plat review should include consideration of the impact of development on estuarine waters and the shoreline. As mentioned above, the county's Flood Mitigation Ordinance has an indirect effect of producing the impact of development on the estuarine shoreline.

Coastal Wetlands

According to the most recent State regulations, coastal wetlands are "any salt marsh or other marsh subject to regular or occasional flooding by tides, including wind tides (whether or not the tide waters reach the marsh land areas through natural or artificial water courses). . ." The regulations go on to describe the coastal wetlands as land supporting a specific list of marsh species. The list consists of ten types of grasses: cord grass, black needle rush, glasswort, salt grass, sea lavender, bull rush, saw grass, cat-tail, salt meadown grass and salt reed grass. There is relatively little marsh grass located within Washington County. When compared with the Outer Banks counties, the difference is striking. The series of maps prepared by the Office of Coastal Management in

*1980 Washington County Land Use Plan [Data from N.C. Wildlife Commission]

1977 shows a very small coastal wetlands area on the Albemarle Sound between Leonard's Point and Bateman's Beach and a second at the mouth of Deep Creek. The county is not in possession of any written confirmation on the actual existence of marsh grasses in either of these two areas. The county does have some written confirmation of the existence of one genus of protected grass species on the southern shore of Lake Phelps. The Natural Areas Inventory referred to earlier, states that there is some black needle rush type vegetation in the south shore marsh adjacent to Lake Phelps. The investigators do not give a specific species, but do mention the genus juncus. This marsh area is generally limited to the shoreline landward to approximately a limit of 60 to 150 feet. Much of this area is already within the CAMA construction permit jurisdiction, if the author's statements are correct. In any event, the local permit officer has been notified of the possible existence of protected marsh grass in this area, and he will record any locations of this and other types of marsh grass as he may encounter them in his field work. The county is also of the opinion that permits from the south shore of Lake Phelps should generally attempt to condition construction activity on the protection of black needle rush or other protected plant species. The county is asking the local soil conservation service for a written opinion on the existence of protected plant species at or near the mouth of the Deep Creek and in the area between Bateman's Beach and Leonard's Point. The regulatory protection described fully above also shall be available for the protection of the coastal wetland areas. Here, particular attention will be directed to the location and maximum protection of marsh grass located on the south

shore of Lake Phelps.

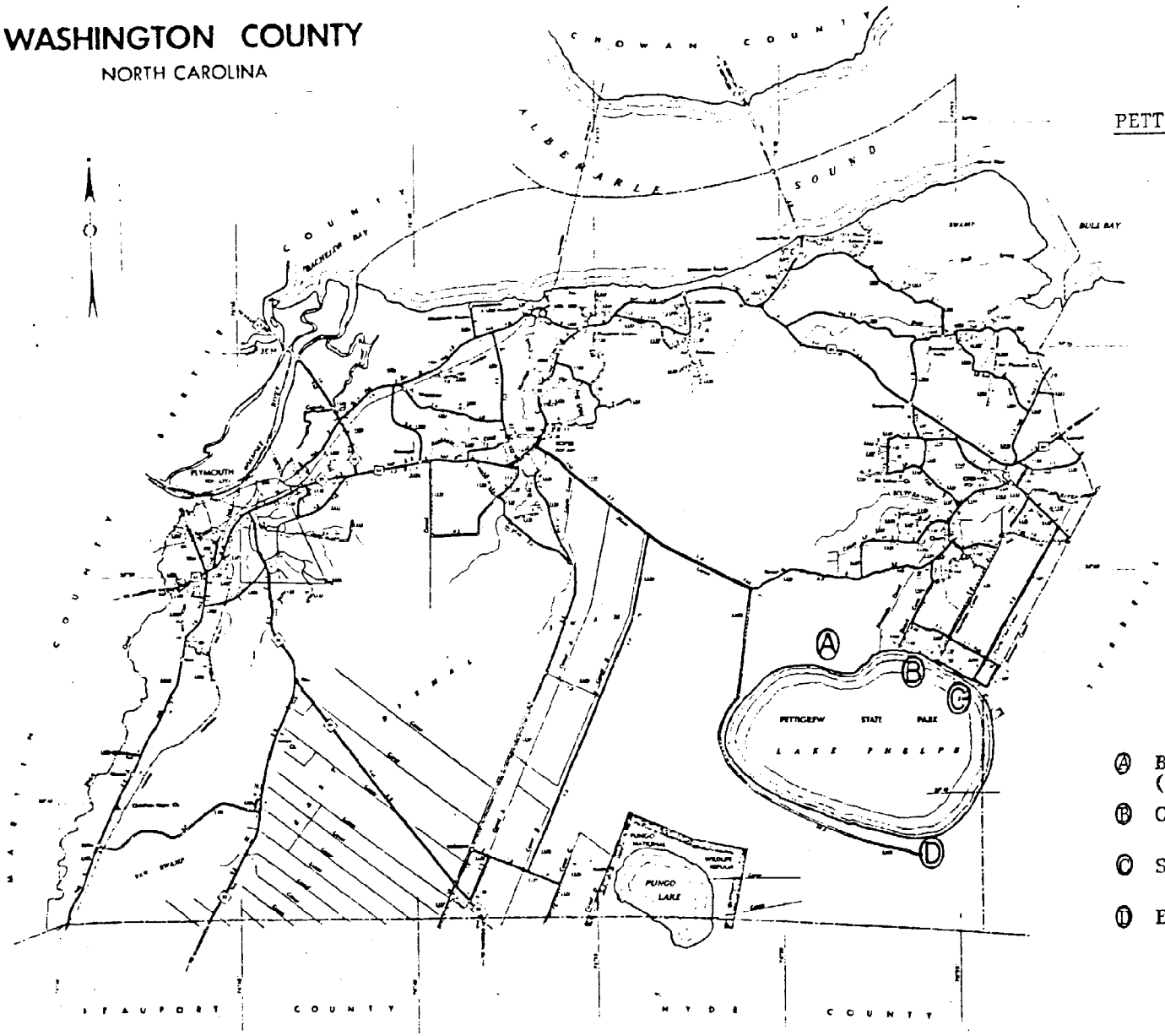
We are investigating further what the proper regulatory treatment of needlerush of the Lake Phelps area is. We must acknowledge some additional uncertainty caused by the vegetation's location adjacent to a lake as opposed to a saltwater sound.

WASHINGTON COUNTY

NORTH CAROLINA

MAP 5

PETTIGREW PARK - LAKE PHELPS



Legend

- Ⓐ Big Point Access Area (proposed)
- Ⓑ Cypress Natural Area
- Ⓒ Somerset Place
- Ⓓ Evergreen Pocosin

AREAS WITH RESOURCE POTENTIAL

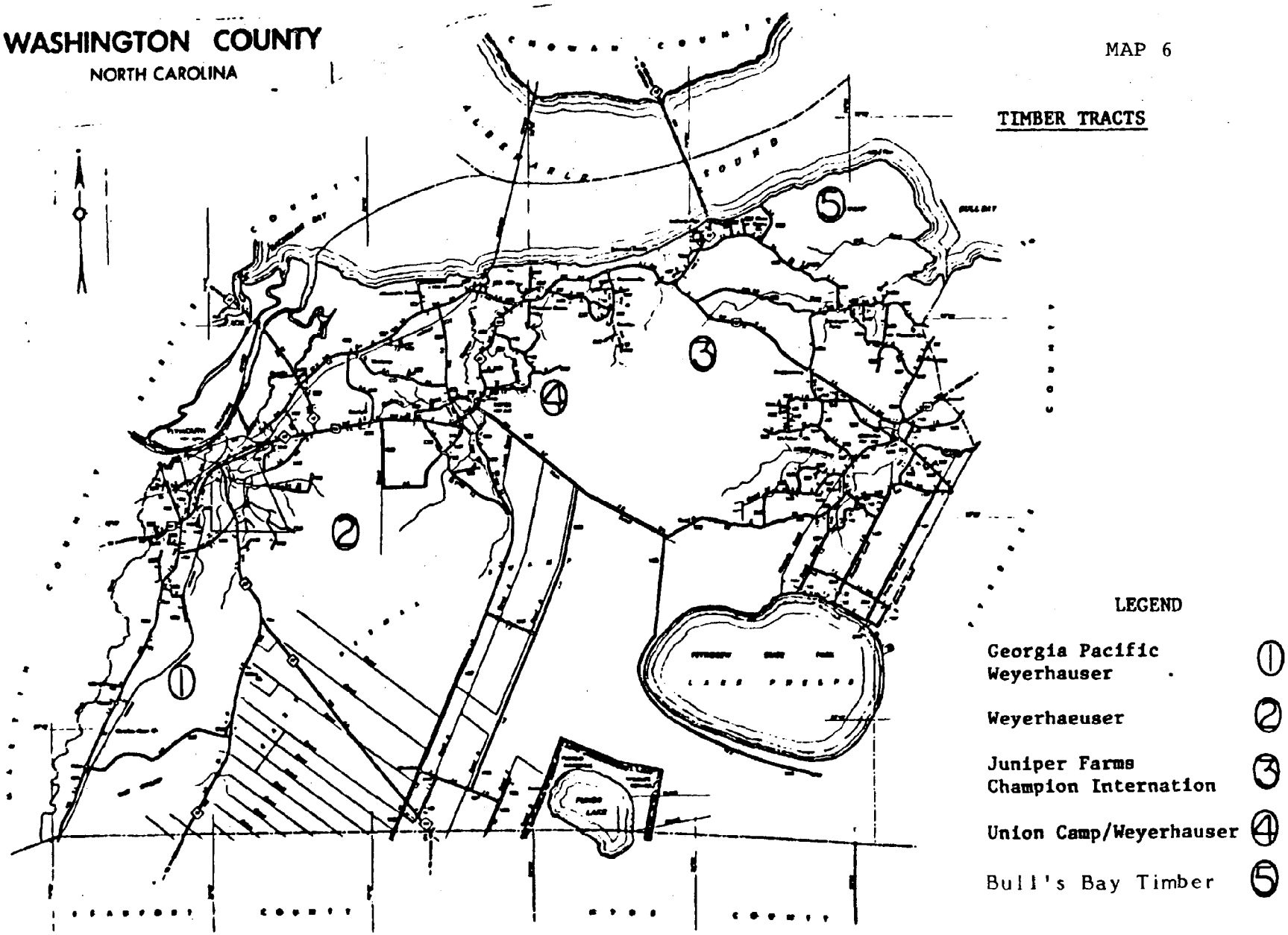
Identification of areas with resource potential reflects natural resources which should be used for their highest and best uses. They include forestland, agricultural lands, wildlife habitat, peat resources and recreation resources.

Forest Land

There are five timber tracts located throughout the County of significant size (Map 6). One wooded area is located between Long Ridge Road and Highway 32 and is owned by Georgia Pacific and Weyerhaeuser. This will continue to be managed as timber land. A large area spanning between Highway 99 and Roper is owned almost exclusively by Weyerhaeuser. A large (approximately 5,000 acres) timber holding known as Juniper Farms has, since 1980 been converted to agricultural use. A tract adjacent to this owned by Champion International will be utilized as forestland. Another forested area near Roper on Newland Road owned by Union Camp and Weyerhaeuser has been converted for agricultural use. Bull's Bay is a forest wetland and is expected to continue as forestland. This area has been logged by a helicopter logging contractor. It is the first logging of this type to occur in Washington County although Mr. Ralph G. Plumblee, former Plant Manager of the Plymouth Georgia Pacific Hardwood sawmill introduced the practice to Northeastern North Carolina where he logged the Bertie County side of the Roanoke approximately 7 years ago.

Agriculture

According to figures from Soil Conservation Service and the Agricultural Extension Agency, 53% of the County's land area is used for


WASHINGTON COUNTY
NORTH CAROLINA
MAP 6
TIMBER TRACTS
LEGEND
Georgia Pacific
Weyerhauser
1
Weyerhaeuser
2
Juniper Farms
Champion Internation
3
Union Camp/Weyerhauser
4
Bull's Bay Timber
5

agriculture production. The largest tracts in production lie in the eastern two-thirds of the County. Soils in this area are highly organic. However, drainage improvements have made these area highly productive.

The Washington County Soil Survey identifies several County soils which have high agricultural yields, with and without management practices.

Most soils within Washington County can be successfully used for agriculture with the aid of management techniques. Those requiring management are located primarily south of Highway 64 and make up approximately 70 percent of the County's soils.

Natural Habitat

Washington County contains a diversity of habitats which support a wide variety of wildlife species. The area is primarily rural and intensely farmed, yet forested areas are interspersed with wetlands which are valuable to wildlife.

Dorovan muck, Dorovan mucky silt laom and Wehadkee silt loam soils are associated with wetland, wooded swamp and drainage basin conditions. These areas are important ecologically and productive as wildlife, water fowl and fish habitat areas. These soils comprise of approximately 22,000 acres.

We can increase most species in these areas through proper habitat management.

Waterfowl habitat areas in the county are located along the estuarine system and adjacent to the lakes. The primary wintering area is Lake Phelps. Wood duck habitat is scattered along Conaby Creek, Mackeys Creek, Deep Creek, Bull Creek and the Scuppernong River.

White-tailed deer are common throughout the County but are abundant

in the southwestern area of the County. Black bear occupy an area running along Long Ridge Road from the Beaufort County line, adjacent to Plymouth along the Roanoke River, between Lake Phelps and Pungo Lake and ares east and southwest of Roper. Areas which are conducive to bear sighting are Bull's Bay and an area south of Plymouth.

Mineral Deposits

Like most eastern North Carolina counties, Washington County is not rich in mineral deposits at the present time. However, the information concerning certain mineral deposits is not readily available. Washington County has achieved a nationwide reputation as a community possessing massive peat resources.

Other mineral deposits are present in the community. Also, the potential for identifying and extracting other mineral deposits is significant. The Washington County Soil Survey identifies eight soil groupings which may contain commercial sand deposits. These groupings are Corn, Bojac, Conetoe, Dogue, Dorovan, Dragston, Portsmouth, Scuppernong, and Tarboro (Soil Survey, Table 12)

Although there are very few drill holes and no mining activity, we have reason to believe that eastern Washington County is rich in phosphate deposits. These deposits are located below approximately 50 to 150 feet of overburden and for this reason have not been mined (Environmental Geologic Atlas Over The Coastal Zone Of North Carolina: Dare, Hyde, Tyrrell and Washington Counties Page 43.) "... Progress is being made in developing technologies which may be applied to such deposits. When perfected, phosphate sediment may be brought to the surface without the necessity of removing the overburden." (Geologic Atlas - Page 44)

The Albemarle Sound shoreline is the location of extensive beach placer deposits of titanium oxide. This mineral is used as a pigment in paints, linoleum, white inks, colored glass, powdery glazes, and for dying leather. It is also used in alloys as a coating for welding-rods and in electrodes for arc lamps. (Geologic Atlas - Page 43).

As noted above, the presence of fuel grade peat in Washington County is widely known and for that reason will not be described in detail here. The Washington County Manager's Office and County Planning Department have an extensive collection of resource material on this valuable resource. Phelps Field near Lake Phelps has been studied extensively and mined on an experimental basis. Many peat deposits in this field are ripe for development.

In conclusion, more information should be gathered on the mineral deposits of Washington County and State government should actively cooperate with County government to encourage their careful but rapid development.

Peat Resources

Studies conducted by the Department of Energy indicate that there are approximately 582 square miles of the Albemarle-Pamlico peninsula containing fuel grade peat deposits. These deposits occur primarily in broad shallow depressions of up to 10 feet thick and in narrow former streamchannels of up to 16 feet thick. The total resources of this peat deposit are approximately 278 million tons of moisture-free peat.

The area is separated into a higher elevated Western Area and a lower elevated Eastern Area. A substantial portion of southeastern Washington County lies within the higher elevated Western Area peat deposit. This deposit differs in some respects from the Eastern Area in that its peat is slightly more decomposed and less fibrous. It yields a higher heating value while containing more carbon and less ash and sulfur. This deposit also contains less moisture and has a higher bulk density making it a very attractive fuel resource.

The North Carolina Department of Natural Resources and Community Development has granted to First Colony Farms, Inc. a Mining Permit to mine a 15,000 acre tract of the Western Area peat deposit. Approximately 8,700 acres of this tract is located in Washington County.

First Colony Farms, Inc. has completed an intensive program of developing mining technology and equipment for producing commercial quantities of fuel grade peat. In 1981, Peat Methanol Associates announced plans to construct a plant, on First Colongy Farms property in southeastern Washington County, that would convert peat into fuel grade methanol. Although the plan was later abandoned in 1984, the project did progress through the environmental studies with favorable conclusions and into the final permitting state. These studies concluded

that peat could be mined in commercial quantities in an economic and environmentally attractive manner.

Recreation Resources

The Pungo National Wildlife Refuge and Pettigrew State Park are two major public recreation lands in Washington County.

Presently the major emphasis in the National Wildlife Refuge is to provide resting and feeding areas for migratory waterfowl. Recreational uses are non intensive and include primarily deer, waterfowl hunting and nature study. Future potential uses include wildlife observation towers, nature trails and environmental education facilities.

Recreation potential on Lake Phelps has been assessed during the Pettigrew State Park Master Plan preparations. The Plan reviews the existing park facilities and proposes improvements and expansion.

Attendance figures for the Park for 1984 reached 60,943 people, of which were 5,156 boaters, 5,188 fishermen, 4,670 picnickers, 3,372 hikers and 2,781 campers. Hiking trails, lectures, slide shows and picnic areas are available upon request from school groups and clubs. The picnic areas will accommodate several hundred for large gatherings and family reunions.

The master plan calls for an additional 82 acres to be purchased to add to the existing Pettigrew access area to develop overnight camping areas and picnic facilities. A fishing pier, expanded boat launching and parking facilities are also planned.

Big Point located on the northern edge of the Lake connected to the State natural area has potential for recreational activities (Map 5). Not presently owned by the state, the 130 acre area has a sandy deep lake area which would be ideal for water recreation.

The Natural Heritage designated natural area joining Big Point with Pettigrew Park would be used primarily for nature study with the

development of interpretive trails.

The 500 acre site owned by Division Parks and Recreation on the southern end of the Lake is primarily a peat, evergreen pocosin. Only 50 acres of this area are suitable for recreational use, and include only the rim of the Lake.

In 1982, the Board of County Commissioners adopted a resolution calling for expanded shoreline access especially on the Sound. The County has initiated negotiations with the North Carolina Department of Transportation to attempt to add recreational features to the Albemare Sound Bridge reconstruction project. Further, the County is examining the possibility of accepting shoreline land donations and applying for Beach Access grant-in-aid funds from the Department of Natural Resources and Community Development.

Approximately two or three additional access points on the Albemarle Sound are needed. Ideally, one area should be located between Conaby Creek and the Railroad Trestle. A second should be located between the Railroad Trestle and the NC 32 bridge, and the third between the NC 32 bridge and the Tyrrell County boundary. At least one of these areas should include picnic facilities and an access for waders or swimmers. There are virtually no public swimming areas on the Albemarle Sound, Roanoke River or Lake Phelps. The County should also work toward and encourage at least one additional shoreline access point on Lake Phelps and Pungo Lake. These areas should not be limited to boat launching facilities but should include some type of picnicing and swimming or wading.

On the Roanoke River, the municipality of Plymouth has made tremendous strides in improving riverfront access for the public.

The County Recreation Plan identifies potential recreation areas and access needs. For more information, refer to this Plan.

Freshwater Swamps

The three largest legitimate swamps are East Dismal Swamp in south-central Washington County, Bull's Neck Swamp on Bull's Bay in north-eastern Washington County and Van Swamp in the extreme southwestern portion of the County. The floodplain of Conaby Creek has also been described by some authors as a swamp.

Geologically, Van Swamp is a relatively flat basin bordered on its eastern and western margins by two parallel eastern facing scarps. Elevation is approximately 35 feet above mean sealevel.
The East Dismal Swamp is situated on a broad, very flat upland surface which is poorly drained due to the lack of extreme drainages in the area. Elevation is approximately seventeen feet above sealevel. The Bull's Neck peninsula is characterized by organic sedimentation. It has a series of long arcuate sand ridges. Some of these are as low as one foot while others reach a height of eight feet above sealevel. (Natural Areas Inventory Report)

Although these swamp areas do contain significant botanical and animal species, it is the finding of Washington County that the existing State and Federal regulations are adequate to protect legitimate swamps. In fact, it is the position of Washington County that the State and Federal Government should re-examine these programs particularly the CAMA Major Permit Program and the Federal Dredge and Fill Program to see if they can be made less obtrusive from the standpoint of protecting private property owners rights. Specifically, in order to enable the farming and forestry community to survive in a challenging economic era, we are proposing that farmers and foresters be permitted to run drainage lines through swamps to outlets. Of course, when this is done,

the very best drainage construction techniques should be used. For example, ditch slopes should be considered carefully and banks which have the potential for erosion should be seeded.

PUBLICALLY OWNED FOREST PARKS - FISH AND GAME LANDS

Federal Holdings

The only major federal holdings are the Pungo National Wildlife Refuge. Pungo consists of Pungo Lake and a natural area surrounding the Lake. Both the Lake and the acreage also extend into northern Hyde County.

State Holdings

The major state land holding in Washington County is Lake Phelps and Pettigrew State Park. This area is clearly depicted on virtually all maps of Washington County including the North Carolina Department of Transportation County map. In addition to Pettigrew Park three separate boat launches areas are located in Washington County. The most visible is the one at Zeb Vance Norman Bridge. The Conaby Creek launching area is located very close to the Zeb Vance Norman Bridge launch site just to the south. A third launching facility is located in northeastern Washington County at Deep Creek. A fourth launching facility is located just over the county line and Martin County on the Roanoke River. Finally a launch facility has been proposed as part of the overall Scuppernong River Project. According to the information furnished by the Washington County Tax Office there are no privately owned wildlife sanctuaries presently in Washington County. A sixty to seventy acre tract of wet lands located near Rankin Lane may soon be transferred by a donation to the Boy Scouts of America; however, this transfer has not been completed so of this time the title has not been transferred.

COMMUNITY FACILITIES

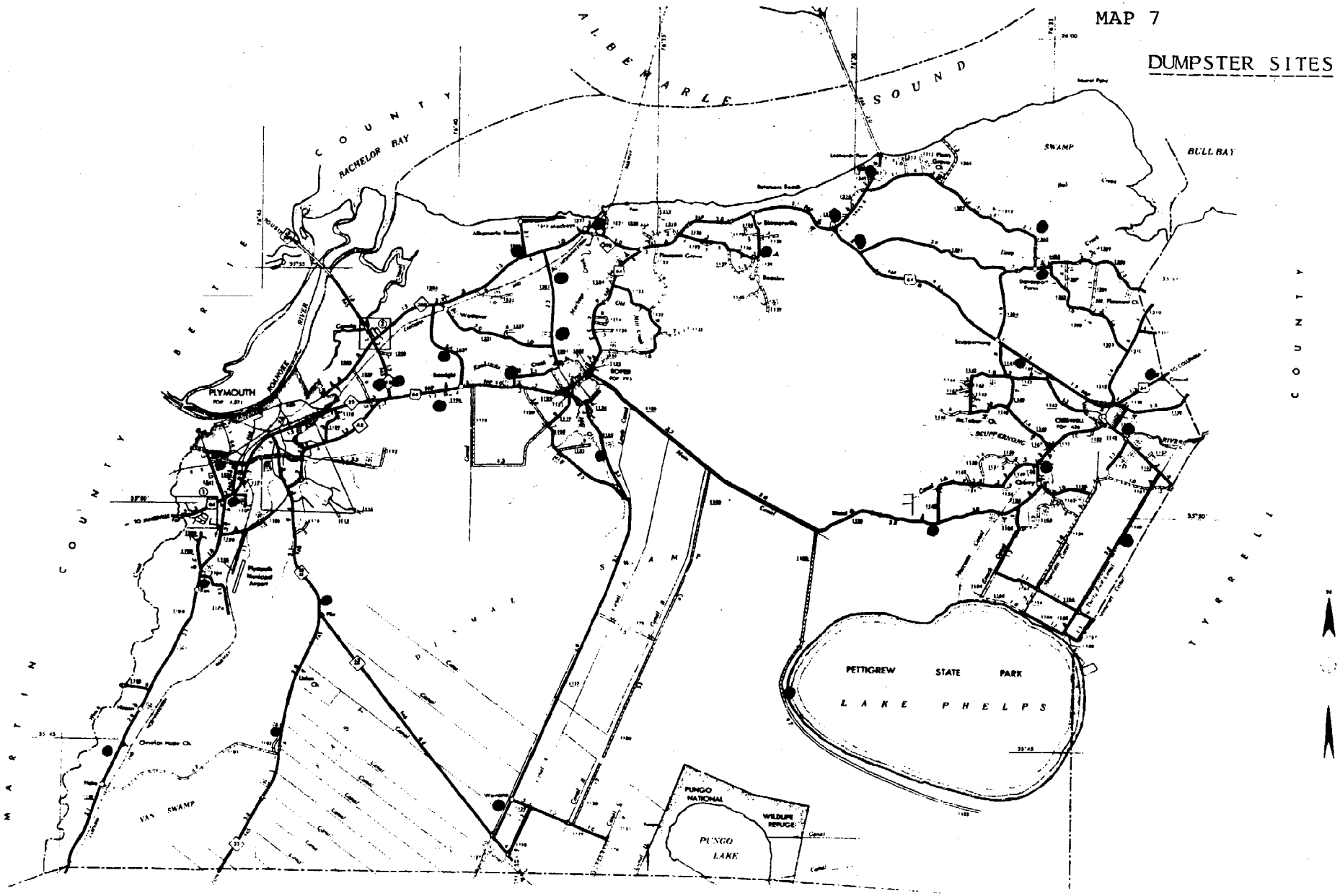
We cannot over-emphasize the importance of community facilities to a community's quality of life and ability to grow. Treatment of this extensive and complex subject here must be generalized and brief. Prior to the next five year Land Use Plan update, the County should attempt to complete a comprehensive Community Facilities Study.

Solid Waste

Presently, the approved sanitary landfill site in Washington County is a 9 acre site just northeast of Westover, approximately 1 mile north of State Road 1300. The site is maintained by a private contractor who leases the land from the property owner. The site serves Washington and Tyrrell counties with approximately 18,776 people. A private contractor and the municipalities collect solid waste.

Twenty-eight dumpster sites are scattered throughout the County with a capacity of 490 cubic yards. (Figure 18). Sixty-eight commercial sites are served twice weekly. Plymouth provides collection service for residential areas and businesses. Creswell and Roper serve residents and small businesses.

Littering and placement of appliances and other large items at the container sites has been a recurring problem. County Government has intensified enforcement of its Sanitation Ordinance and should further intensify enforcement. Further, the Board of Commissioners modified its landfill contract so that homeowners may now dispose of large household items at the landfill without a fee.



WASHINGTON COUNTY, NORTH CAROLINA

Central Water Services

The Towns of Plymouth, Roper and Creswell have agreed to supply water for Washington County's distribution system. The following is a summary of their water supply capabilities. Table1 summarizes the demands for the combined system.

Plymouth has an existing water production capacity of 800,000 gallons per day (gpd) and a total elevated storage of 800,000 gallons. Their present production is 500,000 gallons during an average day and 875,000 gallons during a peak day.

The proposed Plymouth service area has approximately 1,040 potential customers. Plymouth has agreed to allocate 150,000 gpd of its capacity to the County. In order to do this, the existing plant will be expanded to 1,200,000 gpd. After expansion of the Plymouth plant and the connection of 475 County customers, the total plant production will be about 583,000 gpd on an average day and 1,025,000 gpd on a peak day.

Roper has an existing water production capacity of 288,000 gpd and elevated storage of 100,000 gallons. Their present production is 55,000 gallons during an average day and 110,000 gallons during a peak day.

The proposed Roper Service Area has approximately 489 potential customers. Assuming 80 percent of the potential would become customers in the outlined service area and a per capita water consumption of 65 gpcd, the average day demand by the county system would be 69,000 gpd and 125,000 gpd during a peak day.

Roper's total plant production would increase to 124,000 gpd on an average day and peak day production to 235,000 gpd.

FIGURE 15

Summary of Water Demands

Service Area	Production Capacity GPD Existing	Production Capacity GPD Proposed	Existing Water Demands GPD Ave. Day	Existing Water Demands GPD Max. Day	County Water Demands GPD Ave. Day	County Water Demands GPD Max. Day	Total Demands GPD Ave. Day	Total Demands GPD Max. Day
Plymouth	800,000	1,200,000	500,000	875,000	83,500	150,000	583,500	1,025,000
Roper	288,000	288,000	55,000	110,000	69,000	125,000	124,000	235,000
Creswell	110,000	300,000	35,000	70,000	87,000	157,000	122,000	227,000
Total	1,198,000	1,788,000	590,000	1,055,000	239,500	432,000	829,500	1,487,000

Basis of County Demand Calculations:

(1) 2.72 persons per household (connection)
(2) 65 gallons per person per day consumption
(3) 80% connection of potential customers Roper and Creswell service areas
(4) 475 connections maximum (150,000 GPD) in Plymouth Service area

Creswell has water production capacity of 110,000 gpd and elevated storage of 100,000 gallons. Their present average production is approximately 35,000 gpd and the peak day is estimated to be 70,000 gpd.

The proposed Creswell Service Area has approximately 619 potential customers. Assuming 80 percent connection to the system and a per capita water consumption of 65 gpcd, the average day demand by the county system would be 87,000 gpd and 157,000 gpd on a peak day.

Creswell's total plant production would increase to 122,000 GPD on an average day and 227,000 gpd during a peak day. Initially, the Creswell plant will be expanded to 300,000 gpd. A 100,000 gallon County owned elevated storage tank and booster pump station is being built in the Leonards' Point Area, which would help alleviate heavy demands on the plant.

Upon completion there; the County waterworks presently under construction will consist of approximately 60 miles of water transmission lines, one 100,000 gallon elevated water tank, and utilize the water supply, treatment and elevated storage components of all three minicipal waterworks.

Further, a water supply subsystem which is part of the staged Washington County Industrial Park Project will add an additional (second) 100,000 gallon elevated water tank and an additional approximately 3500 linear feet of water transmission lines. Upon completion, the improvements in the Park will be consolidated into the County Waterworks.

The towns' get their water from the Castle Hayne aquifer.

Roads and Highways

Currently, there are two major highway projects underway in Washington County. In May of 1985, the construction phase of the Albemarle Sound Bridge reconstruction was initiated. The construction contract for this project is the largest single award in history of the North Carolina Department of Transportation. The second major project is the improvements scheduled for U.S. 64. This project consists of improvements from Williamston eastward to the Junction of N.C. 45 north. The improvements include widening the two lanes from Williamston to Dardens, a by-pass of the area west of Plymouth, additional lanes through Plymouth and east of Plymouth to N.C. 45 and the construction of a rest area adjacent to the Washington County Hospital just east of Plymouth.

In addition to U.S. 64, the other primary highways serving Washington County are N.C 149 (Ken Trowbridge Road), N.C. 45-99, N.C. 308 and N.C. 32. N.C. 149 which primarily functions as the plant entrance to the Plymouth Weyerhaeuser mill is in fairly good condition but could need resurfacing in approximately two years. In the next three to four years, N.C. 45 near the Bertie County line will also need resurfacing. In a matter of weeks, the North Carolina Department of Transportation will begin resurfacing N.C. 308. Finally, in approximately three to four years, N.C. 32 will also need resurfacing.

In summary, the county's primary roads are in generally good condition to serve existing needs.

Over the planning horizon, additional improvements are needed. Additional four laning of U.S. 64 east toward the "Pea Ridge Y" is especially important. Continuing the four laning toward the Outer Banks

is also a high priority. Four laning of U.S. 64 from Tarboro, North Carolina to Williamston is another high priority for Washington County. Finally, from an economic standpoint, further improvements especially four laning of U.S. 17 north to the Virginia line is especially important. U.S. 17 has the capability of opening up massive markets in the Norfolk, Richmond, Washington, D.C., and Baltimore markets.

Public School System

Washington County is presently involved in a massive effort to completely modernize the physical plant of its public school system. In 1985, Pines Elementary School was opened. This school consolidated and replaced the old Roper Elementary, Fourth Street Elementary, and Washington Street Elementary school campuses. The 1980 Land Use Plan described these three old campuses as very deteriorated and in need of replacement.

Phase II of the County's modernization will be to eliminate the mobile classroom units at Plymouth High School and enlarge the cafeteria and library. The 1980 plan described Plymouth High School overall as in "good structural condition." Phase II also includes funding to finance improvements to the administrative offices and library at this long term facility. The 1980 plan described Washington County Union as "in generally good structural condition." In 1985, a large portion of Washington County Union was air conditioned.

The final phase calls for consolidating Creswell Elementary School on to the Creswell High School campus. Modern classroom space for both elementary students and high school students will be constructed on the existing high school campus. The 1980 plan described the condition of Creswell Elementary School as "poor." Also, structural limitations in the high school building were also noted.

General Obligation Bond Authorization for Phases II and III was enacted in 1984.

In summary, the 1980 Land Use Plan stated capital improvement goals for the public school system and it appears that these goals will be exceeded.

COMMUNITY FACILITIES DEMAND

Central Water Services

Although Washington County presently is constructing its original County Waterworks system, the maximum capacity will be reached soon after completion. Within the next 24 months, Washington County should begin planning for the first expansion of the County Waterworks System. Special emphasis should be placed on the water supply component. Specifically, Washington County should attempt to construct a new well or wells and a Water Treatment plant. Even with no increase in population, the increased popularity of the County Waterworks and the relatively small percentage of the total population which will be served make it necessary for Washington County to seriously explore expansion of this vital service.

Sanitary Sewer

Once again, even in the absence of raw population growth, there appears to be an increasing need for sanitary sewer services throughout the county. Increasing commercial development and potential industrial development indicate the need for expanded sanitary sewer services even in the absence of raw population growth. If wastewater disposal regulations are tightened by State or Federal Government, the demand could increase even more. In view of these factors, within the next five years, Washington County should explore several possibilities for meeting this demand. These possibilities include but are not limited to:

1. County financing of expansion of the existing municipal

wastewater systems;

2. Utilization of package of wastewater treatment plant on receiving streams. Such a system might be planned and operated by County Government but financed by property owners, especially industrial property owners;

3. Planning and operation of on-site land application systems (irrigation).

As of this date, Washington County has already financed two Plymouth Wastewater Capital Improvements Project. The first was the project to extend sanitary sewer services to Plymouth Garment Company, which at the time was outside of the corporate limits. The second project is currently in the design phase and will provide a force main pipeline and pumping station to serve the new elementary school at the junction of N.C. 45 north and U.S. 64 just east of Plymouth. The wastewater system for the Industrial Park is basically similar in its financing arrangement although here, the Town of Plymouth along with Washington County and the Federal Government has made a contribution to the financing package.

Public Safety

Since 1981, Washington County's Emergency Medical Services, Firefighting services, and Law Enforcement services have improved dramatically. Two additional deputies have been added, the two-way radio system improved, and the departmental fleet dramatically improved. In the area of firefighting, two new departments have been established in Beaufort County but include large land areas in southern Washington County in their service area. Further, the older departments have made substantial improvements in equipment and training. Finally, the County has recently placed in service two sets of emergency extrication equipment which is used to rescue people trapped in

wrecked motor vehicles. One of these units is housed in the Creswell Fire Department and the other in the Plymouth Fire Department giving Washington County excellent coverage for this type of service. By way of illustration, there are only two units of this type presently in service in New Hanover County.

Public Schools

As of September 12, 1983, the enrollment of the Washington County School System was 3,015. In recent years, public school enrollment has declined in Washington County. As late as 1970, the total average daily membership was 3,818. Hence, we see that the public school system is capable of accommodating a substantial amount of growth and should be able to accommodate the growth projected through the end of the planning horizon. However, from a qualitative standpoint, even with the three phase building improvements project which will be in the construction phase in a matter of weeks, further improvements are needed. Presently, it appears that the bonds issued for improvements on the Plymouth High School campus will be for a term of approximately 26 years. In view of this, the County should make every effort to improve it maintenance and capital outlay at all of the long term schools. Long term schools are Plymouth High School, Creswell High School, and Roper Union. Toward the end of the planning horizon, the County should very carefully examine major renovation projects for these three schools.

CONSTRAINTS TO DEVELOPMENT

Cultural & Historic Resources

When cultural and historic resources can be protected without violating private property rights, protection measures should be encouraged. Protection measures which create property tax advantages for the owners should not be provided by County Government. Before issuing demolition permits for any structure on the "Historic Structures" list (Pages 86 through 92), the County Building Inspector's Office should confirm that the owner is aware of the age and significance of the property.

Finally, in the absence of zoning regulations, Washington County does not attempt to protect historic structures for inconsistent contiguous development. If such a problem threatens any of the listed properties, the Planning Department will attempt to point out the predicted adverse impact.

HISTORIC STRUCTURES

1. Alexander House. N. End of SR 1319, Skinnersville vic. Two-story Federal era house with double-shoulder chimney. Private.

2. Arnold House. N. side SR 1316 at jct. with NC 32. Leonard's Point vic. Early nineteenth century. Two-story frame dwelling, three bays wide and two deep. Exterior end chimney, front shed porch and rear addition, Federal interiors, flush sheathing under porch. Private.

3. Belgrade. N. side of SR 1158, 0.3 mi. E. of jct. with SR 1159, Creswell vic. One-and-one-half-story frame Federal style house with gable roof and double exterior chimneys of Flemish bond; built about 1800; original simple interior trim remains intact, was home of "Parson" Pettigrew who was elected first bishop of the Episcopal church in North Carolina (but never consecrated). Private. SL.

4. Blount House. Faces Albemarle Sound, 1.5 mi. N. of SR 1324, Westover vic. Fine two-story frame center-hall plan Federal style dwelling with two exterior chimneys, built about 1800; wide porch on south side of house and ell constructed during Victorian era; interiors intact. Private. SL.

5. Bower Farm. E. side NC 32, 2.6 mi. S. of jct. with SR 1101, Plymouth vic. Two-story gable roof frame nineteenth century house. Exterior end chimneys one rebuilt, six-over-six sash with easement windows in gable end on right side. Private.

6. Chesson House. At N. end of SR 1320, Skinnersville vic. Nineteenth century. One-story frame dwelling; center-hall plan two room deep with later wing; original nine-over-nine window sash, interesting interiors include doors with unusual painted designs. Private.

*from: Historic and Architectural Resources of the Tar-Neuse River Basin, "North Carolina, Department of Cultural Resources, Division of Archives and History.

7. J.A. Chesson House. W. Side of SR 1301, 1.0 mi. of N. of jct. with SR 1331, Roper vic. Two story frame Federal dwelling with single-shoulder chimney with tumbled weatherings at each end, hall-and-parlor plan with late Victorian two-story ell added; stairway enclosed and attic floored. Private.

8. Will Chesson House. On N. side of US 64, 1.0 mi. W. of jct. with SR 1135, Skinnersville vic. Fine, large scale center-hall plan Federal era house built about 1820 by sea captain; vernacular interior. Private.

9. Joshia P. Davenport House. W. side SR 1141, 0.2 mi. S. of jct. with US 64, Scuppernong vic. Two-story frame Greek Revival farmhouse, three bays wide and two deep. Exterior end chimney, central entrance, front shed porch and rear addition. Private.

10. Furlough House. N. side of US 64, opp. jct. with SR 1119, Roper vic. Two-story frame dwelling built during the Federal era; unusually small windows at the second level; first floor altered. Private.

11. Garrett's Island Home. S. side SR 1112, 1.8 mi. E. of jct. with SR 1113, Plymouth vic. Built about 1750, probably by Daniel Garrett; small frame house with gambrel roof, shed dormers, and exterior brick chimneys; interior contains fluted mantel with paneled overmantel. Private SL.

12. Harrison-Blount House. SE. corner of jct. of SR 1119 and 1122, Roper vic. Federal style center-hall plan dwelling with Victorian alterations. Probably built by James J. Harrison. Nearby is site of Lee's Mill, begun in 1702 by Capt. Thomas Blount, operated until 1921. Private. SL.

13. Holly Grove Plantation. Long drive on E. side of SR 1310, 0.1 mi. S. of jct. with SR 1311, Creswell vic. One-story cottage with gable roof and front shed porch. Nine-over-nine sash on first level, six-over-six on second. Exterior end chimneys, Federal and Greek Revival elements in interior. Private.

14. Homestead Farm (Hassell House). SW. corner of jct. of US 64 with SR 1120, Roper Vic. Original two-room frame Federal style farmhouse built about 1800, later two-story front portion. Private.

15. House. Private road W. side of SR 1137, 0.3 mi. S. of jct. with SR 1136, Pleasant Grove vic. Two-story frame mid-nineteenth century house, three bays wide with gable roof. Front hip roof porch, interior chimneys, six-over-six sash, central entrance. Private.

16. Jackson House. W. side SR 1100, 0.5 mi. N. of jct. with SR 1101, Hoke vic. Main block is a two-story center-hall weatherboard frame dwelling, three bays wide and two deep. Gable roof on main house, shed porch along front, two exterior end double-shouldered and stepped brick chimneys. Kitchen had exterior and single-shouldered mud and slick chimney, now gone, one of very few known standing recently in North Carolina. Private.

17. Johnson-Swain House. S. side of SR 1111, 0.7 mi. E. of jct. with SR 1113, Plymouth vic. Two-story frame house with large- double-shouldered brick chimney. Private.

18. Mockingbird Hill Cottage. S. side of end of SR 1151, Cherry vic. One-story and attic frame cottage, mid-nineteenth century. Gable roof with full length shed porch, replaced end chimney. Private.

19. Morattuck Church. N. side of SR 1106, 0.8 mi. E. of jct. with SR 1105, Plymouth vic. Congregation established in 1785. first building burned and was replaced by the present structure built in 1865; one-story frame gable roof building, two bays wide and four deep. Abandoned and deteriorated. Private.

20. Nichols-Vale House. N. side of SR 1111, 0.8 mi. SW. of jct. with US 64, Plymouth vic. Ca. 1800. Two-story frame Federal style house, center-hall plan; exterior double-shouldered chimneys. Private.

21. Ephram Pritchett House. E. side SR 1301, at jct, with SR 1308, Creswell vic. Two-story frame dwelling with double tier front porch with shed roof. Three bays wide, two deep, exterior end chimneys, later rear addition. Second half nineteenth century. Private.

22. Rehoboth Church. S. side of US, 0.4 mi. W. of jct. with SR 1317, Skinnersville vic. One-story frame temple-form church completed in 1853; said to have been constructed and finished by slaves of J.S. Norman who donated the land. Private. NR.

23. St. David's Chapel. SE corner jct. of SR 1158 and 1159, Creswell vic. Original portion of this frame church was built in 1803 by the Reverend Charles Pettigrew of Belgrade and known as Pettigrew's Chapel; building altered in 1857 after a design by Richard Upjohn and in 1858 reorganized under the name of St. David's Chapel. Private. SL.

24. Somerset Place State Historic Site. N. side of Lake Phelps, just S. of jct. of SR 1167 and 1168, Creswell vic. The plantation itself was developed in late eighteenth century with a vast system of canals, draining swampland and providing irrigation for early rice crops. The machinery there, very advanced for the period, was widely admired. Slaves brought direct from Africa late in eighteenth century retained their African culture to a remarkable extent. House, outbuildings, much of canal system remain. The house, built for Josiah Collins III about 1830, is one of the best extant examples of coastal plantation houses of the period. State Historic Site. public. NR.

25. B.F. Spring Farm. N. side SR 1126, 0.3 mi. E. of jct, with SR 1149, Cherry vic. One-story frame cottage with gable roof and engaged front shed porch and rear shed. Beaded siding, brick exterior end chimneys. Typical small nineteenth century dwelling. Private.

26. Dewey Spruill House. Long Drive on S. side of SR 1163, 0.1 mi. E. of jct. with SR 1162, Cherry vic. Two-story mid-nineteenth frame dwelling three bays wide, six-over-six-sash. Exterior end chimneys, single-stepped shoulders. Much original interior fabric intact, deteriorated condition. Private.

27. Winfield Spruill House. N. side SR 1300, 0.2 mi. W. of jct. with US 64, Pleasant Grove vic. Two-story frame dwelling, three bays wide and two bays deep. Central entrance, gable roof, two exterior stepped double-shoulder chimneys nine-over-six sash. Enclosed stair, much original fabric. Deteriorated. Private.

28. Swanner-Lamb House. Jct. of SR 1318, 1319, and 1320. Skinnersville vic. Mid-nineteenth century two-story frame house, wide shed front porch and enclosed rear shed. Private.

29. Thompson House. SE. side SR 1119, 0.5 mi. SW. of jct. with SR 1120, Roper voc. Simple two-story frame Federal house; unusual is the New England type saltbox form, rare in North Carolina. Private. SL.

30. Walker House (Harrison House). On E. side SR 1119, 0.4 mi. N. of jct. with SR 1120, Roper vic. Saltbox type dwelling with exterior chimneys and unusually high water table; and said built by retired New England sea captain. Private.

31. Westover Plantation. S. side Sr 1300, 0.3 mi. W. of jct. with SR 1329, Westover vic. A two-story, three-bay frame structure in the Greek Revival style. One one-story porch covers the center bay. Numerous outbuildings. Private. SL.

CRESWELL

32. Creswell Commercial Buildings. Creswell. Cohesive group of late nineteenth century, early twentieth century commercial structures, mostly frame with gable fronts. SL.

33. Houses. Collection of mid-through late nineteenth century and early twentieth century frame structures showing Greek Revival and Victorian influences. Many ornamental porches. Private.

PLYMOUTH

34. Armistead House. 302 W. Main Street. Mid-nineteenth century. Two-story frame dwelling, five bays wide with exterior end chimneys. Greek Revival interior detail. Private.

35. Addie Brinkley House. 201 E. Main Street. Handsome two-story Victorian house with bracketed eaves, other ornament. Private.

36. Dave Brinkley Cottage. 212 Jefferson Street. Mid-nineteenth century. One-story frame cottage, central entrance with transome and side-lights. Front shed porch with turned posts, interior end chimney, later addition at rear. Private.

37. David Clark House. 219 Jefferson Street. Built ca. 1811. Two-story frame side-hall-plan Federal style dwelling. Private.

38. Fort Williams. N. side of 1325, opp. jct. with SR 1342. Site of confederate fort captured by Federal troops early in Civil War and recaptured by Confederate forces in April 1864. Private.

39. Grace Episcopal Church. SW corner of Madison and Water Streets. Established 1837; constructed after plans drawn by Richard Upjohn; brick Gothic Revival structure completed 1861. Private. SL.

40. Hampton Academy. Across from 109 E. Main Street. Two-story brick building with hip roof and front cross gable, round arched window surrounds. Private.

41. Hornthall House. 108 W. Main Street. Two-story frame house with hip roof intersected by cross gables with sawn bargeboards and finials. Recent two-story porch and altered central entrance. Late nineteenth century. Private.

42. Latham House. 311 E. Main Street. Ca. 1850. Two-story center-hall plan frame dwelling; Greek Revival style with bracketed cornice. Built by Charles Latham, lawyer, state legislator and sheriff. Private, SL.

43. Nichols House. 220 Washington Stree. Ca. 1804. Two-story center-hall plan frame Federal style dwelling. Altered. Private.

44. Plymouth Depots (Passenger and Freight). Four one-story gable roof structures, two of brick and two of frame. Typical early twentieth century railroad buildings. Private.

45. Plymouth United Methodist Church. SW. corner of 3rd at Adams Street. One-story brick veneered gable end church, one-by-five bays. Two-story central bay tower. Built ca. 1832, brick veneered 1932. Congregation founded in 1832. Private.

46. Spruill House. 326 Washington Street. Late nineteenth century, story-and-a-half cottage ornee. Frame structure with a hip roof intersected by cross gables. Sawnwork, interior chimneys and an ornate finial. Private. SL.

47. Stubbs House. Winesett Circle, Ca. 1830. Large two-story Greek Revival frame dwelling. Porch recent. Private.

ROPER

48. Roper Commercial District. Small late nineteenth-early twentieth century commercial district with brick and frame structures. Similar period frame houses, forming a homogenous townscape.

49. Downing-Spruill House. N. side US 64, 0.1 mi. W. of jct. with SR 1301. Two-story Federal period house with hip roof. Private.

50. Herbon Methodist Church. N. side Buncombe Avenue, opp. jct. with Bank Street. Greek Revival era structure built in 1842. Private.

51. Mizell-Lewis House. NW. side of Buncombe Avenue, just SW. of Deep Creek. Greek Revival era dwelling constructed about 1850 by Anson Mizell; interior chimneys, pedimented gable ends. Private.

52. St. Luke's Episcopal Church. E. side of Bush Street between John Street and Buncombe Avenue. Early twentieth century. Small frame church with pointed arch windows, entrance tower with belfry. Private.

Unplanned Development Problems

We have already discussed one of the most obvious problems from unplanned development, the one of conflicting land uses between residential development and agriculture. In addition to the problem of odor, these two types of land uses can result in hazards associated with aerial spraying and dust. Further, the farmer can also be subject to threats of lawsuits. Presently, in North Carolina, farmers are generally immune from nusiance lawsuits when they were in operation prior to the residential development. Also, in extreme situations, farmers may have access problems when long stretches of road frontage are developed. In Washington County, there have been several recorded nusiances caused by taverns located in residential neighborhoods and close to churches. Also, highway improvement projects can produce negative impacts on residential structures. Specifically, when additional lanes are constructed, the close proximity to houses may cause safety hazards and high levels of noise. Toward that end, we encourage the North Carolina Department of Transportation to liberalize its policy of financing the movement of houses toward the rear of lots. By the end of the planning horizion, the County should consider the enactment of a zoning or rural development ordinance.

Projected Changes in Land Use

The improvements including the addition of traveling lanes to U.S. 64 just west of Plymouth and to the east of Plymouth is the area most likely to experience changes in predominant land use. In this same general system, we have the largest pipeline in the Washington County Waterworks (an 8" line). Also, at the junction of U.S. 64 east and N.C. 45 north, a new consolidated elementary school will be con-

structed adjacent to the County Resources Center. This school will house approximately 800 students. Nearby, Washington County is developing its 60 acre Industrial Park just off of Mackeys Road approximately one mile east of Plymouth. Closer into Plymouth, we have in recent months seen a flurry of commercial activity including the construction of a MacDonalds outlet, a new Winn Dixie supermarket, and a fast food steakhouse. We can expect to see further commercial and light industrial development all along this corridor from Washington County Hospital out to and past the junction of N.C. 45 north. Residential development here will also probably quicken.

During the last two decades, from the perspective of Washington County, there has been a considerable change in land use along the Albemarle Sound. This area contains some of the most productive agricultural soils in the county but has also been attractive for residential development. From the perspective of the coastal area, the pace of development has been moderate to slow. We can expect to see further residential development, especially in specific locations served by good roads.

Lake Phelps - The Allen Road Fire will have a downward affect on land use and will most likely result in a significant number of lots laying fallow. On the other hand, we may very well see an increase in the quality of residential development. We may see for example, former mobile home sites as the site for single family detached structures. This projection is based on a very general assumption that oftentimes when middle to upper class families rebuild, they build a higher quality of structure than the one they lost. Also, Phelps Field is a prime location for a peat resources development project. Washington County officially and informally encourages the development of this important

resource in this location as well as others.

In northeastern Washington County, we could see additional residential and commercial development stimulated by the Albemarle Sound Bridge construction project and the overall attractiveness of the Sound. In addition to improving the esthetics of the general area, the project includes erosion control measures which could substantially lessen this problem in the Leonard's Point area. Most importantly, we will most likely see an increased traffic count on the Albemarle Sound Bridge specifically and N.C. 32 in general.

Finally, we can expect to see additional residential development on N.C. 32 south near the Beaufort County border. This area is attractive as a bedroom community for individuals commuting to Washington, North Carolina to work. The area is presently predominantly agricultural and woodsland. For similar reasons, we could see residential development occur just south of Plymouth on N.C. 32. This area is also primarily agricultural.

CITIZEN PARTICIPATION

The basic foundation of Washington County's ongoing citizen participation program is a lay Planning Board. This Board is composed of 11 seats. Of these, 10 are citizen members. Of the citizen members, only three are in allied occupations. The Board presently has one registered land surveyor, one professional engineer, and one professional soil conservationist. The remaining members are citizens representing virtually all neighborhoods in the community. The Commissioners and staff look to the Planning Board members to provide them with input from citizens in the various neighborhoods. The Planning Board members also keep the citizenry informed concerning land use issues, regulations, and future questions. Hence, we have a dialogue between the Planning Board and the citizenry of Washington County.

From a more formal standpoint, Washington County has taken specific steps to afford the public formal opportunities to comment on land use planning as it relates to the revision of this document. On April 17, 1985, the County published its Citizen Participation Plan in the local weekly newspaper, The Roanoke Beacon. The plan was published as an easily readable display advertisement approximately two columns wide and six inches. Additionally, The Roanoke Beacon provided prominent news coverage of the update process. For example, the edition published on May 8, 1985, included a large front page banner headline entitled "Officials Discuss Land Use Policy". This plan which is set out in Figure 20 established five formal opportunities for citizens to comment on the Land Use Plan. Three Planning

Figure 16

CITIZEN PARTICIPATION PLAN - LAND USE PLAN UPDATE

Washington County is presently revising its official Land Use Plan. We solicit questions, comments, and suggestions from Washington County citizens, and landowners concerning the content of the Land Use Plan.

Specifically, we invite questions and comments concerning the portions dealing with land use planning issues and policy issues. Issues and policies will be discussed at upcoming meetings of the Washington County Planning Board and the Washington County Board of Commissioners.

PLANNING BOARD*	COUNTY COMMISSIONERS
April 25, 1985 - Room 201 Courthouse - 7:30 pm	May 6, 1985 - Room 201 Courthouse - 9:15 am
May 9, 1985 - 7:30 pm Creswell Municipal Building	May 22, 1985 - Room 201 Courthouse - 7:45 pm
May 23, 1985 - 7:30 pm Roper Community Building	

Written questions and comments may be directed to the Washington County Planning Department, P. O. Box 1007, Plymouth, NC 27962. A copy of issues which must be addressed is posted at the Washington County Planning Department, 4th Floor - Courthouse. A public hearing on Land Use Planning issues has been scheduled by the Washington County Planning Board at 7:30 pm, Thursday, April 25, 1985 in Room 201 of the Washington County Courthouse.

Finally, for illustrative purposes, a copy of the 1981 Land Use Summary including land use planning issues and policy statements are available on request from the Washington County Planning Department.

Ann C. Keyes
Planning Board Clerk

4/17/85

Board meetings were scheduled with one in Plymouth, one in Creswell, and one in Roper. Two County Commissioners meetings in May were also scheduled for public hearings.

Finally, we invited written questions and comments and offered to provide copies of the 1980 Land Use Plan Summary for illustrative purposes. As of this writing, formal public input has been non-existent.

We do not interpret the lack of formal public input as a negative occurrence. As we stated earlier, our basic ongoing citizen participation program utilizing the Planning Board members will continue. However, in the final analysis, the true importance of citizen participation is the opportunity for comment not the extent of direct participation. We have all seen instances where the legitimate citizen participation process has been corrupted by highly organized well financed single issue groups and other lobbing organizations.

In conclusion, we would submit that at the present time, it appears that the Washington County citizenry is fairly satisfied with the land use planning process or else they would make their protest known.

STORM HAZARD MITIGATION, POST-DISASTER RECOVERY, AND EVACUATION PLANS

The entire North carolina Coastal region, including Washington County, faces strong threats of damage each year from hurricanes, Northeasters, or other major storms. For nearly 20 years, there was a marked "slowdown", or "lull", in hurricane activity along the State's coast. Predictions were that a major storm could strike the State at any time during the hurricane season, since such a storm was "long overdue". And then, in September, 1984, the "waiting" ended. Hurricane Diana, with some of the strongest sustained winds ever recorded, rammed into the Southeast coast near Wilmington. Although damage was extensive, the potential destruction was much greater and the damage would have been greatly escalated had the storm hit land at a slightly different location.

Storm Hazard Mitigation: Discussion

Hazard mitigation, or actions taken to reduce the probability or impact of a disaster could involve a number of activities or policy decisions. The starting point, however, is to identify the types of hazards (including the relative severity and magnitude of risks), and the extent of development (including residential, commercial, etc.) located in storm hazard areas.

Hurricanes are extremely powerful, often unpredictable forces of nature. The two most severe effects are fatalities and property damage, which are usually the result of four causes: high winds, flooding, wave action, and erosion, each of which are discussed briefly in this section.

High Winds

High winds are the major determinants of a hurricane, by definition, i.e., a tropical disturbance with sustained winds of at least 74 miles per hour. Extreme hurricanes can have winds of up to 165 miles per hour, with gusts up to 200 miles per hour. These winds circulate around the center or "eye" of the storm. Although the friction or impact of the winds hitting land from the water causes some dissipation of the full force, there is still a tremendous amount of energy left to cause damage to buildings, overturn mobile homes, fell trees and powerlines, and destroy crops. Also, tornadoes can often be spawned by hurricane wind patterns. Wind stress is an important consideration in storm hazard mitigation planning. Because of a hurricane's size and power, it is likely that all of Washington County would be subject to the same wind velocity in the event of a storm.

Flooding

With Washington having the entire northern boundary located on the Albemarle Sound and the northwestern boundary located on the Roanoke River and with elevations in these areas ranging from 2-8 feet above sea level, we are left vulnerable to most types of flooding conditions (i.e., hurricanes, northeasters and high winds). See Map 9.

Wave Action

Damage from wave action is connected very closely to the storm surge, i.e., wind-driven water with high waves moving to vulnerable shoreline areas. Areas most likely to be affected are ocean erodible areas and estuarine shoreline areas. There are no ocean erodible area

in Washington County, but there are extensive estuarine shoreline areas (75 feet inland from the mean high water mark of estuarine waters) in the County. However, wave action damage would have the most significant impact along the Albemarle Sound Shoreline.

Erosion

The final major consideration in storm hazard mitigation is severe erosion, caused by high winds, high water, and heavy wave action. Again, in Washington County, the area most susceptible to storm-related erosion is the estuarine shoreline AEC along the Albemarle Sound. This is essentially the same area potentially affected by the action of damaging waves and described under wave action above. Shoreline erosion could lead to loss of property through portions of waterfront lots being washed into the Sound or even actual structural damage to buildings. Erosion potential is an important factor to consider in developing storm hazard mitigation policies.

Summary: Storm Hazard Mitigation Considerations

In Summary, Washington County is not confronted with the same degree of hazard from hurricanes as an oceanfront county, but our entire northern boundary adjoins the Albemarle Sound and does, however, present a hazard.

It is not possible to delineate on a map the areas of our county that may be affected by the powerful winds associated with a hurricane. The areas that can be predicted as problem or hazardous areas are shown in Map 8 and 9 as areas of environmental concern and flood prone areas. The area of environmental concern (AEC is a strip of land that is seventy five (75) feet landward of the mean high water mark on our

northern border where Washington County joins the Roanoke River and the Albemarle Sound. This estuarine shoreline has been designated an (AEC) under the North Carolina Coastal Area Management Act (CAMA). The flood prone areas as shown on Map 9 are the shoreline and low-lying sections of our county which are quite obviously in danger of flooding during a hurricane. High tides in the sound will push water back up the creeks and streams. The very heavy rainfall associated with a hurricane won't be able to drain normally and flooding will occur in previously unmapped areas.

Although Washington County's geography includes extensive shoreline on the Albemarle Sound, Roanoke River, Lake Phelps and Pungo Lake, it is not vunerable to the type of hurricane and tropical storm damage that is associated with barrier island counties or even those just slightly to the east. It would appear that generally speaking, existing regulations scattered over several programs enable the county to regulate redevelopment after severe storms. Here, we refer specifically to the County's Flood Migigation Ordinance, provisions of the NC State Building Code, the Health Departmen's septic tank rules, and the CAMA development permit controls. Two ares which may not be addressed by existing programs are the possible impact on the county's new water system and the increased risk of vandalism and looting. The county should consider adding a policy statement to its existing set of Water System Rules and Regulations which would disclose to the public the county's reluctance to rebuild water lines following a major storm should such an investment carry higher risks. Also the county should remain aware of its Emergency Powers Ordinance and the possible need to trigger a curfew or other special crime prevention measures in the wake of a major hurricane.

POLICY STATMENTS: STORM HAZARD MITIGATION

In order to minimize the damage potentially caused by the effects of a hurricane or other major storms, Washington County proposes the following policies.

High Winds

Washington County supports enforcement of the N.C. State Building Code, particularly requirements of construction standards to meet wind-resistive factors,i.e., "design wind velocity". The County will also support provisions in the State Building Code requiring tie-downs for mobile homes, which help resist wind damage.

Flooding

Washington County is supportive of the hazard mitigation elements of the National Flood Insurance Program. Currently, Washington County is participating in the regular phase of the insurance program. Washington County also supports continued enforcement of the CAMA and 404 Wetlands development permit processes in areas potentially susceptible to flooding.

Wave Action and Shoreline Erosion

Washington County is supportive of the CAMA development permit process for estuarine shoreline areas and the requisite development standards which encourage both shoreline stabilization and facilitation of proper drainage.

IMPLEMENTATION: STORM HAZARD MITIGATION

Washington County enforces a building inspection program with the services of a building inspector enforcing all provisions of the NC State Building Code. These provisions include designing

for wind resistance and mobile home tie-downs for newly placed mobile homes.

Washington County has adopted the Flood Damage Prevention Ordinance for the Regular Phase of the National Flood Insurance Program. This ordinance requires basis floodproofing for all new construction and substantial improvements including all first floor elevations being at or above the base flood elevations, which is being enforced as part of the County's building inspection program.

The County will continue to support enforcement of State and Federal programs which aid in mitigation of hurricane hazards, including CAMA and the U.S. Army Corps of Engineers 404 permit process.

Development Moratoria

The general powers of the building inspector probably permit the county to enact a temporary moratorium on building permits in storm damaged areas following a hurricane. Should the county suffer a high enough level of damage, a moratorium would permit the development of stricter setback requirements, or outright condemnation and acquisition. The problem here, of course, would be to identify revenues to provide just compensation to property owners should acquisition be the only alternative.

Post-Disaster Reconstruction Plan

1. Emergency Management will be the lead agency with responsibilities for immediate cleanup and removal activities to minimize health and safety hazards.

2. The N.C. Department of Transportation will clear the major highways and then as soon as possible the secondary roads will be cleared. Special attention will be given to areas where emergency vehicles need to get through.

3. North Carolina Power Company will repair damaged power lines and restore electricity.

4. Carolina Telephone Company will repair their lines and restore communications.

5. Local policies will not restrict reconstruction provided private funds are used. The need for reconstruction with public funds would probably require a much longer period of reconstruction because of the red tape and strict guidelines to be followed.

6. We have established a recovery task force consisting of all members of the support group from our local Emergency Management Plan.

7. A damage assessment shall be conducted with the Tax Administrator being in charge of the survey. He shall choose or call upon key people throughout the county to assist him in the compilation of this damage assessment report. This report should be compiled as quickly as possible for use by the recovery task force and other agencies that will need it to provide emergency services.

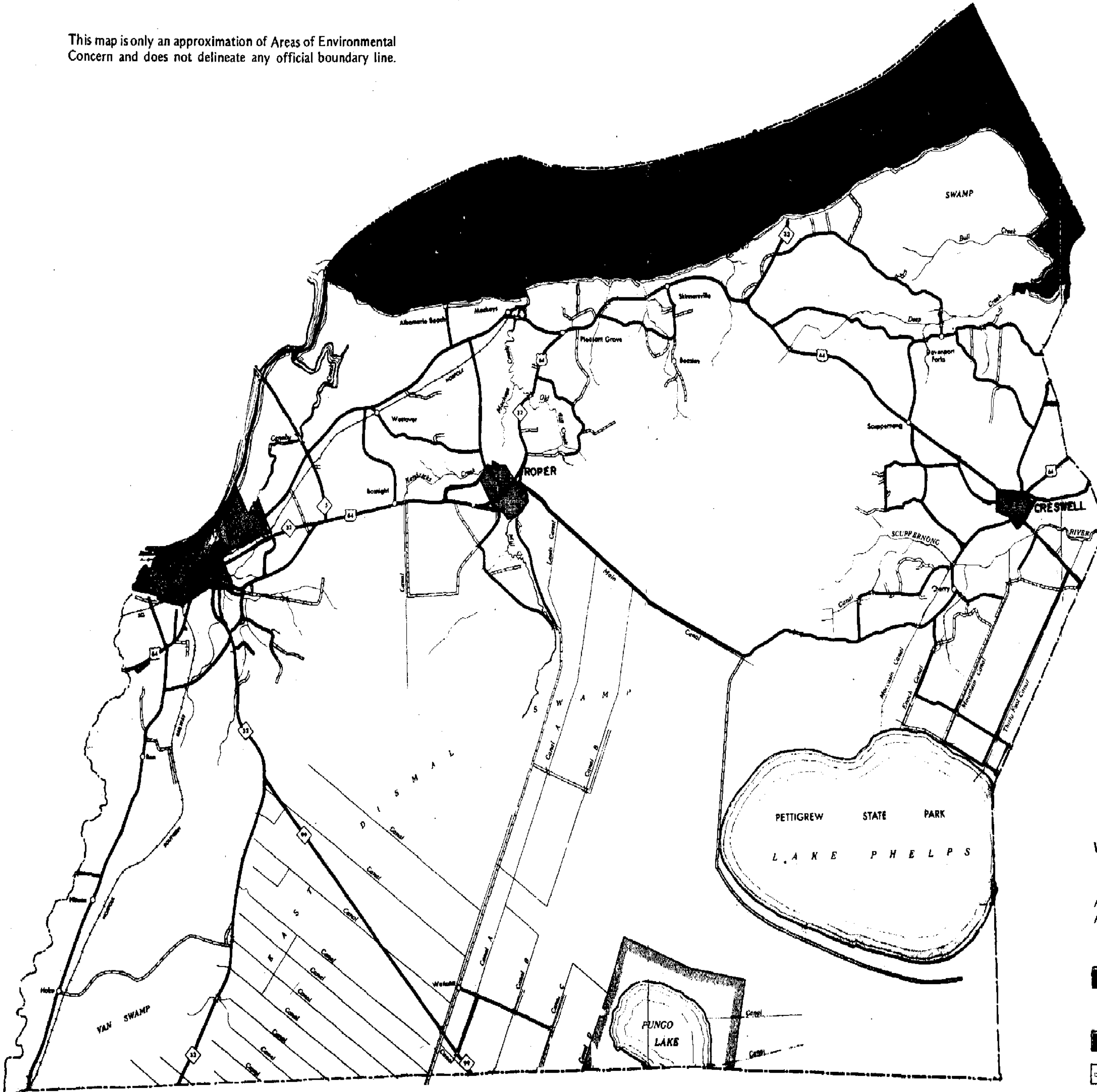
8. Repairs and reconstruction will be permitted on a worst need basis with minor repairs needed for re-occupany to be permitted first. Major repairs and reconstruction would be permitted only after the building trades labor force had completed the major repairs.

9. All construction is to comply with State, Federal and the North Carolina Building Code regulations.

10. Our support group or recovery task force shall be responsible for implementing the policies and procedures contained in this Post-Disaster Reconstruction Plan.

11. The repair and/or replacement of public utilities and facilities including possible relocation to less hazardous areas shall be given individual consideration by the administrative and elected officials of the County or the affected municipality within the county.

This map is only an approximation of Areas of Environmental Concern and does not delineate any official boundary line.



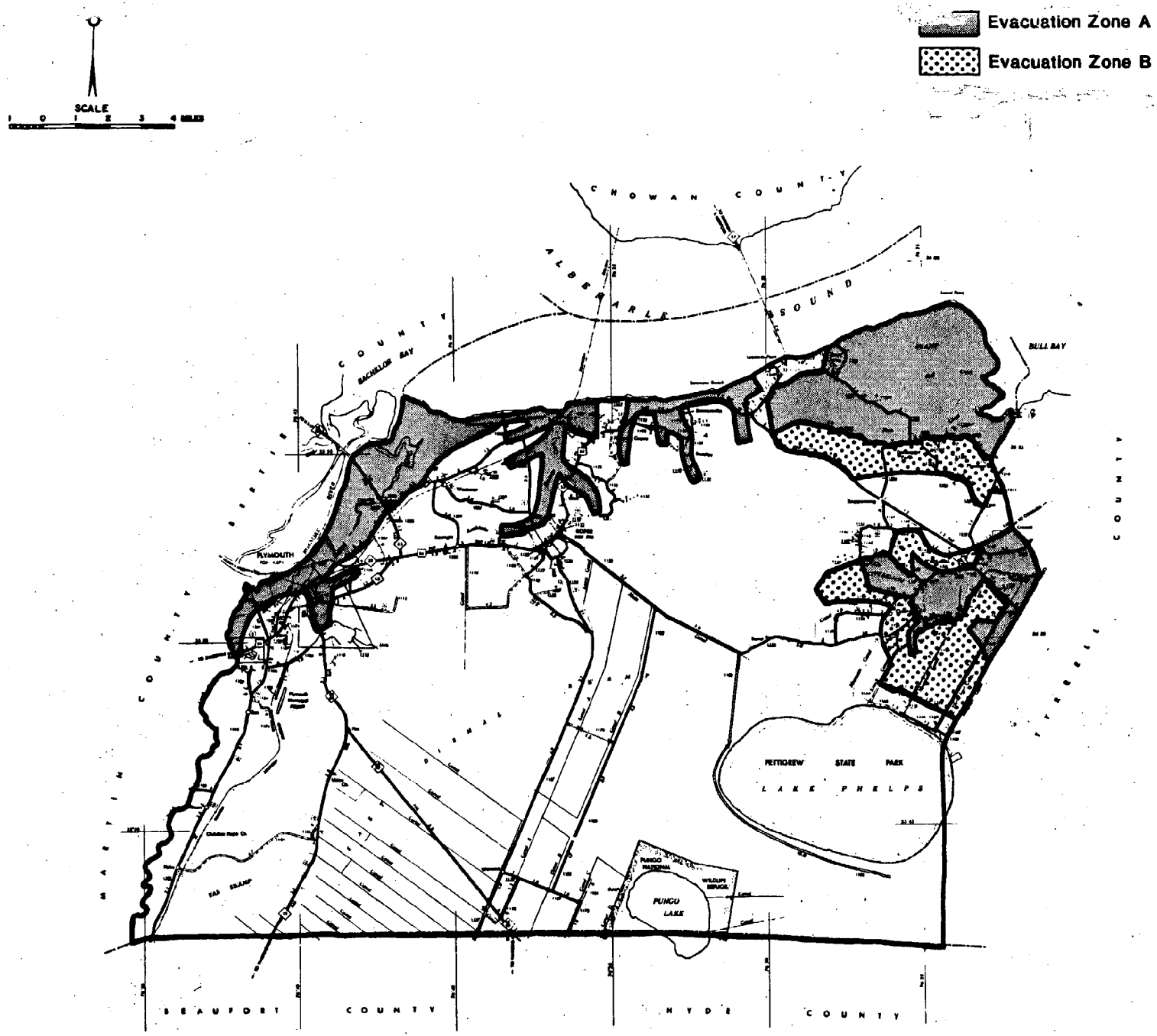
WASHINGTON COUNTY

Approximate location of
Areas of Environmental Concern

AEC–Estuarine Waters
and
AEC–Public Trust Waters

AEC–Coastal Wetlands

AEC–Estuarine Shoreline



WASHINGTON COUNTY, NORTH CAROLINA

Shaded areas shown on map are flood prone. If flooding of your area is predicted, evacuate early to avoid being marooned.

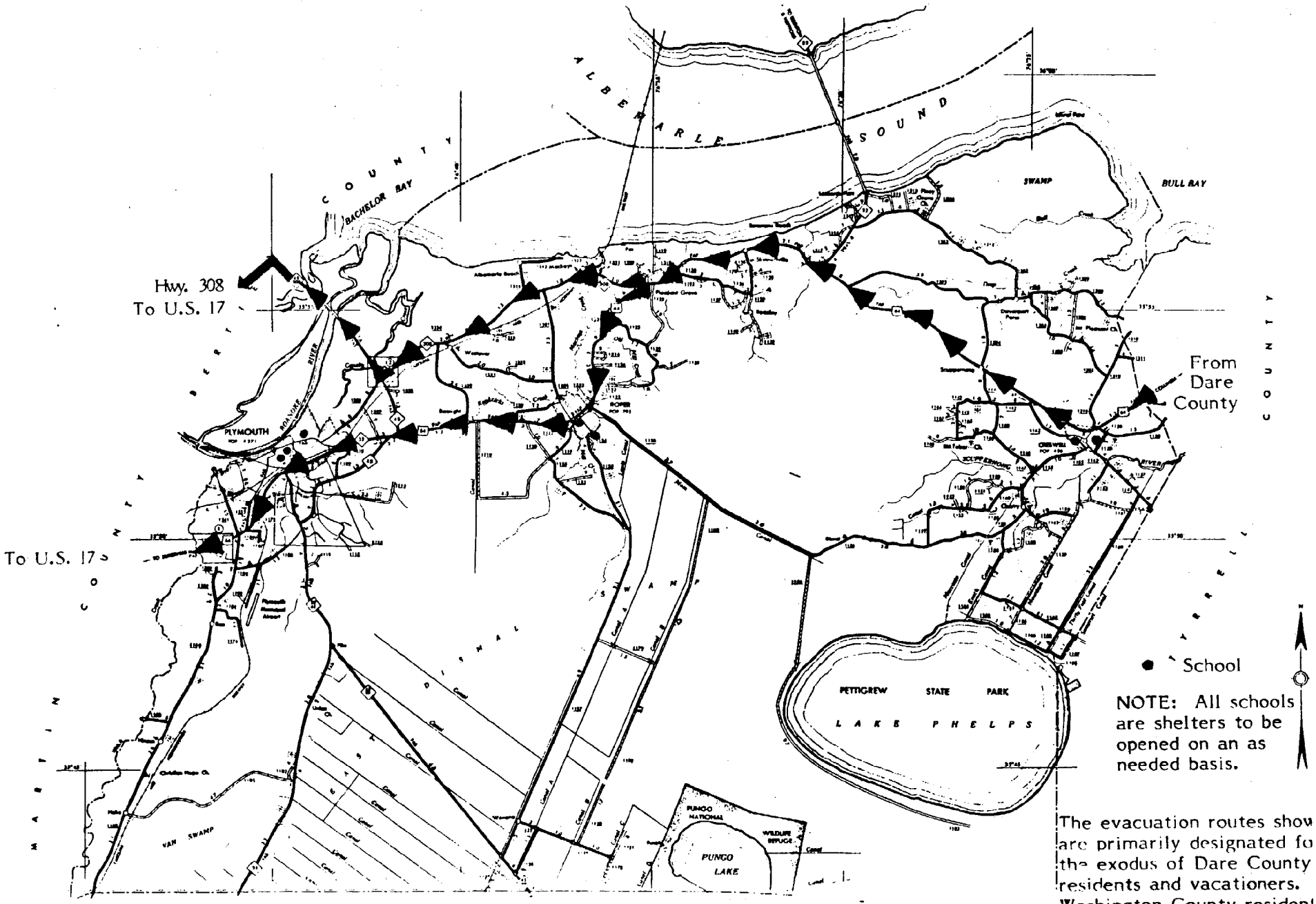
Hurricane Evacuation Plan

Washington County has an official Emergency Management Hurricane Plan which was adopted in 1977. A review of this plan indicates that it is generally adequate for the County's needs. Because of our location between Dare County, the Outer Banks and the higher ground of Martin County and other points to the west, Washington County will have many residents and vacationers evacuating from Dare County on U.S. Highway 64. See Map 10 for evacuation routes and shelter locations. Although our shelters will be opened as needed, our primary goal is to keep non-residents moving inland until the weather forces us to begin sheltering everyone. Sine our public schools are to be used as shelters, no attempt has been made to define evacuation routes for our residents who already know the best and alternate routes to the school nearest them.

The non-residents entering Washington County and traveling west on U.S. Highway 64 will continue to Pleasant Grove where the traffic will be split. Alternate vehicles will follow N.C. Hwy. 308 to the right and into Bertie County where they can intersect and follow U.S. 17 and 64 westward. Those vehicles that continue from Pleasant Grove west on U.S. 64 will continue through Roper and Plymouth into Martin County and other points westward.

We are attempting to give an inventory of the property and structures at risk from the effects of a hurricane in or near our county. We have also taken a close look at the monetary value losses that might be sustained in our jurisdiction, how our tax base could be affected, and the percent of our population at risk. See Figure 17.

MAP 10



NOTE: All schools are shelters to be opened on an as needed basis.

The evacuation routes show are primarily designated fo the exodus of Dare County residents and vacationers. Washington County resident should follow the best rout to nearest shelter.

WASHINGTON COUNTY

NORTH CAROLINA

Figure 17

AN INVENTORY AND ANALYSIS OF LAND AND STRUCTURES AT RISK
ALONG THE 28 MILES OF SHORELINE AND THE
HAZARD AREAS OF WASHINGTON COUNTY

	COUNTY TOTALS	AT RISK	% OF TOTALS
Population	15,433	1,800	11.7%
Housing	4,460	750	16.8%
Commercial	260	3	1.2%
Tax Base	$350,000,000	$34,500,000	9.86%
Current Tax Dollars	$ 2,135,000	$ 210,510	9.86%

Re-Entry

Factors regarding re-entry are also included in the Emergency Management Hurricane Evacuation Plan.

GENERAL POLICY ON GROWTH

The general land use policy of Washington County concerns the optimum rate of growth. This policy is designed to state the local discretion and is heavily influenced by the existing circumstances, problems and resources occurring and in place in Washington County. The general growth policy and all of the others are proposed consistent with and tempered by applicable Federal and State regulations. In a nutshell, the county agrees to comply with all Federal and State developmental regulations but once these requirements have been met, seeks to promote a wide range of economic development including industrial expansion, commercial development, residential growth, and sheer growth in population. The county acknowledges serious growth lag problems and is aware of the typical rural obstacles to achieving economic growth. In a specific sense, the county's growth policy maintains a high priority on the development of native peat resources.

Policy Alternatives

We can identify a wide range of policy alternatives surrounding the issue of overall growth. The alternatives organized from one extreme to the other are:

1. A virtually no growth policy;
2. A very limited highly selective growth policy;
3. A moderate growth policy which would also be somewhat selective and would not include extensive promotional efforts;
4. An aggressive wide ranging growth policy augmented by broad promotional activities;
5. A complete laissez faire policy encouraging and permitting any type of development.

Washington County dismisses the alternatives at both extremes - the new growth policy and the "anything goes" policy. This narrows the choices considerably.

Policy of Choice

The policy of choice is the aggressive growth policy. However, this policy does not intend to favor each and every development proposal which might surface. In addition to the aforementioned requirement that existing State and Federal developmental regulations be met; the county reserves the right to examine each individual proposal on its on merits. When serious land use conflicts, nusiances, or real public health risks can be identified, proposals will be discouraged or rejected in the discretion of county elected officials. Such a rejection might even occur when a proposal meets the bare minimum State and Federal regulatory requirements. The general tone of this progrowth policy however, will be to present a community attitude favorable to new economic growth.

Implementation

We propose several specific policies and procedures to attempt to implement the progrowth policy:

1. The county proposes to continue an active industrial recruitment program and to explore new points of emphasises in this program including but not limited to participation on regional and State boards and committees, and expiration of moderately priced advertising programs.

2. The county commits itself to keeping locally developed regulations simple and responsive. Here, we are especially interested in quick turn-around times for plat review and permit applications.

3. Close cooperation with the industrial recruitment program of the North Carolina Department of Commerce will be maintained and intensified.

4. The county will attempt to focus its recruiting efforts in a way that maximizes its peculiar circumstances and unique factors of the local community. For example, the county should not attempt to recruit industries which it cannot support. Conversely, it should not simply recruit industry without any idea about which types of industry might be profitable in a small rural county.

COORDINATION

Here, we are defining coordination as the process of dovetailing municipal land use plans with the Washington County Land Use Plan. In the cases of Roper and Creswell, there have been no separate freestanding documents. If that practice continues, coordination should be a rather straightforward process. The municipality of Plymouth does operate its own land use planning program.

Policy Alternatives

We preceive three basic policy alternatives:

1. Provide virtually no coordination between Washington County and the Town of Plymouth except that required by law;
2. Have a specific coordinating procedure with meaningful dialogue;
3. Have a formally consolidated program.

Discussion of these alternatives are difficult since they have not been explored in great detail by the two jurisdictions. However, we shall explore some ideas and by providing a copy of this passage, encourage feedback from the Town of Plymouth.

Policy of Choice

The policy of choice shall be the middle alternative which will attempt to increase the coordination and dialogue past its present level. We propose here that the process be formalized somewhat. Toward the end of the five year period, there may be the possibility

to completely consolidate the entire process?

Implementation Methods

Implementation methods shall include the following specific measures:

1. Provide the Town of Plymouth with a complete set of the county land use planning documents including the land use plan text and maps;

2. Provide a briefing once the final plan is adopted;

3. Send specific invitations to the county's final public hearings.

4. Hold one joint meeting of the Plymouth Planning Board and the County Planning Board per year.

Of course, the final implementation results will depend on the Town of Plymouth's response to these suggestions.

STATEWIDE COASTAL ISSUES -

Here, we refer to five planning issues directly related to unique coastal considerations. The five subareas are:

1. Marina development

2. Floating home development

3. Island development

4. Protection of maritime forests

5. Sand dune protection and measures

After consulting with the County Tax Assessor, Soil Conservation Service, and after reviewing aerial photography, we are virtually certain that there are no actual islands located within the jurisdiction of Washington County. Further, we can identify no real sand dunes or maritime forests. However, we are aware that there are high quality pure atlantic white cedar stands in the Bull's Neck Swamp and are aware

of the stand of water tupelo in the Chapel Swamp area. We understand that neither of these stands technically can be described as maritime forests. Finally, we can identify no floating home developments or even mention of proposal to construct floating homes and we know of no marinas or plans to construct marinas in Washington County.

Policy Alternatives

We have not developed any policy alternatives because of the absence of problems associated with the purely coastal planning issues.

Policy of Choice

No policy decisions have been made for the same reason.

Implementation

No specific implementation strategies are necessary at this time.

In conclusion, the county should monitor the future developments in the following areas:

1. Marina development; and
2. Floating home development.

Proposals to construct these types of developoments could trigger the necessity for specific developmental controls but such developments at the present time do not appear to be likely.

WATER SUPPLY, STORMWATER AND AGRICULTURAL RUNOFF ISSUES - Definition

In Washington County, water supply issues almost invariably refer to groundwater. Since the presence of abundant groundwater virtually rules out the use of relatively poor quality surfacewater.

Stormwater runoff outside of the municipalities is generally limited to roads, highways and multi-family housing or commercial development. Agricultural or "non-point" runoff is a meaningful issue and is related to water quality questions.

Policy Alternatives

In the area of stormwater runoff, the alternatives when considering the county's relatively undeveloped state, are rather limited. Realistically, stormwater runoff is primarily the responsibility of the North Carolina Department of Transportation and private landowners. Stormwater runoff is a much more relevant issue for municipalities in general. However, the county and its local school system are landowners also and in that respect should consider stormwater management alternatives. In the area of stormwater management, we see the alternatives basically as twofold. Stormwater can either be properly managed or ignored.

In the area of water supply questions, we offer a slightly more complex set of alternatives. Water supply should be considered in two parts. The first part of the discussion should deal with the county government's direct water supply responsibility due to the operation of the new county waterworks. The second part of the issue deals with water supply in general, especially those property owners not served by the county water system but still reliant on private wells. The alternatives related to the county's central water system include:

1. No plans to protect groundwater supplies;
2. More extensive use of the existing programs available for monitoring and protecting water supply;
3. Exensive urban type programs to protect water supply.

The alternatives relating to water supply in general can be described as follows:

1. No policy development or a complete market system with no planning or regulations;

2. A limited monitoring system with primary reliance on services provided by the local Health Department, State government, and the Federal government;

3. An extensive urban type program with new local monitoring capabilities and extensive watershed controls.

Policy of Choice

On the question of policies relating to protecting the water supply in general and the county's central water system supply, we are electing to choose the moderate policy alternatives. The county should attempt to use more extensively the existing programs available for monitoring and protecting water supplies. With the present rate of growth and land use conversion, this alternative should be sufficient. If conditions change, and many more irrigation projects are built or if other types of development put the groundwater supplies at risk, the county should reconsider its position. By using programs and services presently available, the county should be able to protect the planned water supply for the central water system through the end of the planning horizon.

It is a little more difficult to accurately assess the county's overall groundwater resources and the threats posed to them. The construction of the county waterworks system seems to have greatly reduced the number of compliants associated with private wells. Hence, the policy of choice is to once again, use the information and progamatic resources available in the local area.

Implementation

A rather extensive body of information concerning groundwater use and possible abuse is available locally. The county has access to water supply and development information to the following programs:

1. Building code enforcement
2. Flood insurance program enforcement
3. Subdivision plat review
4. Mobile Home park plat review
5. CAMA permit administration
6. Public health well inspections program

Further, at the State and Federal level, additional information is available. The State distributes to counties, information on test wells and commercial wells. Virtually all the programs above offer some limited capability to protect water supply and prevent degradation to local acquifers. If the pace or quality of development changes substantially, the county should be prepared to examine additional planning programs and regulatory controls for which it possesses enabling legal authority. Such controls would include zoning and watershed controls of the type presently being utilized by Orange County, North Carolina. One particularly helpful implementation strategy would be to instruct the building inspector to identify any specific project which might damage groundwater supply even where such a project might not violate any specific provisions of the North Carolina State Building Code. This type of monitoring would require additional training for the county's building inspector. Over the next two to three years, the county will attempt to cross-train its building inspector for that purpose.

The county has already entered into an engineering agreement for the planning and preliminary design of a county well field and treatment plant. Presently, the county purchases its raw

water supply from the three municipalities. The engineering contract does include a study of the existing groundwater resources and at least the obvious threats to the quantity and quality of groundwater resources. There is evidence to suggest that by centralizing individual water supply to a county waterworks system, groundwater resources can be utilized more efficiently. More importantly, this does provide a better opportunity to protect one or two well fields as opposed to trying to protect each private land well in the county. One of the most basic implementation consideration should be for the county to attempt to purchase adequate land surrounding the proposed well field to enable it to protect it from negative encroachment. In the event that the land cannot be purchased, the county should explore the possiblity of purchasing mineral rights or other zoning type controls which would at least apply to the specific site of the well field.

The county should be able to protect groundwater supplies even in the face of large peat development projects. Here, the key is the specific methodology used for peat extraction and development. It is our finding that the PMA project successfully demonstrated that by using the best available design and technology, peat development can occur without serious degradation to the groundwater supply. On the other hand, the county should be vigilant to the potential of wreckless development of peat resources.

PEAT RESOURCES - Definition

Extensive peat resources are located in eastern Washington County and along its river banks. Specifically, Phelps Field in the Lake Phelps area contains approximately 15,000 acres of partially developed peat fields. This area has been the subject of numerous studies calling

for peat mining and peat related industries. It is the county's policy to encourage the orderly and careful development of Phelps Field and other local peat resources. Support for this policy, however is not a passive one but is contingent on landowner and developers keeping county officials fully informed of background information and development proposals.

Policy Alternatives

The policy alternatives in this area appear to be:

1. Take no position on the matter;
2. Take an extremely conservative position and develop local regulations in addition to State and Federal programs which would slow down or at least add extra layers of regulatory controls to the peat extraction process;
3. Promote the careful development of peat resources consistent with existing State and Federal regulatory requirements;
4. Promote peat resources development at any costs.

Policy of Choice

Washington County herein selects the third alternative of promoting careful peat resources development consistent with existing State and Federal environmental regulations. This policy alternative assumes that there will be free if any additional local regulatory programs established based on our overall finding that there is already a great deal of regulatory protection embodied in the existing statutes and regulations.

Implementation

One of the county's primary implementation tactics will be for its economic development commission to work closely with First Colony Farms and other organizations to encourage the orderly development of the peat located in Phelps Field.

On a secondary basis, the county should also cooperate with other landowners and developers interested in peat resources development.

If neither of these responsive tactics are successful, the county should consider taking an active lead in attempting to identify and attract investors interested in peat resources development.

WASTEWATER PROBLEMS - Definition

Due to problems associated with shallow water tables, and somewhat limited soils, Washington County, like many other eastern North Carolina counties is experiencing some difficulty where ground absorption systems cannot adequately treat wastewater. This problem is not limited to new development or population growth. The problem can occur where homes or other structures are already in use. If performance standards are increased by the State Public Health Service, the program can create new pressures, even in settled neighborhoods.

Policy Alternatives

One alternative is to simply ignore the problem and assume that is, that it must be addressed by the landowner. 2) The county could choose to play a very limited role of monitoring the situation and providing technical assistance to landowners facing wastewater treatment problems. 3) The county could become actively involved by constructing a county-owned and operated wastewater collection and treatment system.

Some counties in North Carolina, for example, Moore County, have already constructed a county-owned and operated wastewater collection and treatment systems similar for those operated for years by cities and towns. The extreme alternative of simply not getting involved does not appear to be realistic. The county should, then attempt

to monitor the extent and nature of the problem and at least offer technical assistance to landowners and investors interested in building industries or commercial properties in Washington County. Here, we specifically recommend that the county either through its in-house staff, or through it retained engineer become familiar with the alternative on site sewage disposal. So far, sewage disposal in Washington County has been limited to either groundwater absorption (septic tank) systems or municipal conventional wastewater treatment plants. Another option would be to provide technical assistance and promote the construction of privately owned small package wastewater treatment plants using conventional secondary treatment technology. Of course, this alternative would require the location to be near an adequate receiving stream with enough assimilative capacity. In the event this is not practical, prospective new industries could consider privately owned sight specific wastewater treatment systems using spray irrigation.

Finally, toward the end of the planning horizon, the county should reexamine the level of demand and environmental need for a county operated wastewater treatment facility. In any event, the county should explore possibilities of reducing its dependence on the three wastewater collection and treatment systems operated by the municipalities.

RESOURCE PRODUCTION AND MANAGEMENT POLICIES - Definition

This policy issue deals primarily with agriculture and forestry. It seeks to explore the resources from a productive standpoint, and also attempts to analyze the environmental risks associated with poor agricultural and forestry practices.

Policy Alternatives

We can identify three basic policy alternatives. The first would be to simply take no position on matters of this sort or where mandated by State and Federal law. The moderate policy alternative would be for the county to operate its existing local programs, monitor changes in agricultural and forestry and on a highly selective basis, add additional regulatory controls only where State and Federal controls break down or there is a critical local set of circumstances.

The final policy alternative would be to enact an aggressive comprehensive land use control and management system. Some local governments in North Carolina have enacted environmental impact ordinances, extensive watershed land use controls, and land clearing regulations.

Policy of Choice

The policy of choice selected is the moderate one where the county continues to operate its local planning programs already in place, carefully monitor future development, and add additional controls where State and Federal programs break down and where a particularly critical situation arises.

Here, there is an implicit statement that generally speaking, the existing body of local, State and Federal regulations are performing adequately. There are some exceptions, such as the dwindling fin fish resources, especially striped bass. Even in this instance, there is substantial evidence to indicate that the water quality and fin fish problems are beyond the capability of local governments. It is our finding that water quality problems

are so complex and regional in nature that they must be addressed primarily by State government and in some cases, even the Federal Government.

Further, we find that much of the opposition to land clearing and super farming is populist in nature and very difficult to substantiate from an environmental standpoint.

From an educational standpoint, the county should continue to encourage its Agricultural Extension Service and Soil Conservation Service to promote sound farm and forestland management practices through the educational approach. Where possible, educational efforts should be augmented by financial incentives such as those included in the cost share program operated by the Soil Conservation Service.

Implementation

As noted above, the preferred implementation strategy is participation in State and Federal programs and extensive use of the educational approach.

ECONOMIC AND COMMUNITY DEVELOPMENT - Definition

One of the most basic policy statements of Washington County is to increase the rate of economic growth and to diversify economic growth and community development. Specifically, the county should attempt to reduce it reliance on agriculture and wood products manufacturing, but not to the point that it would discourage additional wood products or agricultural development.

Policy Alternatives

The policy alternatives are basically those set out above in the basic general policy statement. The policy choice is also consistent with that selected under the general policy statement. Some additional explanation is necessary here, however. The county's severe need for growth does not put it in a position to be able to actually screen out developmental proposals simply because they do not advance economic diversification. According to the most recent State estimate, Washington County suffered a real decline in population and had the largest decline of any North Carolina county. For this reason, and simply in order to maintain good relationships with existing businesses, the county should not discourage expansion of existing agricultural and wood products industries or fail to attempt to accommodate new proposals.

However, in its promotional and recruiting practices, the county should emphasize non-traditional type industries, commercial development, and service industries.

Implementation

The county should continue an attempt to expand its ongoing economic development program. Specifically, county officials should work cooperatively with municipal officials in Plymouth and Roper to explore all economic development and community development possibilities as they apply to the three surplus elementary school campuses. With the completion of the new Pines Elementary School last fall, the old Roper Elementary School, Fourth Street Elementary School and Washington Street Elementary School campuses are now vacant and

represent an economic development resource of sorts. With the recent problem of actual declining population, the county might consider offering up residential development tracts to private developers for the construction of unsubsidized housing. These campuses should also be redeveloped to remove any possible blighting influences and to examine the possibility of creating new passive recreational resources.

In order to attempt to maintain an environment which accommodates new economic growth, the county should attempt to monitor all developmental permit applications to State agencies. This practice would attempt to encourage State permit officials to not go beyond their legislative authority in enforcing environmental regulations. From a community development standpoint, we also plan to implement the Scuppernong River snagging and clearing project which has been in the planning stage for a decade. Successful completion of this project would reduce flooding of cultivated fields. This problem has grown over the years as the Scuppernong River has become seriously clogged with debris. Further, the community development implementation strategy would be to attempt to increase shoreline access resources for county residents through the construction of a local shoreline park, swimming area, or pier. Specifically, the county has examined the possibility of retaining a section of the old Albemarle Sound Bridge for pedestrian access.

ENERGY FACILITIES

In Washington County, the location of energy facilities realistically means peat resources development and/or the construction of an electrical generating power station fired by peat, "dirty" wood chips, clean wood chips, coal or a combination of these fuels. With all of North Carolina Power Company's generating facilities located in Virginai, there are public relations reasons and engineering reasons to attempt to secure generating facilities in the southern portion of their service area.

Washington County supports ongoing efforts to encourage the construction of electrical generating facilities using non-nuclear fuels. The top priority in term of fuel stocks are placed on wood and peat but the County does support coal as a fuel if air emissions can be controlled.

Naturally, if peat was the fuel, there would be considerable advantages to locating a generating station in or near Phelps Field. Suitable sites for a more conventional generating station (e.g. wood-fired) are readily available. However, Washington County does support the construction of a electrical generating station in or near Phelps Field if the developer follows sound environmental planning guidelines.

SUBCHAPTER 7H - STATE GUIDELINES FOR AREAS OF ENVIRONMENTAL CONCERN

SECTION .0100 - INTRODUCTION AND GENERAL COMMENTS

.0101 INTRODUCTION

(a) One of the basic purposes of North Carolina's Coastal Area Management Act (CAMA or the act) is to establish a state management plan that is capable of rational and coordinated management of coastal resources. The act recognizes that the key to more effective protection and use of the land and water resources of the coast is the development of a coordinated approach to resource management. The Coastal Area Management Act provides two principal mechanisms to accomplish this purpose. First, the formulation of local land use plans articulating the objectives of local citizens and translating these objectives into future desired land use patterns; and second, the designation of areas of environmental concern for the protection of areas of statewide concern within the coastal area.

(b) Both the development of local land use plans and the designation and regulation of critical resource areas contribute to rational management by encouraging local and state governments to exercise their full authorities over coastal resources and to express their management goals in a comprehensible and uniform manner. Local objectives benefit through their incorporation into a state management scheme, and the statewide objectives of resource protection and development benefit through an integrated and comprehensive management approach. It is the purpose of the state guidelines to ensure this uniformity and consistency in the local land use plans and the regulation of critical resource areas, or areas of environmental concern (AECs), through the establishment of unified policies, criteria, standards, methods, and processes.

(c) These state guidelines are designed to provide individuals and governmental agencies with a complete statement of the uniform policies and standards adopted by the Coastal Resources Commission (CRC or the commission) for areas of environmental concern, as mandated by the act.

History Note: Statutory Authority G.S. 113A-101; 113A-102; 113A-124(c)(5); Eff. September 9, 1977.

.0102 CAMA PROVISIONS FOR AECs

LAND CLASSIFICATION

Developed

In Washington County, as one might expect, the most heavily developed nonincorporated areas are in and around the municipalities, especially the county seat, Plymouth. Community facilities in and near Plymouth are capable of supporting additional population and industrial growth. The Town of Plymouth possesses considerable access water supply capacity and to a more limited extent, sanitary sewerage capacity. Built up areas around Roper and Plymouth are less pronounced. Also, although not presently classified as developed, the land area generally north of U.S. 64 and south of Albemarle shoreline is capable of supporting growth. This area contains some of the county's best soils and best drained parcels.

Of course, the Washington County Industrial Park, located between U.S. 64 and Mackeys Road, just east of Plymouth is the prime location for industrial growth. The park is served with electricity, rail, water utilities including an elevated tank and sanitary sewerage. In conjunction with the North Carolina Department of Transportation's Industrial Access Program, the county is presently constructing a paved road within the park.

Transition

We have predicted that transition or change will occur along U.S. 64 from Plymouth eastward to the Tyrrell County line. Unless zoning controls are enacted, there will be a mixing of residential growth from a qualitative standpoint. Commerical growth will be

interspersed with the residential growth and some industrial development may also occur. As the demand for farming acreage in the Wenona area declines, we may see some retirement residential construction. In the southwestern section along N.C. 32 by the end of the planning horizon, we will most likely see some additional bedroom community development with homes being built by people working in Beaufort County. We expect similar bedroom type development to occur along S.R. 1100. Over the next five to ten years, the County should plan for extensions of its water main southward down N.C. 32 to accommodate the projected growth. Industrial growth could easily occur near the Plymouth Airport in spite of the lack of central wastewater facilities. This area is in large undivided tracts and is served by rail. In most of the areas classified as community, we expect slow single family residential growth. In many cases, this growth will occur in the form of mobile home installations on large privately owned lots. Many parcels classified as community are served by shallow wells and septic tanks. Within its resources, the County should attempt to serve additional locations with its central water system. Subdivision plat review in areas labeled community, rural and conservation should take special note of the developers' plans for water service, wastewater service, and surface drainage. Where individual parcels within the community classification can support industry, industy should be permitted to develop.

Farming and logging will continue to be a very important land use within many of the areas classified as community.

Rural

A large percentage of Washington County has been classified as rural. The road network is an unusual one with massive expanses of land not served by public roads. The area in central Washington County between S.R. 1126 and U.S. 64 is a good example. From a realistic standpoint, most of the land in rural classification will continue in its present land use. The predominant land uses are: unmanaged woodsland with low grade hardwoods, managed woodsland subject to periodic logging, and agriculture. However, within this general area, there are parcels suitable for residential or other types of development. Landowners, and prospective developers are cautioned to carefully examine soil conditions and drainage limitations before committing financial resources to development in areas classified as rural.

Conservation

We have classified the shore of the Roanoke River and Albemarle Sound as conservation. The shoreline of Lake Phelps has also been classified as conservation. However, even within this classification, there are parcels clearly suitable for residential, commercial or industrial development. Along the Albemarle Sound, one of the major limitations on residential development is erosion. The area also has some suceptability to hurricane flooding, although not nearly of the magnitude of the eastern region of the Albemarle Sound. The Roanoke River is also somewhat subject to flooding although in most locations, the banks are extremely high. A hurricane of category three, four, or five however, would produce substantial flooding along the

Roanoke River. The County should caution prospective developers about the special characteristics of the areas labeled conservation. The County presently is effectively enforcing its Flood Damage Prevention Ordinance in these areas, especially the Roanoke shoreline near the Plymouth city limits which is undergoing residential development. Even here however, the County's information in some places is limited because the U.S. Department of Housing and Urban Development has provided the Planning Office only with "unnumbered A zones." These plates do not give specific topographic vertical information.

Local Approach to Land Classification

Consistent with the overall inter-governmental structure of the Coastal Area Management Program, Washington County herein states for the record its approach to the interpretation and utilization of the land classification system. G.S. 113A-101 outlines a cooperative State-local program. This cooperative program outlines state roles local roles, and concurrent roles. Enforcement is described as a concurrent state-local responsibility. Toward that end, Washington County proposes its method for interpreting and utilizing the land classification system. The actual system itself has been designed and put into place by the Coastal Resources Commission.

Our approach toward the utilization of the land classification system is that this system shall be used as a basic planning criteria. It shall not be an exclusive planning criteria. By way of illustration, when a potential developer proposes to construct a specific structure on a specific site, the land classification system should not be the only factor considered by the permit letting agency when reviewing the permit application. At the local level, the land classification system should be one of several planning factors considered when local government decides whether to locate infrastructure components. The land classification system should be made available to federal agencies and lending institutions for their voluntary use. Specifically, when the Washington County Economic Development Commission endorses an industrial prospect, said industrial project should not be inhibited by the land classification system.

In areas shown as conservation areas, the primary emphasis should be placed on the streams and/or shorelines located within the conservation

areas. Special emphasis should be placed on the land area within 1300 feet of the banks of streams located within the areas of environmental concern. In the case of lakes such as Lake Phelps, the primary emphasis once again should be within 75 feet of high water. A less obtrusive approach should be taken to the area beyond 75 feet in the case of lakes and beyond 1300 feet in the case of streams. Also the designation of an area in the conservation category should not deny access to streams and other bodies of water. Drainage structures that otherwise would be permitted, should be allowed to drain into streams and other types of bodies of water as long as the construction activity is done consistent with good soil conservation practices. The designation of an area as conservation should not prevent barge landing or other types of access from being constructed. However, where it is practical, construciton activity should be set back from the shoreline or the stream. Washington County does acknowledge that the conservation land classification was developed to protect the whole environmental integrity of the coastal region. We understand that failure to protect sensitive areas within Washington County could in certain circumstances, have a negative environmental impact in neighboring counties.

Finally, the land classification system is based not only on immediate growth projections, but on economic development goals through the planning horizon.

.0204 LAND CLASSIFICATION 10.11

(a) A land classification system has been developed as a means 10.13
of assisting in the implementation of the policies adopted as 10.14
provided in Rule .0203 of this Section. By delineating land 10.15
classes on a map, local government and its citizens can specify
those areas where certain policies (local, state and federal) 10.16
will apply. Although specific areas are outlined on a land 10.17
classification map, it must be remembered that land
classification is merely a tool to help implement policies and 10.18
not a strict regulatory mechanism. The land classification map
must be of a scale and quality that is easily read by local, 10.19
state and federal agencies. To further clarify its intent, the
local government should describe how land classification is 10.20
linked to policy. For example, a local government may have a
policy to protect surface water quality from agriculture and 10.21
urban development runoff. The implementation strategy might be
to require land buffers, swales etc. between development and 10.22
water bodies. The local government could then designate a
conservation buffer around water bodies. This buffer could be 10.23
described in the narrative of the plan as "...a one mile buffer
of conservation lands..." which would clarify the local 10.24
government's intent.

(b) The land classification system provides a framework to be 10.25
used by local governments to identify the future use of all 10.26
lands. The designation of land classes allows the local 10.27
government to illustrate their policy statements as to where and
to what density they want growth to occur, and where they want to 10.28
conserve natural and cultural resources by guiding growth.

(c) The land classification system includes five classes: 10.29
developed, transition, community, rural and conservation. Local 10.30
governments may subdivide these classes into more specific
subclasses. Any subclass should be able to aggregate back to the 10.31

original class. Some classes may not apply to each local government; for example, the community or rural class may not apply in an incorporated municipality. 10.32

(d) In applying the land classification system each local 10.33
government should give particular attention to how, where and 10.34
when development of certain types and intensity will be encouraged or discouraged. Urban land uses and higher intensity 10.35
uses which presently require the traditional urban services should be directed to lands classified developed. Areas 10.36
developing or anticipated to develop at urban densities which will eventually require urban services should be directed to 10.37
lands classified transition. Low density development in settlements which will not require sewer services should be 10.38
directed to areas classified as community. Agriculture, forestry, mineral extraction and other similar low intensity uses 10.39
and very low density, dispersed residential uses should be directed to lands classified rural. Generally, public or private 10.40
water or sewer systems will not be provided in areas classified rural as an incentive for intense development. 10.41

(1) Developed: 10.43

(A) Purpose. The purpose of the developed class is to 10.45
provide for continued intensive development and 10.46
redevelopment of existing cities.

(B) Description and characteristics. Areas meeting 10.47
the intent of the developed classification are 10.48
currently urban in character where minimal undeveloped land remains and have in place, or are 10.49
scheduled for the timely provision of, the usual municipal or public services. Urban in character includes mixed land uses such as residential, 10.50
commercial, industrial, institutional and other uses at high to moderate densities. Services 10.51
include water, sewer, recreational facilities, streets and roads, police and fire protection. In some instances an area may not have all the 10.52
traditional urban services in place, but if it otherwise has a developed character and is 10.53
scheduled for the timely provision of these services, it still meets the intent of the developed classification. Areas developed for 10.54
predominately residential purposes meet the intent of this classification if they exhibit existing high to moderate densities such as: 10.55

(i) a density at or approaching 500 dwelling 10.57
units per square mile; or 11.1

(ii) a density of 3 or more dwelling units per 11.4
acre; or

(iii) a majority of lots of 15,000 square feet or less, which are provided or scheduled to be provided with the traditional urban services; and/or 11.7

(iv) permanent population densities approaching or exceeding 2000 persons per square mile and the seasonal population may swell significantly. 11.9

(C) Discussion. Local governments may subdivide the developed class into subclasses. Developed / multifamily residential, developed / single family residential, developed / commercial and developed / industrial are examples. In applying the developed class or subclasses, the local government should discuss how, when and where it will provide the services necessary to support the needs of an urban area. This class is designed to illustrate urban intensity development and services necessary to support it. 11.11 11.12 11.13 11.14 11.15

(2) Transition: 11.16

(A) Purpose. The purpose of the transition class is to provide for future intensive urban development on lands that are suitable and that will be provided with the necessary urban services to support intense urban development. 11.18 11.19 11.20

(B) Description and Characteristics. Areas meeting the intent of the transition classification are presently being developed for urban purposes or will be developed in the next five to ten years to accommodate anticipated population and urban growth. These areas are in, or will be in a "transition" state of development going from lower intensity uses to higher intensity uses and as such will eventually require urban services. 11.22 11.23 11.24 11.25 11.26

(i) Areas classified transition will provide lands for intensive urban growth when lands in the developed class are not available. Transition lands must be able to support urban development by being generally free of physical limitations and be served or readily served by urban services. Urban development includes mixed land uses such as residential, commercial, institutional, industrial and other uses at or approaching high to moderate densities. Urban services include water, sewer, streets and roads, police and fire protection that will be made available at the 11.28 11.29 11.30 11.31 11.32 11.34

time development occurs or soon thereafter. Permanent population densities in this class will be approaching 2,000 persons per square mile and the seasonal population may swell significantly.

(ii) In choosing land for the transition class, such land should not include: Areas with severe physical limitations which would make the provision of urban services difficult or impossible, lands which meet the definition of conservation, lands of special value (unless no other alternative exists) such as productive and unique agricultural lands, forest lands, potentially valuable mineral deposits, water supply watersheds, scenic and tourist resources including archaeological sites, habitat for important wildlife species, areas subject to frequent flooding, areas important for environmental or scientific values, lands where urban development might destroy or damage natural systems or processes of more than local concern, or lands where intense development might result in undue risk to life and property from natural or existing manmade hazards.

(iii) If any designated area of environmental concern is classified transition a definitive explanation shall be included stating why the area is felt to be appropriate for high density development.

(iv) Predominately residential areas meet the intent of the transition classification if they exhibit characteristics such as:

(I) a density at or approaching 500 dwelling units per square mile, or

(II) a density which will meet or exceed three dwelling units per ace, or

(III) a majority of lots of 15,000 square feet or less which are provided with or will be provided with the necessary urban services to support high intensity development.

(v) In most cases the transition class will be adjacent or contiguous to the developed class.

(C) Discussion. The developed and transition classes and subclasses should be the only areas under active consideration by the local government for intensive urban development requiring urban services. In applying the transition class or subclasses the local government should describe how, when and where it will provide services necessary to support the needs of this intense land class. If the local government intends to allow the private provision of urban services such as sewage package treatment systems, community water systems, private or rural fire protection, private garbage pick up, etc. then the local government should also discuss how it will ensure these private services will be provided so as to avoid unnecessary future public expenses. This class is designed to illustrate emerging and developing urban areas and to help local governments ensure adequate urban services will be provided to support such development.

(3) Community:

(A) Purpose. The purpose of the community class is to provide for clustered, mixed land uses at low densities to help meet the housing, shopping, employment and other needs in rural areas.

(B) Description and Characteristics. Areas meeting the intent of the community class are presently developed at low densities which are suitable for private septic tank use. These areas are clustered residential and/or commercial land uses which provide both low intensity shopping and housing opportunities and provide a local social sense of a "community". Very limited municipal type services such as fire protection and community water may be available, but municipal type sewer systems are not to be provided as a catalyst for future development. In some unusual cases sewer systems may be possible, but only to correct an existing or projected public health hazard. Areas developed at low density in a cluster meet the intent of the community class if they exhibit characteristics such as:

(i) densities of less than 500 dwellings per square mile, or

(ii) few residential development densities which meet or exceed three dwellings per acre, or 12.30
(iii) residential lot sizes of 15,000 square feet or greater, and/or 12.32
(iv) low population densities such as 640 persons per square mile (one person per acre). 12.34

(C) Discussion. It should be stressed that the community class applies to clustered low intensity development in a rural landscape. This development is usually associated with crossroads in counties. Some "communities" may have or may require municipal type services to avert an existing or anticipated health problem. Even though limited services may be available, these areas should not be shown in the higher intensity land classes, as the major characteristic which distinguishes community with limited services from the developed and transition classes is that services are not provided to stimulate intense development in a rural setting, but rather to neutralize or avert health problems. Due to the small size of most communities, they will appear as small areas in a dispersed pattern on the county land classification map. This class illustrates small, dispersed groupings of housing and commercial land uses in a rural landscape. 12.35 12.36 12.37 12.38 12.39 12.40 12.41 12.42 12.43

(4) Rural: 12.44

(A) Purpose. The purpose of the rural class is to provide for agriculture, forestry, mineral extraction and various other low intensity uses on large sites including low density dispersed residential uses where urban services are not and will not be required. Any development in this class should be compatible with resource production and should not significantly impair or permanently alter natural resources. 12.46 12.47 12.48 12.49

(B) Description and Characteristics. Areas meeting the intent of this classification are appropriate for or presently used for agriculture, forestry, mineral extraction and similar allied uses. Very low density dispersed, single family residential uses are also appropriate within rural areas where lot sizes are large and where densities do not require the provision of urban type services. Private septic tanks and wells are the primary onsite services available to support residential development, but fire, rescue squad and sheriff 12.50 12.51 12.52 12.53 12.54

protection may also be available. Population densities will be very low, less than one person per acre. 12.55

(C) Discussion. The rural class is the broadest of the five classes and will generally constitute the major land class on county land classification maps. Local governments may subdivide the rural class into subclasses such as rural/agriculture, rural/forestry etc. in order to illustrate where these basic rural activities will occur. 12.56 12.57 13.1 13.2

(5) Conservation: 13.3

(A) Purpose. The purpose of the conservation class is to provide for the effective long-term management and protection of significant, limited, or irreplaceable areas. Management is needed due to the natural, cultural, recreational, scenic or natural productive values of both local and more than local concern. 13.6 13.7 13.8

(B) Description and Characteristics. Areas meeting the intent of this classification include: 13.10

(i) AEC's, including but not limited to public trust waters, estuarine waters, coastal wetlands etc. as identified in 15 NCAC 7H; 13.13

(ii) other similar lands, environmentally significant because of their natural role in the integrity of the coastal region and include but are not limited to bottom land hardwoods, pocasins, swamp forests, areas that are or have a high probability of providing wildlife habitat, forest lands that are essentially undeveloped and lands which otherwise contain significant productive, natural, scenic, cultural or recreational resources. 13.14 13.15 13.16 13.17 13.18

(C) Discussion. The conservation class is designed to illustrate the natural, productive, scenic, cultural and recreational features of the coastal zone which make the region a desirable place in which to live, work and visit. As such the conservation class should be applied to areas that because of their unique, productive, limited, cultural or natural features should be either not developed at all (preserved), or if developed, done so in an extremely limited and cautious fashion. Urban services, public or private, should not be provided in these areas as a catalyst to stimulate intense development. In 13.21 13.22 13.23 13.24 13.25

most cases limited onsite services will adequately support any limited development within this class and will also protect the very features which justify the area's inclusion in the conservation classification. Mapping of AEC's in the conservation class on the local government's land classification map should be accomplished with the understanding the AEC's are intensively defined by their characteristics in 15 NCAC 7H, and therefore maps only indicate approximate locations and are not definitive enough for site specific regulation purposes. Policy development in the land use plan should acknowledge the intent of this class and policies should be consistent with the function of areas shown in the conservation class.

History Note: Statutory Authority G.S. 113A-107(a);
Eff. February 1, 1976;
Amended Eff. July 1, 1984; September 1, 1979.

(a) The Coastal Area Management Act requires that these state guidelines "shall give particular attention to the nature of development which shall be appropriate within the various types of areas of environmental concern that may be designated by the commission."

(b) The act further provides that local land use plans "shall give special attention to the protection and appropriate development of areas of environmental concern."

(c) The 1974 Legislature found that "the coastal area, and in particular the estuaries, are among the most biologically productive regions of this state and of the nation," but in recent years the area "has been subjected to increasing pressures which are the result of the often conflicting needs of society expanding in industrial development, in population, and in the recreational aspirations of its citizens."

(d) "Unless these pressures are controlled by coordinated management," the act states, "the very features of the coast which make it economically, aesthetically, and ecologically rich will be destroyed."

(e) To prevent this destruction, the act charges the Coastal Resources Commission with the responsibility for identifying types of areas -- water as well as land -- in which uncontrolled or incompatible development might result in irreversible damage. It further instructs the commission to determine what types of development activities are appropriate within such areas, and it calls on local government to give special attention to these environmentally fragile and important areas in developing their land use plans. Also, the act provides that upon establishing the types of development activities appropriate within areas of environmental concern, the CRC should implement a permit program capable of controlling an inappropriate or damaging development activities within the AECs. The intent of this authority is not to stop development, but rather to ensure the compatibility of development with the continued productivity and value of certain critical land and water areas.

(f) The act divides the implementation responsibilities of the permit program between local governments and the CRC. Individuals proposing "minor development" activities [defined in G.S. 113A-118(d)(2)] within an AEC will be required to receive permits from a local permit officer, while individuals undertaking "major development" activities [defined in G.S. 113A-118(d)(1)] will seek permits directly from the CRC. In either case, the criteria and standards determining permit approval as described in this Subchapter of the guidelines will be identical.

History Note: Statutory Authority G.S. 113A-102(a); 113A-106; 113A-107; 113A-113(a); 113A-118;

Eff. September 9, 1977.

.0204 AECs WITHIN THE ESTUARINE SYSTEM

The following regulations in this Section define each AEC within the estuarine system, describe its significance, articulate the policies regarding development, and state the standards for development within each AEC.

History Note: Statutory Authority G.S. 113A-107(a); 113A-107(b); Eff. September 9, 1977.

.0205 COASTAL WETLANDS

(a) Description. Coastal wetlands are defined as any salt marsh or other marsh subject to regular or occasional flooding by tides, including wind tides (whether or not the tide waters reach the marshland areas through natural or artificial watercourses), provided this shall not include hurricane or tropical storm tides.

Coastal wetlands contain some, but not necessarily all, of the following marsh plant species:

(1) Cord Grass (Spartina alterniflora),
(2) Black Needlerush (Juncus roemerianus),
(3) Glasswort (Salicornia spp.),
(4) Salt Grass (Distichlis spicata),
(5) Sea Lavender (Limonium spp.),
(6) Bulrush (Scirpus spp.),
(7) Saw Grass (Cladium jamaicense),
(8) Cat-tail (Typha spp.),
(9) Salt Meadow Grass (Spartina patens),
(10) Salt Reed Grass (Spartina cynosuroides).

Included in this definition of coastal wetlands is "such contiguous land as the Secretary of NR&CD reasonably deems necessary to affect by any such order in carrying out the purposes of this Section." [G.S. 113-230(a)]

(b) Significance. The unique productivity of the estuarine system is supported by detritus (decayed plant material) and nutrients that are exported from the coastal marshlands. The amount of exportation and degree of importance appears to be variable from marsh to marsh, depending primarily upon its frequency of inundation and inherent characteristics of the various plant species. Without the marsh, the high productivity levels and complex food chains typically found in the estuaries could not be maintained.

Man harvests various aspects of this productivity when he fishes, hunts, and gathers shellfish from the estuary. Estuarine dependent species of fish and shellfish such as menhaden, shrimp,

flounder, oysters, and crabs currently make up over 90 percent of the total value of North Carolina's commercial catch. The marshlands, therefore, support an enormous amount of commercial and recreational businesses along the seacoast.

The roots, rhizomes, stems, and seeds of coastal wetlands act as good quality waterfowl and wildlife feeding and nesting materials. In addition, coastal wetlands serve as the first line of defense in retarding estuarine shoreline erosion. The plant stems and leaves tend to dissipate wave action, while the vast network of roots and rhizomes resists soil erosion. In this way, the coastal wetlands serve as barriers against flood damage and control erosion between the estuary and the uplands.

Marshlands also act as nutrient and sediment traps by slowing the water which flows over them and causing suspended organic and inorganic particles to settle out. In this manner, the nutrient storehouse is maintained, and sediment harmful to marine organisms is removed. Also, pollutants and excessive nutrients are absorbed by the marsh plants, thus providing an inexpensive water treatment service.

(c) Management Objective. To give highest priority to the protection and management of coastal wetlands so as to safeguard and perpetuate their biological, social, economic and aesthetic values; to coordinate and establish a management system capable of conserving and utilizing coastal wetlands as a natural resource essential to the functioning of the entire estuarine system.

(d) Use Standards. Suitable land uses shall be those consistent with the management objective in this Rule. Highest priority of use shall be allocated to the conservation of existing coastal wetlands. Second priority of coastal wetland use shall be given to those types of development activities that require water access and cannot function elsewhere.

Unacceptable land uses may include, but would not be limited to, the following examples: restaurants and businesses; residences, apartments, motels, hotels, and trailer parks; parking lots and private roads and highways; and factories. Examples of acceptable land uses may include utility easements, fishing piers, docks, and agricultural uses, such as farming and forestry drainage, as permitted under North Carolina's Dredge and Fill Act and/or other applicable laws.

In every instance, the particular location, use, and design characteristics shall be in accord with the general use standards for coastal wetlands, estuarine waters, and public trust areas described in Rule .0208 of this Section.

History Note: Statutory Authority G.S. 113A-107(a); 113A-107(b); 113A-113(b)(1);

and establish a management system capable of conserving and utilizing estuarine waters so as to maximize their benefits to man and the estuarine system.

(d) Use Standards. Suitable land/water uses shall be those consistent with the management objectives in this Rule. Highest priority of use shall be allocated to the conservation of estuarine waters and its vital components. Second priority of estuarine waters use shall be given to those types of development activities that require water access and use which cannot function elsewhere such as simple access channels; structures to prevent erosion; navigation channels; boat docks, marinas, piers, wharfs, and mooring pilings.

In every instance, the particular location, use, and design characteristics shall be in accord with the general use standards for coastal wetlands, estuarine waters, and public trust areas described in Regulation .0208 of this Section.

History Note: Statutory Authority G.S. 113A-107(a); 113A-107(b); 113A-113(b)(2); Eff. September 9, 1977; Amended Eff. January 24, 1978.

.0207 PUBLIC TRUST AREAS

(a) Description. Public trust areas are all waters of the Atlantic Ocean and the lands thereunder from the mean high water mark to the seaward limit of state jurisdiction; all natural bodies of water subject to measurable lunar tides and lands thereunder to the mean high water mark; all navigable natural bodies of water and lands thereunder to the mean high water level or mean water level as the case may be, except privately-owned lakes to which the public has no right of access; all water in artificially created bodies of water containing significant public fishing resources or other public resources which are accessible to the public by navigation from bodies of water in which the public has rights of navigation; and all waters in artificially created bodies of water in which the public has acquired rights by prescription, custom, usage, dedication, or any other means. In determining whether the public has acquired rights in artificially created bodies of water, the following factors shall be considered:

(1) the use of the body of water by the public,
(2) the length of time the public has used the area,
(3) the value of public resources in the body of water,
(4) whether the public resources in the body of water are mobile to the extent that they can move into natural bodies of water,

(5) whether the creation of the artificial body of water required permission from the state, and

(6) the value of the body of water to the public for navigation from one public area to another public area.

(b) Significance. The public has rights in these areas, including navigation and recreation. In addition, these areas support valuable commercial and sports fisheries, have aesthetic value, and are important resources for economic development.

(c) Management Objective. To protect public rights for navigation and recreation and to preserve and manage the public trust areas so as to safeguard and perpetuate their biological, economic and aesthetic value.

(d) Use Standards. Acceptable uses shall be those consistent with the management objectives in (c) of this Rule. In the absence of overriding public benefit, any use which significantly interferes with the public right of navigation or other public trust rights which the public may be found to have in these areas shall not be allowed. The development of navigational channels or drainage ditches, the use of bulkheads to prevent erosion, and the building of piers, wharfs, or marinas are examples of uses that may be acceptable within public trust areas, provided that such uses will not be detrimental to the public trust rights and the biological and physical functions of the estuary. Projects which would directly or indirectly block or impair existing navigation channels, increase shoreline erosion, deposit spoils below mean high tide, cause adverse water circulation patterns, violate water quality standards, or cause degradation of shellfish waters are generally considered incompatible with the management policies of public trust areas. In every instance, the particular location, use, and design characteristics shall be in accord with the general use standards for coastal wetlands, estuarine waters, and public trust areas.

History Note: Statutory Authority G.S. 113A-107(a); 113A-107(b); 113A-113(b)(5); Eff. September 9, 1977.

.0208 USE STANDARDS

(a) General Use Standards

(1) Uses which are not water dependent will not be permitted in coastal wetlands, estuarine waters, and public trust waters. Restaurants, residences, apartments, motels, hotels, trailer parks, private roads, factories, and parking lots are examples of uses that are not water dependent. Uses that are water dependent may include: utility easements; docks; wharfs; boat ramps; dredging; bridges and bridge

approaches; revetments, bulkheads; culverts; groins; navigational aids; mooring pilings; navigational channels; simple access channels and drainage ditches.

(2) Before being granted a permit by the CRC or local permitting authority, there shall be a finding that the applicant has complied with the following standards:

(A) The location, design, and need for development, as well as the construction activities involved must be consistent with the stated management objective.

(B) Before receiving approval for location of a use or development within these AECs, the permit-letting authority shall find that no suitable alternative site or location outside of the AEC exists for the use or development and, further, that the applicant has selected a combination of sites and design that will have a minimum adverse impact upon the productivity and biologic integrity of coastal marshland, shellfish beds, submerged grass beds, spawning and nursery areas, important nesting and wintering sites for waterfowl and wildlife, and important natural erosion barriers (cypress fringes, marshes, clay soils).

(C) Development shall not violate water and air quality standards.

(D) Development shall not cause major or irreversible damage to valuable documented archaeological or historic resources.

(E) Development shall not measurably increase siltation.

(F) Development shall not create stagnant water bodies.

(G) Development shall be timed to have minimum adverse significant affect on life cycles of estuarine resources.

(H) Development shall not impede navigation or create undue interference with access to, or use of, public trust or estuarine waters.

(I) Development proposed in estuarine waters must also be consistent with applicable standards for the ocean hazard system AECs set forth in Section .0300 of this Subchapter.

(3) When the proposed development is in conflict with the general or specific use standards set forth in this Rule, the CRC may approve the development if the applicant can demonstrate that the activity associated with the proposed project will have public benefits as

identified in the findings and goals of the Coastal Area Management Act, that the public benefits clearly outweigh the long range adverse effects of the project, that there is no reasonable and prudent alternate site available for the project, and that all reasonable means and measures to mitigate adverse impacts of the project have been incorporated into the project design and will be implemented at the applicant's expense. These measures taken to mitigate or minimize adverse impacts may include actions that will:

(A) minimize or avoid adverse impacts by limiting the magnitude or degree of the action;

(B) restore the affected environment; or

(C) compensate for the adverse impacts by replacing or providing substitute resources.

(b) Specific Use Standards

(1) Navigation Channels, Canals, and Boat Basins Navigation channels, canals and boat basins must be aligned or located so as to avoid primary nursery areas (identified in 15 NCAC 3B .1405; effective date November 1, 1977) highly productive shellfish beds, beds or submerged vegetation, or significant areas of regularly or irregularly flooded coastal wetlands.

(A) Navigation channels and canals can be allowed through narrow fringes of regularly and irregularly flooded coastal wetlands if the loss of wetlands will have no significant adverse impacts on fishery resources, water quality or adjacent wetlands, and, if there is no reasonable alternative that would avoid the wetland losses.

(B) All spoil material from new construction shall be confined landward of regularly and irregularly flooded coastal wetlands and stabilized to prevent entry of sediments into the adjacent water bodies or marsh.

(C) Spoil from maintenance of channels and canals through irregularly flooded wetlands shall be placed on non-wetland areas, remnant spoil piles, or disposed of by an acceptable method having no significant, long term wetland impacts. Under no circumstances shall spoil be placed on regularly flooded wetlands.

(D) Widths of the canals and channels shall be the minimum required to meet the applicant's needs and provide adequate water circulation.

(E) Boat basin design shall maximize water exchange by having the widest possible opening and the

shortest practical entrance canal. Depths of boat basins shall decrease from the waterward and inland.

(F) Any canal or boat basin shall be excavated no deeper than the depth of the connecting channels.

(G) Canals for the purpose of multiple residential development shall have:

(i) no septic tanks unless they meet the standards set by the Division of Environmental Management and the Division of Health Services;

(ii) no untreated or treated point source discharge;

(iii) storm water routing and retention areas such as settling basins and grassed swales.

(H) Construction of finger canal systems will not be allowed. Canals shall be either straight or meandering with no right angle corners.

(I) Canals shall be designed so as not to create an erosion hazard to adjoining property. Design may include bulkheading, vegetative stabilization, or adequate setbacks based on soil characteristics.

(2) Hydraulic Dredging

(A) The terminal end of the dredge pipeline should be positioned at a distance sufficient to preclude erosion of the containment dike and a maximum distance from spillways to allow adequate settlement of suspended solids.

(B) Dredge spoil must be either confined on high ground by adequate retaining structures or if the material is suitable, deposited on beaches for purposes of renourishment, with the exception of (G) of this Subsection (b)(2).

(C) Confinement of excavated materials shall be on high ground landward of regularly and irregularly flooded marshland and with adequate soil stabilization measures to prevent entry of sediments into the adjacent water bodies or marsh.

(D) Effluent from diked areas receiving disposal from hydraulic dredging operations must be contained by pipe, trough, or similar device to a point waterward of emergent vegetation or, where local conditions require, below mean low water.

(E) When possible, effluent from diked disposal areas shall be returned to the area being dredged.

(F) A water control structure must be installed at the intake end of the effluent pipe.

(G) Publicly funded projects will be considered by review agencies on a case by case basis with respect to dredging methods and spoil disposal.

(H) Dredge spoil from closed shellfish waters and effluent from diked disposal areas used when dredging in closed shellfish waters shall be returned to the closed shellfish waters.

(3) Drainage Ditches

(A) Drainage ditches located through any marshland shall not exceed six feet wide by four feet deep (from ground surface) unless the applicant can show that larger ditches are necessary for adequate drainage.

(B) Spoil derived from the construction or maintenance of drainage ditches through regularly flooded marsh must be placed landward of these marsh areas in a manner that will insure that entry of sediment into the water or marsh will not occur. Spoil derived from the construction or maintenance of drainage ditches through irregularly flooded marshes shall be placed on non-wetlands wherever feasible. Non-wetland areas include relic disposal sites.

(C) Excavation of new ditches through high ground shall take place landward of a temporary earthen plug or other methods to minimize siltation to adjacent water bodies.

(D) Drainage ditches shall not have a significant adverse effect on officially designated primary nursery areas, productive shellfish beds, submerged grass beds, or other documented important estuarine habitat. Particular attention should be placed on the effects of freshwater inflows, sediment, and nutrient introduction. Settling basins, water gates, retention structures are examples of design alternatives that may be used to minimize sediment introduction.

(4) Nonagricultural Drainage

(A) Drainage ditches must be designed so that restrictions in the volume or diversions of flow are minimized to both surface and ground water.

(B) Drainage ditches shall provide for the passage of migratory organisms by allowing free passage of water of sufficient depth.

(C) Drainage ditches shall not create stagnant water pools or significant changes in the velocity of flow.

(D) Drainage ditches shall not divert or restrict water flow to important wetlands or marine habitats.

(5) **Marinas.** Marinas are defined as any publicly or privately owned dock, basin or boat storage facility constructed to accommodate more than 10 boats, and providing any of the following services: permanent or temporary docking space; dry stack storage; haul-out facilities and repair services. Excluded from this definition are boat ramp facilities allowing access only and none of the preceding services.

(A) Marinas which require dredging shall not be located in primary nursery areas, nor in areas which require dredging through primary nursery areas for access. Maintenance dredging in primary nursery areas for existing marinas will be considered on a case-by-case basis.

(B) Marinas should be developed on non-wetland sites or in deep waters (areas not requiring dredging) and should not disturb valuable shallow water and wetland habitat, except for dredging necessary for access to high ground sites. The following four alternatives for siting marinas are ranked in order of preference:

(i) an upland site requiring no alteration of wetland or estuarine habitat, and providing adequate flushing by tidal or wind generated water circulation;

(ii) an upland site requiring dredging for access when the necessary dredging will cause no significant adverse impact on fishery or wetland resources;

(iii) a deep water site not a primary nursery area, with no excavation or wetland alteration;

(iv) a marina requiring excavation of relatively unproductive estuarine substrate to a depth no greater than the depth of the connecting channels. Projects shall be designed to use the highest of these four priorities that is feasible.

(C) Marinas should:

(i) be designed to minimize use of public waters by encouraging a mixture of dry storage areas, public launching facilities, and berthing spaces;

(ii) shall prominantly display a sign at the marina showing the location of the nearest

pumpout facility, listing the telephone numbers of local septic tank pumping services, and including other appropriate waste disposal information; [provision (ii) applies only to permits applied for after January 31, 1982]; and

(iii) demonstrate the implementation of all necessary means and measures to minimize the impact of pollutants likely to be emitted by the operation of the marina and attendance vessels upon the natural systems including providing grease and sediment traps for storm water runoff.

[D] Marinas shall be designed to minimize adverse effects on navigation and public use of waters while allowing the applicant adequate access to deep waters.

[E] Marinas shall not be enclosed within breakwaters that preclude circulation sufficient to maintain water quality.

[F] Marinas which require dredging shall provide acceptance areas to accommodate disposal needs for future maintenance dredging.

[6] Docks and Piers

[A] Docks and piers shall not significantly interfere with water flows.

[B] To preclude the adverse effects of shading marsh vegetation, structures which are built over vegetated marsh shall not exceed six feet in width, except that "T"s or platforms at the waterward end are not restricted to these dimensions but cannot have a total area of more than 500 square feet.

[C] Piers shall be designed to minimize adverse effects on navigation and public use of waters, while allowing the applicant adequate access to deep waters.

[D] Pier alignments along federally maintained channels must meet Corps of Engineers District guidelines.

[E] Piers shall not extend beyond the established pier length along the same shoreline for similar use, and in no case extend more than one-third of the width of a natural water body or man-made canal or basin.

[F] Piers shall not interfere with the access to any riparian property and shall have a minimum setback

of 15 feet between any part of the pier and the 12.36
adjacent property owner's areas of riparian
access. The line of division of areas of riparian 12.37
access shall be established by drawing a line
along the channel or deep water in front of the 12.38
properties, then draw a line perpendicular to the
line of the channel so that it intersects with the 12.39
shore at the point the upland property line meets
the water's edge. The minimum setback provided in
the regulation may be waived by the written 12.40
agreement of the adjacent riparian owner(s) or 12.41
when two adjoining riparian owners are co-
applicants. Should the adjacent property be sold 12.42
before construction of the pier commences, the
applicant shall obtain a written agreement with 12.43
the new owner waiving the minimum setback and 12.44
submit it to the permitting agency prior to
initiating any development of the pier. 12.45
Application of this Regulation may be aided by 12.46
reference to an approved diagram illustrating the
regulation as applied to various shoreline 12.48
configurations. Copies of the diagram may be
obtained from the North Carolina Administrative
Procedures Section of the Attorney General's 12.49
Office or the Office of Coastal Management.

(G) Docks and piers shall not significantly interfere 12.50
with shellfish franchises or leases. Applicants 12.51
for authorization to construct a dock or pier
shall provide notice of the permit application or 12.52
exemption request to the owner of any part of a
shellfish franchise or lease over which the 12.53
proposed dock or pier would extend.

(7) Bulkheads and Shore Stabilization Measures 12.54

(A) Bulkhead alignment, for the purpose of shoreline 12.56
stabilization, must approximate mean high water or 12.57
normal water level.

(B) Bulkheads shall be constructed landward of 13.1
significant marshland or marshgrass fringes. 13.2

(C) Bulkhead fill material shall be obtained from an 13.3
approved upland source, or if the bulkhead is a 13.4
part of a permitted project involving excavation
from a non-upland source, the material so obtained 13.5
may be contained behind the bulkhead.

(D) Bulkheads or other structures employed for 13.6
shoreline stabilization shall be permitted below 13.7
approximate mean high water or normal water level 13.8
only when the following standards are met:

(i) the property to be bulkheaded has an identifiable erosion problem, whether it results from natural causes or adjacent bulkheads, or it has unusual geographic or geologic features, e.g. steep grade bank, which will cause the applicant unreasonable hardship under the other provisions of this Regulation;

(ii) the bulkhead alignment extends no further below approximate mean high water or normal water level than necessary to allow recovery of the area eroded in the year prior to the date of application, to align with adjacent bulkheads, or to mitigate the unreasonable hardship resulting from the unusual geographic or geologic features;

(iii) the bulkhead alignment will not result in significant adverse impacts to public trust rights or to the property of adjacent riparian owners;

(iv) the need for a bulkhead below approximate mean high water or normal water level is documented in the Field Investigation Report or other reports prepared by the Office of Coastal Management; and

(v) the property to be bulkheaded is in a nonoceanfront area.

(E) Where possible, sloping rip-rap, gabions, or vegetation may be used rather than vertical seawalls.

(8) Beach Nourishment

(A) Beach creation and/or maintenance may be allowed to enhance water related recreational facilities for public, commercial, and private use.

(B) Beaches can be created and/or maintained in areas where they have historically been found due to natural processes. They will not be allowed in areas of high erosion rates where frequent maintenance will be necessary.

(C) Placing unconfined sand material in the water and along the shoreline will not be allowed as a method of shoreline erosion control.

(D) Material placed in the water and along the shoreline shall be clean sand free from pollutants and highly erodible finger material. Grain size shall be equal to or larger than that found naturally at the site.

(E) Material from dredging projects can be used for beach nourishment if:
(i) it is first handled in a manner consistent with regulations governing spoil disposal;
(ii) it is allowed to dry for a suitable period; and
(iii) only that material of acceptable grain size is removed from the disposal site for placement on the beach. Material shall not be placed directly on the beach by dredge or dragline during maintenance excavation.

(F) Beach creation shall not be allowed in any designated primary nursery areas, nor in any areas where siltation from the site would pose a threat to shellfish beds.

(G) Material shall not be placed on any coastal wetlands or submerged aquatic vegetation.

(H) Material shall not be placed on any submerged bottom with significant shellfish resources.

(I) Beach construction shall not create the potential for filling adjacent or nearby navigation channels, canals, or boat basins.

(J) Beach construction shall not violate water quality standards.

(K) Permit renewal of these projects shall require an evaluation of any adverse impacts of the original work.

(L) Permits issued for this development shall be limited to authorizing beach nourishment only one time during the life of the permit. Permits may be renewed for maintenance work or repeated need for nourishment.

(9) Wooden and Riprap Groins

(A) Groins shall not extend more than 25 ft. waterward of the mean high water or normal water level unless a longer structure can be justified by site specific conditions, sound engineering and design principals.

(B) Groins shall be set back a minimum of 15 ft. from the adjoining property lines. This setback may be waived by written agreement of the adjacent riparian owner(s) or when two adjoining riparian owners are co-applicants. Should the adjacent property be sold before construction of the groin commences, the applicant shall obtain a written agreement with the new owner waiving the minimum setback and submit it to the permitting agency

prior to initiating any development of the groin.
(C) Groins shall pose no threat to navigation.
(D) The height of groins shall not exceed 1 ft. above mean high water or the normal water level.
(E) No more than two structures shall be allowed per 100 ft. of shoreline unless the applicant can provide evidence that more structures are needed for shoreline stabilization.
(F) "L" and "T" sections shall not be allowed at the end of groins.
(G) Riprap material used for groin construction shall be free from loose dirt or any other pollutant in other than non-harmful quantities and of a size sufficient to prevent its movement from the site by wave and current action.

History Note: Statutory Authority G.S. 113A-107(a); 113A-107(b); 113A-113(b); Eff. September 9, 1977; Amended Eff. July 1, 1983; May 1, 1983; February 1, 1983; December 1, 1982.

.0209 ESTUARINE SHORELINES

(a) Rationale. As an AEC, estuarine shorelines, although characterized as dry land, are considered a component of the estuarine system because of the close association with the adjacent estuarine waters. This Section defines estuarine shorelines, describes the significance, and articulates standards for development.

(b) Description. Estuarine shorelines are those non-ocean shorelines which are especially vulnerable to erosion, flooding, or other adverse effects of wind and water and are intimately connected to the estuary. This area extends from the mean high water level or normal water level along the estuaries, sounds, bays, and brackish waters as set forth in an agreement adopted by the Wildlife Resources Commission and the Department of Natural Resources and Community Development [described in Regulation .0206(a) of this Section] for a distance of 75 feet landward.

(c) Significance. Development within estuarine shorelines influences the quality of estuarine life and is subject to the damaging processes of shore front erosion and flooding.

(d) Management Objective. To ensure shoreline development is compatible with both the dynamic nature of estuarine shorelines and the values of the estuarine system.

(e) Use Standards

(1) All development projects, proposals, and designs shall substantially preserve and not weaken or eliminate

natural barriers to erosion, including, but not limited to, peat marshland, resistant clay shorelines, cypress-gum protective fringe areas adjacent to vulnerable shorelines.

(2) All development projects, proposals, and designs shall limit the construction of impervious surfaces and areas not allowing natural drainage to only so much as is necessary to adequately service the major purpose or use for which the lot is to be developed. Impervious surfaces shall not exceed 30 percent of the AEC area of the lot, unless the applicant can effectively demonstrate, through innovation design, that the protection provided by the design would be equal to or exceed the protection by the 30 percent limitation.

(3) All development projects, proposals, and designs shall comply with the following mandatory standards of the North Carolina Sedimentation Pollution Control Act of 1973:

(A) All development projects, proposals, and designs shall provide for a buffer zone along the margin of the estuarine water which is sufficient to confine visible siltation within 25 percent of the buffer zone nearest the land disturbing development.

(B) No development project proposal or design shall permit an angle for graded slopes or fill which is greater than an angle which can be retained by vegetative cover or other adequate erosion-control devices or structures.

(C) All development projects, proposals, and designs which involve uncovering more than one acre of land shall plant a ground cover sufficient to restrain erosion within 30 working days of completion of the grading; provided that this shall not apply to clearing land for the purpose of forming a reservoir later to be inundated.

(4) Development shall not have a significant adverse impact on estuarine resources.

(5) Development shall not significantly interfere with existing public rights of access to, or use of, navigable waters or public resources.

(6) No major public facility shall be permitted if such facility is likely to require extraordinary public expenditures for maintenance and continued use, unless it can be shown that the public purpose served by the facility outweighs the required public expenditures for construction, maintenance, and continued use. For the

purpose of this standard, "public facility" shall mean a project which is paid for in any part by public funds.

(7) Development shall not cause major or irreversible damage to valuable, documented historic architectural or archaeological resources.

History Note: Filed as a Temporary Amendment Eff. December 18, 1981, for a Period of 120 Days to Expire on April 15, 1982; Statutory Authority G.S. 113A-107(b); 113A-108(a); 113A-113(b); Eff. September 9, 1977; Amended Eff. December 1, 1982; April 1, 1982; June 1, 1980; October 23, 1979.

REVIEW OF RECENT CHANGES IN THE MUNICIPALITIES OF ROPER AND CRESWELL

ROPER

In 1980, Roper was constructing a new central sanitary sewer system. Since that time, the town has made considerable progress in tapping existing development to the new sanitary sewers. Also, the town placed a high emphasis on deteriorating city streets and drainage structures. In recent years, the town has been extremely successful in securing community development block grants and has used a substantial portion of this money for street improvements and drainage improvements including the construction of storm sewers.

Roper also expressed concern about Federal flood insurance regulatory requirements and emergency management services. At the earliest opportunity, the Town of Roper cooperated effectively with Washington County and has secured program compliance under the Federal Flood Insurance Program through the county Department of Public Works and Planning. This same county department provides hurricane and flood evacuation services. The County Director of Public Works and Planning also serves as the Emergency Management Coordinator and the level of services has been improved and stabilized. Both Roper and Creswell expressed concern over the county's emergency management effort in 1980.

The county Sheriff's Department is providing limited animal control services within the city limits of Roper. The Sheriff and the Roper City Council are continuing discussions on overall police protection concerns in Roper.

Roper also expressed concern over a lack of employment and housing opportunities in 1980. Since that time, new subsidized

housing units have been constructed by the Mid-East Housing Commission in Roper. Also, the construction of a small shopping center near the old Roper Elementary school campus has produced a few additional jobs. Recreation opportunities continue to be a concern.

CRESWELL

In 1980, Creswell was also completing the construction of a new central sanitary sewer system. Since that time, the town has concentrated on tapping the existing development to the new system in developing an operating and maintenance program. Creswell shared Roper's concern about the county's ability to provide realistic emergency management services. This service, as in the case of Roper, has been improved by assigning this function to the County Director of Public Works and Planning. Another concern shared by both towns was the limited employment opportunities available in or near Creswell. This situation has not changed materially except that First Colony Farms has drastically reduced its workforce.

Since 1980, the Town of Creswell, in conjunction with the Soil Conservation Service has completed a sizable flood control project. This project included the construction of a substantial dike system and has been extremely effective in managing stormwater. The Town of Creswell also praticipates in the County's flood insurance inspections and permit program.

In Creswell, municipal officials also appear to remain concerned about adequate police protection. Both towns continue to be sensitive to the need to convert agricultural land within the city limits to developed uses in order to get maximum revenue from utility systems and to enhance the tax base. Since 1980, 20 units of subsidized housing has been added to the Creswell housing stock and are owned and managed by the Mid-East Housing Commission. Land use conversion has increased but at a very slow rate.

MARTIN COUNTY
BERTIE COUNTY
PLYMOUTH
POP. 4,571
ROANOKE RIVER
BACHELOR BAY
Plymouth Municipal Airport
Christian Hope Ch.
Union Ch.
Hoke
Hinson
Ren
Westover
Albemarle Beach
Mackeys
ROPER
POP. 795
Lewis Canal
Canal
Canal A
Canal B
Canal C
Main Canal
Wenona
VAN SWAMP
EAST DISMAL SWAMP
PUNGO NATIONAL WILDLIFE REFUGE
PUNGO
PETTIGREW LAKE
TO JAMESVILLE
TO SUFFOLK
Beasley
Stimersville
Pleasant Grove
Mill Creek
Mackeys Creek
Canaby Creek
Welch Creek
Lenarrah Pond
Batemans Beach
Pike
Dismal
CAROLINA AND NORTHWESTERN RAILWAY
35°45'
35°50'
35°55'
76°45'
76°40'

DATE DUE

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