

SOIL SURVEY

Pasquotank County North Carolina



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with the
NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

How to Use THE SOIL SURVEY REPORT

THE soil survey of Pasquotank County was made to find out the nature and extent of each kind of soil. Soil scientists walked across the fields and through the woodlands. Wherever each one went, he examined the surface soils and subsoils; looked closely at the lay of the land; and watched for differences in the crops, weeds, brush, and trees that were growing on the different soils. He carried a photograph made from an airplane that flew directly overhead, and on it he plotted boundaries of the soils. He placed a symbol in each area to tell what kind of soil he saw there.

This report contains a description of each soil and statements about what that soil will do under different kinds of use and treatment. Soil maps of the entire county have been printed on the aerial photographs, which were pieced together to make a mosaic. Roads, houses, streams, and other important landmarks and places have been marked on the aerial mosaic. You can also see the woodlands, the open fields, and something about how the fields are arranged. Remember, however, that the photographs were made in 1938, and that if woodlands have been cleared or if fields have been rearranged since, the map will not show them.

Find Your Farm on the Map

Look at the small map of the county in the back of this report. It shows the main roads and streams and several place names. Look at the part of the county where your farm is located and notice the big black number in the rectangle. That number tells you the map sheet on which you will find your farm. If your farm is near the edge of a sheet, you will have to check its exact location on the large-scale maps.

Look at the red lines that are boundaries of different kinds of soils. Each kind of soil is marked by a letter symbol, also printed in red. Usually, the letter symbol is inside the area it identifies, but if the area is too small, the symbol is outside and connected to the area by a straight line.

Make a list of the different symbols on your farm and then turn to the map legend in the back of this report, where each symbol is followed by the name of the soil it identifies. You are now ready to learn about the strong points and shortcomings of your soils and what you can do to take care of your soils and get best returns year after year.

Suppose you have found soil Pa, Pasquotank silt loam, on your farm. How does this soil look in the field? What does it need to control runoff and erosion? How is it used? How much will it produce? These questions are answered in the report.

Pasquotank silt loam and all other soils mapped in Pasquotank County are described in the section Soil Series, Types, and Phases. After you have read about the Pasquotank silt loam, you will want to know how much it can produce. For this information turn to

table 6 in the section Estimated Expectable Yields. This table gives expected yields under two levels of management—the management commonly practiced and improved management. You will notice that yields of most crops increase on this soil if improved management is used.

What should be done to take care of the soil and to get the better yields given in table 6? The answer to this is found by first noting that Pasquotank silt loam is in Management Group 2 (see last column in the map supplement), and then by turning to Management Group 2 in the section Management Groups of Soils.

Management Group 2 consists of Pasquotank silt loam, Pasquotank very fine sandy loam, and Weeksville silt loam, all of which need about the same kind of management. Read about the ordinary management needed to get the yields in columns A of table 6, and about the better management needed to get the higher yields given under columns B.

Make a Farm Plan

Study your soils to see whether you have been cultivating any that usually do not produce well. Compare the yields you have been getting with those you could expect under different management. Then, decide whether or not you should change your method of farming or the use of these soils. The choice, of course, must be yours. You may need help in making your own farm plan if you decide to change your methods. This report will help you in planning, but it is not a plan of management for your farm or any other single farm in the county.

For help in farm planning, consult members of the Soil Conservation Service, or the county agricultural agent. Members of your State agricultural experiment station staff and others familiar with farming in your county will also be glad to help.

Soils of the County as a Whole

Many users of this report will want to know something about the kinds of soils that occur in each part of the county. The section, Soil Associations, will be useful to them. Information about the climate, agriculture, and several other subjects appear in other sections of the report. A technical discussion of the formation of the soils of the county is given in the section, Morphology and Genesis of Soils. The general character of the area is given in a section of that name.

This publication on the soil survey of Pasquotank County, North Carolina, is a cooperative contribution from the—

SOIL CONSERVATION SERVICE
and the
NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

SOIL SURVEY OF PASQUOTANK COUNTY, NORTH CAROLINA

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United States Department of Agriculture in Cooperation with the North Carolina Agricultural Experiment Station

Contents

	Page		Page		Page
The soils of Pasquotank County	2	The soils of Pasquotank County—		Soil associations	38
General nature of the soils	2	Continued		1. Pasquotank-Barclay-Weeksville	38
Soils and their relations	2	Soil series, etc.—Continued		2. Bertie-Othello	38
Soil series, types, and phases	4	Othello series—Continued		3. Othello-Bertie-Dragston	40
Barclay series	5	Othello very fine sandy loam	18	4. Pocomoke-Portsmouth	40
Barclay very fine sandy loam	5	Deep phase	18	5. Bayboro	40
Bayboro series	5	Pasquotank series	19	6. Elkton-Bladen	40
Bayboro loam	5	Pasquotank silt loam	19	7. Mucky peat-Swamp	41
Thick surface phase	6	Pasquotank very fine sandy loam	19	Morphology and genesis of soils	41
Sandy substratum phase	6	Pocomoke series	20	Factors of soil formation in Pasquotank County	41
Bayboro mucky loam	6	Pocomoke fine sandy loam	20	Parent material	41
Burned phase	6	Pocomoke loam	20	Climate	41
Bertie series	7	Pocomoke mucky loam	20	Vegetation	41
Bertie fine sandy loam	7	Portsmouth series	21	Relief	42
Bertie very fine sandy loam	7	Portsmouth fine sandy loam, sandy substratum phase	21	Time	42
Deep phase	8	Sassafras series	21	Classification of soils	42
Bibb series	8	Sassafras loamy fine sand	21	Morphology of soils by great soil groups	44
Bibb soils	8	Stono series	21	Gray-Brown Podzolic soils	44
Bladen series	8	Stono fine sandy loam	21	Low-Humic Gley soils	45
Bladen silt loam	8	Stono very fine sandy loam	22	Humic Gley soils	46
Sandy substratum phase	8	Swamp	22	Regosols	46
Bladen fine sandy loam, sandy substratum phase	9	Weeksville series	23	Miscellaneous land types	47
Borrow pits	9	Weeksville silt loam	23	Forests and other natural vegetation	47
Dragston series	9	Woodstown series	23	Forest use and management	48
Dragston fine sandy loam	9	Woodstown fine sandy loam	23	Scientific and common names of the plant species	49
Dragston very fine sandy loam	9	Management groups of soils	24	Agriculture	50
Elkton series	9	Management group 1	24	Agricultural history	50
Elkton silt loam	10	Management group 2	25	Crops	50
Thick surface phase	10	Management group 3	25	Corn	50
Sandy substratum phase	11	Management group 4	26	Soybeans	51
Elkton fine sandy loam, sandy substratum phase	11	Management group 5	26	Potatoes	51
Fallsington series	12	Management group 6	27	Cabbage	51
Fallsington fine sandy loam	12	Management group 7	27	Minor crops	51
Galestown series	12	Management group 8	27	Pasture	51
Galestown loamy fine sand	12	Management group 9	28	Livestock and livestock products	51
Klej series	13	Management group 10	28	Land use	52
Klej loamy fine sand	13	Management group 11	29	Types and sizes of farms	52
Lenoir series	13	Management group 12	29	Farm tenure and labor	53
Lenoir very fine sandy loam	13	Management group 13	30	Farm power and mechanical equipment	53
Sandy substratum phase	13	Management group 14	30	General character of the area	53
Made land and dumps	14	Management group 15	30	Location and extent	53
Matapeake series	14	Management group 16	31	Physiography, relief, and drainage	53
Matapeake fine and very fine sandy loams	14	Management group 17	31	age	53
Mattapex series	14	General management practices for Pasquotank County soils	31	Water supply	54
Mattapex very fine sandy loam	14	Drainage	31	Climate	54
Deep phase	15	Fertilizing and liming	32	Early history	55
Mattapex fine sandy loam	15	Maintenance of organic matter	33	Organization and population	55
Mucky peat	15	Crop rotations	33	Industries	55
Nixonton series	17	Tillage	35	Transportation and markets	55
Nixonton very fine sandy loam	17	Planting and harvesting	35	Community facilities	55
Othello series	17	Control of insect pests	35	Soil survey methods and definitions	55
Othello fine sandy loam	18	Estimated expectable yields	35	Glossary	56
		Capability groups of soils	37	Literature cited	57
		Capability classes and subclasses in Pasquotank County	37		

¹ Report revised by R. C. Jurney, U. S. Department of Agriculture.

² Field work for this survey was done while Soil Survey was a part of the Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration. Soil Survey was transferred to the Soil Conservation Service on November 15, 1952.

PASQUOTANK COUNTY, in the Tidewater section of northeastern North Carolina, occupies a nearly level plain or marine terrace that has slow to very slow surface drainage. Many of the soils are poorly or somewhat poorly drained. Drainage is the chief problem in land uses and soil management, and practically all the cultivated land has some artificial drainage. The climate is mild, and rainfall is adequate and fairly evenly distributed. The county is primarily agricultural, but lumbering and the preparation of forest products are also important. Corn, soybeans, potatoes, and cabbage are the main cash crops. Sweetpotatoes, oats, lespedeza, snap beans, peanuts, cotton, and sweet corn are also grown. Some beef cattle and hogs are raised. To provide a basis for agricultural uses of the land, this cooperative soil survey was made by the United States Department of Agriculture and the North Carolina Agricultural Experiment Station. Field work was completed in 1949, and all statements in this report refer to conditions at that time.

The Soils of Pasquotank County

General Nature of the Soils

The soils of Pasquotank County are similar to those of the surrounding counties in North Carolina and Virginia. They have formed in a temperate climate in which winters are not cold and summers not very hot. Rainfall is moderately high and is well distributed. The effect of climate on soil formation has been influenced greatly by the nearly level, level, or depressed relief. Many of the soils have poor drainage and relatively high ground-water tables, as is indicated by the dominantly gray or gray mottled subsoil layers. Well drained and moderately well drained soils cover about 3 percent of the county; somewhat poorly drained soils, 12 percent; and poorly and very poorly drained soils, 85 percent. Many of the poorly drained soils are friable and porous, and their poor drainage results from a high water table.

Practically all the soils of the county have formed under a forest vegetation, principally hardwoods. Although less organic matter is added to the soil under forest cover

than under a grass vegetation, lack of adequate drainage has caused an accumulation of much organic material on some soils.

The soils were derived from unconsolidated beds of loamy sands, sandy loams, silts, and clays. They vary widely in texture, color, consistence, and organic-matter content. In texture the range is from soils with loamy sand throughout the profile to soils with silt loam or clay loam surface soils and dense silty clay or clay subsoils. The organic-matter content varies from 1 or 2 percent in the lighter colored cultivated soils to about 30 percent in the darker colored uncultivated, or even cultivated, soils. Some of the uncleared organic soils in the Dismal Swamp section have as much as 90 percent organic matter. Generally the soils are strongly to very strongly acid to a depth of about 3 feet. The substrata in places are slightly acid to neutral.³

The texture, structure, and consistence of the soil layers largely determine land use, as well as the ease or difficulty of draining and working the soils. Coarse-textured friable soils naturally are less difficult to drain and easier to handle. In addition, they are suited to a wider variety of crops than soils having fine-textured firm layers, such as silty clay or clay, in the profile. Potatoes, snap beans, early sweet corn, cabbage, and, when possible, the general crops are grown largely on the more friable and permeable soils. Soils with dense silty clay or clay subsoils are planted almost exclusively to corn, soybeans, pasture, and lespedeza. On the more friable and permeable soils, crops are injured less during extremely wet or dry seasons and yields average somewhat higher than on the firmer, less permeable soils having fine-textured layers in their profiles.

Soils and Their Relations

The soils of Pasquotank County have been placed in 22 series and 4 miscellaneous land types. The general characteristics and relations of the soil series are given in table 1. Mapped as miscellaneous land types are Mucky peat, Swamp, Borrow pits, and Made land and dumps.

³ Field tests for acidity were made with Hellige soil-testing kit.

TABLE 1.—*Soil series of Pasquotank County, N. C., grouped according to surface soil and subsoil characteristics and natural drainage*

Characteristics		Natural drainage					
Surface soil ¹	Subsoil ²	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
Light colored; sandy; very low in organic matter.	Light yellowish brown to yellow; sandy.	Galestown ³					
Same	Yellowish red in upper part; strong brown in lower part; loamy.	Sassafras ³					
Same	Yellowish brown in upper part; pale yellow mottled with light gray and yellowish brown in lower part; sandy.			Klej ⁴			
Same	Dark brown in upper part; strong brown, yellowish brown, or yellowish red in lower part; clay loam or loam.		Matapeake ³				
Same	Reddish yellow in upper part; mottled in lower part; loamy; pockets of sandy clay loam in lower part.			Woodstown			
Same	Brown in upper part; mottled in lower part; clay loam or loam; interbedded fine sandy loam in lower part.			Mattapex			
Same	Yellowish brown in upper part; mottled in lower part; loamy.			Nixonton			
Same	Mottled shades of yellow and gray; loamy.				Barclay ⁵		
Same	Mottled shades of yellow, brown, and gray; clay loam or loam; interbedded textures in lower part.				Bertie ⁵		
Light colored; loamy; very low in organic matter.	Mottled shades of brown, yellow, and gray; loamy; interbedded textures.				Dragston ⁵		
Same	Mottled, mostly shades of brown and gray; clayey; loamy in lower part.				Lenoir		
Same	Gray or light gray mottled with yellow and brown; loamy.				Bibb ⁶		
Same	Light brownish gray or light olive gray; loamy.					Pasquotank ⁵	
Same	Gray or light gray mottled with shades of brown; clay loam or loam; interbedded textures in places.					Othello ⁵	
Same	Light gray or light brownish gray mottled with pale yellow; loamy; lenses or pockets have fine texture.					Fallsington ⁵	
Same	Gray or light gray mottled with yellowish brown; clayey.					Elkton ⁵	
Same	Mottled, mostly with shades of yellow and gray; loamy; clayey pockets or layers in places.				Stono ⁴		
Dark colored; loamy; low in organic matter.	Gray or light gray mottled with strong brown and yellowish brown; clayey in upper part; loamy in lower part.						Bladen. ^{5 7}
Same	Mottled gray, light brownish gray, white, and yellowish brown; loamy; lenses or pockets of silty clay loam in lower part.						Weeks-ville. ^{5 7}

See footnotes at end of table.

TABLE 1.—*Soil series of Pasquotank County, N. C., grouped according to surface soil and subsoil characteristics and natural drainage—Continued*

Characteristics		Natural drainage					
Surface soil ¹	Subsoil ²	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
Same-----	Gray and light gray mottled with yellow; loamy; fine sandy loam interbedded.						Portsmouth. ⁵
Dark colored; loamy or mucky; low to medium or high in organic matter.	Light gray, gray, or brown; mottled in lower part; loamy; lenses or layers of coarser texture in lower part.						Pocomoke. ⁵
Same-----	Mottled gray, dark gray, and light gray; clayey.						Bayboro. ⁵

¹ The organic-matter content of the surface soil is approximately as follows: Very low, less than 3 percent; low, 3 to 8 percent; medium, 8 to 15 percent; and high, 15 to 40 percent. Very high would be more than 40 percent, as in Mucky peat, a miscellaneous land type not listed in this table.

² Subsoil as described in this table refers to the material directly under the surface soil. It extends to depths ranging from 30 to 42 inches.

³ Somewhat excessively drained to well drained.

⁴ Moderately well drained to somewhat poorly drained.

⁵ Nearly all cultivated areas have been artificially drained by open ditches. Poorly drained areas used for pasture have generally been artificially drained to some extent.

⁶ Somewhat poorly drained to poorly drained.

⁷ Poorly drained to very poorly drained.

Soil Series, Types, and Phases

In this section the soils of the county are described in detail and their agricultural relations are discussed. The acreage and proportionate extent are given in table 2. Use suitability, present management and management requirements, crop adaptations, fertilizer requirements, and expectable average yields are discussed in the sections: Management Groups of Soils, General Management Practices for Pasquotank County Soils, and Estimated Expectable Yields.

TABLE 2.—*Acreage and proportionate extent of the soils mapped in Pasquotank County, N. C.*

Soil	Area		Proportionate extent
	Acres	Percent	
Barclay very fine sandy loam-----	3, 827	2. 6	
Bayboro loam-----	7, 132	4. 9	
Sandy substratum phase-----	2, 877	2. 0	
Thick surface phase-----	796	. 5	
Bayboro mucky loam-----	4, 167	2. 8	
Burned phase-----	2, 094	1. 4	
Bertie fine sandy loam-----	3, 537	2. 4	
Bertie very fine sandy loam-----	3, 405	2. 3	
Deep phase-----	694	. 5	
Bibb soils-----	791	. 5	
Bladen fine sandy loam, sandy substratum phase-----	2, 128	1. 5	
Bladen silt loam-----	4, 260	2. 9	
Sandy substratum phase-----	861	. 6	
Borrow pits-----	158	. 1	
Dragston fine sandy loam-----	2, 672	1. 8	
Dragston very fine sandy loam-----	557	. 4	
Elkton fine sandy loam, sandy substratum phase-----	4, 372	3. 0	

TABLE 2.—*Acreage and proportionate extent of the soils mapped in Pasquotank County, N. C.—Continued*

Soil	Area		Proportionate extent
	Acres	Percent	
Elkton silt loam-----	20, 312	13. 9	
Sandy substratum phase-----	7, 229	4. 9	
Thick surface phase-----	713	. 5	
Fallsington fine sandy loam-----	1, 712	1. 2	
Galestown loamy fine sand-----	503	. 3	
Klej loamy fine sand-----	862	. 6	
Lenoir very fine sandy loam-----	835	. 6	
Sandy substratum phase-----	1, 524	1. 0	
Made land and dumps-----	260	. 2	
Matapeake fine and very fine sandy loams-----	403	. 3	
Mattapex fine sandy loam-----	930	. 7	
Mattapex very fine sandy loam-----	924	. 6	
Deep phase-----	292	. 2	
Mucky peat-----	30, 095	20. 5	
Nixonton very fine sandy loam-----	597	. 4	
Othello fine sandy loam-----	4, 631	3. 2	
Othello very fine sandy loam-----	2, 901	2. 0	
Deep phase-----	367	. 3	
Pasquotank silt loam-----	5, 589	3. 8	
Pasquotank very fine sandy loam-----	1, 667	1. 1	
Pocomoke fine sandy loam-----	2, 955	2. 0	
Pocomoke loam-----	475	. 3	
Pocomoke mucky loam-----	1, 882	1. 3	
Portsmouth fine sandy loam, sandy substratum phase-----	1, 226	. 8	
Sassafras loamy fine sand-----	262	. 2	
Stono fine sandy loam-----	701	. 5	
Stono very fine sandy loam-----	222	. 1	
Swamp-----	9, 279	6. 3	
Weeksville silt loam-----	1, 259	. 9	
Woodstown fine sandy loam-----	1, 625	1. 1	
Total-----	146, 560	100. 0	

Barclay series

Only one member of the Barclay series—Barclay very fine sandy loam—is mapped in the county. It is flat and somewhat poorly drained. It is associated with Nixonton and Pasquotank soils and is intermediate in drainage between them. Drainage is the principal difference among these soils. The profile shows little or no compaction or change in texture above the sandy substratum.

Barclay very fine sandy loam (Ba) is a deep friable soil that has developed under forest cover from fine-textured marine sediments. The subsoil and substratum have distinct medium mottles (11)⁴ of light gray and shades of yellow. The soil is nearly level to very gently sloping. Surface runoff is slow to medium, and internal drainage is medium to slow. The areas of this soil are small to fairly large and occur in Salem and Nixonton Townships.

Profile in a cultivated field:

Surface soil—

0 to 8 inches, light brownish-gray very fine sandy loam; very friable.

Subsoil—

8 to 18 inches, pale-yellow silt loam or very fine sandy loam finely mottled with light gray and brownish yellow; friable to very friable; slightly sticky when wet.

18 to 40 inches, mottled pale-yellow, light-gray, and brownish-yellow silt loam or very fine sandy loam; friable to very friable; slightly sticky when wet.

Substratum—

40 to 60 inches, light-gray intermixed fine sandy loam and loamy fine sand showing mottles of pale yellow and yellowish brown.

The surface soil varies from light brownish gray to brown or dark grayish brown. In places, especially where this soil joins areas of Bertie or Othello soils, pockets or thin lenses of loam or clay loam are in the subsoil. Below depths of 36 to 40 inches the material is variable but is mainly fine or very fine sandy loam and loamy fine sand.

This soil has a very low organic-matter content, usually less than 2 percent. Except in limed areas, field tests indicate that the surface soil and the upper part of the subsoil are medium to strongly acid. The lower part of the subsoil and the substratum are generally medium to slightly acid. The soil is moderately permeable to roots, air, and water, and its water-holding capacity is high. Fertilizer and lime are not rapidly leached out.

Use and suitability.—About 96 percent of this soil is under cultivation, and a small part is in pasture. Potatoes, cabbage, corn, and soybeans are the principal crops. Small tracts are planted to fall snap beans, sweet corn, and pasture. In forested areas the trees are mainly loblolly pine, hickory, yellow-poplar, sweetgum, red maple, and water, willow, and black oaks. There is an undergrowth of shrubs and vines.

Barclay very fine sandy loam is well suited to all crops commonly grown in the area, especially potatoes and corn. It responds to good management and can be built up and kept productive. Artificial drainage is needed in some places, but drainage is not the problem that it is on some of the less permeable soils. The high water table sometimes retards internal drainage. Shallow open ditches with good outlets, spaced 300 to 500 feet apart, seem to provide adequate drainage. (See management group 1.)

Bayboro series

The soils of the Bayboro series occupy flats or broad shallow depressions and are associated with the Bladen and Elkton soils. Except for having a darker surface soil, they are similar to the Bladen soils. The subsoil of all Bayboro soils is light colored. Some areas have an unusually thick surface soil, and in some the mucky loam surface soil has been burned.

Bayboro loam (Bb) is a black or very dark gray soil. It is nearly level and has slow or very slow surface runoff. Internal drainage is medium to very slow. This soil has developed under forest cover from very fine textured marine sediments. A high water table also influenced formation of the soil. The principal areas are near the Dismal Swamp in Mount Hermon, Providence, and Newland Townships.

Representative profile in a forest:

Surface soil—

0 to 10 inches, black loam; friable, slightly sticky when wet; moderate fine and medium granular structure.

10 to 18 inches, intermingled very dark grayish-brown, grayish-brown, gray, and light-gray silt loam; friable, slightly sticky.

Subsoil—

18 to 40 inches, mottled gray, dark-gray, and light-gray clay or silty clay with a few spots or streaks of brownish yellow; firm, plastic.

Substratum—

40 to 60 inches, light olive-gray silty clay loam mottled with gray, brown, and yellowish red and interbedded with silt loam or very fine sandy loam.

The surface soil ranges from about 6 to 18 inches in thickness, but where the layer is thickest there are intermingled shades of gray and of gray and brown in the lower part. Below 36 inches texture varies, and below 48 inches loamy sand is present in places.

The organic-matter content ranges from about 8 to 15 percent; it is normally lower in cultivated fields than in forested areas. Simple field tests indicate that the surface soil and the upper part of the subsoil are strongly acid and that the lower layers of the profile are medium to slightly acid in places. The open surface soil is moderately permeable to roots, air, and water, but the clay or silty clay subsoil is very slowly permeable.

Use and suitability.—About 32 percent of Bayboro loam is cleared, drained, and used for crops or pasture. Corn and soybeans are the principal crops. A few potatoes and some small grains, mainly oats, are grown. Most of the largest area of improved pasture is on this soil. Forested areas have a cover of loblolly pine, sweetgum, blackgum, red maple, yellow-poplar, holly, water oak, swamp chestnut oak, and redbay or swampbay. The undergrowth of shrubs and vines includes gallberry, sweet pepperbush, greenbrier, small cane, and highbush blackberry.

Artificial drainage is needed for successful production of cultivated crops. Closely spaced, shallow, open ditches that have good outlets seem satisfactory for corn and soybeans. Because of its higher content of organic matter, this soil has a much more permeable surface soil than the associated Bladen and Elkton soils. It can be worked under a wider range of moisture content. With adequate drainage and proper fertilization, yields of corn and soybeans are good. The soil is not especially well suited to potatoes because it warms slowly in spring; frost damage is more likely than on better drained soils; and harvesting is difficult in wet seasons. (See management group 11.)

⁴ Italic numbers in parentheses refer to Literature Cited, p. 57.

Bayboro loam, thick surface phase (Bd) is closely associated with Bayboro loam. It differs mainly in having a thicker surface soil. This soil is nearly level and very poorly drained. Surface runoff is slow or very slow, and internal drainage is medium to slow. Its relatively small acreage is in Mount Hermon and Newland Townships.

The surface soil is 24 to 30 inches thick. The upper 10 to 18 inches of this layer, a black friable loam, is underlain by brown friable silt loam, and that, in turn, by gray or light-gray friable silt loam. The 10- to 16-inch subsoil—a gray firm silty clay, clay, or clay loam—is plastic when wet. The substratum is light olive-gray silty clay loam mottled with gray, brown, and yellowish red and interbedded with silt loam or very fine sandy loam. This mottled material continues to the place where it meets loamy sand, usually at depths of 4 to 5 feet.

This soil has a medium content of organic matter. The permeability of the surface soil is moderate to moderately rapid, but the subsoil is slowly permeable.

Use and suitability.—About 93 percent of Bayboro loam, thick surface phase, is in cultivation; about 3 percent is in improved pasture; and the rest is in forest. Corn and soybeans are the principal crops. Potatoes and small grains, mainly oats, are grown on small tracts.

This soil has a medium range of suitability. Intensive drainage is necessary for satisfactory cultivation, but the soil has better internal drainage and a higher moisture-holding capacity than Bayboro loam. It therefore warms earlier in spring, can be worked sooner after heavy rains, and provides moisture for crops longer in extremely dry weather. (See management group 11.)

Bayboro loam, sandy substratum phase (Bc) is similar to Bayboro loam except that it is underlain by loamy sand at depths of 36 to 40 inches. This soil is nearly level and has slow or very slow surface runoff and rapid to very slow internal drainage. It is associated with the sandy substratum phase of Elkton silt loam. It differs from that soil mainly in having a darker color and a higher organic-matter content. It has developed under forest cover from fine-textured marine sediments deposited on sandy material. The areas range from small to fairly large and are mostly in Mount Hermon, Providence, and Newland Townships.

Profile in a forest:

Surface soil—

0 to 10 inches, black loam; friable; weak medium granular structure; organic-matter content about 12 percent.

10 to 14 inches, very dark gray to gray silt loam; friable.

Subsoil—

14 to 32 inches, gray clay or silty clay finely mottled with light gray and strong brown; firm, plastic when wet.

32 to 40 inches, mottled gray, light-gray, yellow, and strong-brown silty clay interbedded with loam; firm.

Substratum—

40 to 60 inches, light-gray loamy fine sand mottled with yellow and yellowish brown and containing pockets of fine sandy loam.

In cultivated fields the surface soil is dark gray to black, and its organic-matter content is about 10 percent.

Except where limed, this soil is usually strongly acid in the surface soil and subsoil. The substratum is less acid. The surface soil is moderately permeable and the subsoil very slowly permeable.

About 523 acres of Bayboro fine sandy loam, a soil not mapped separately in this county, are mapped with this soil. These areas differ mainly in texture and are

included because of their small acreage. They are principally in Newland Township and are associated with Bladen fine sandy loam, sandy substratum phase.

Use and suitability.—About 36 percent of Bayboro loam, sandy substratum phase, has been cleared and drained and is now cultivated or in pasture. Corn and soybeans are the principal crops, but small acreages are in oats and unimproved pasture. Forested areas have the same type of cover as Bayboro loam.

As for Bayboro loam and other soils that have very slowly permeable subsoils, intensive drainage is essential for successful production of cultivated crops. Because it has more organic matter in its surface layer, this soil has better tilth and moisture relations than the associated light-colored Elkton soil, and it can be worked at a wider range of moisture content. (See management group 11.)

Bayboro mucky loam (Be) differs from Bayboro loam mainly in having more organic matter in its surface soil. In cultivated fields the organic-matter content is usually 20 to 30 percent, but it is as high as 50 percent in forested areas. The black mucky loam surface soil ranges from 6 to 18 inches in thickness. It is loose to very friable and has a well-developed granular structure at field moisture conditions. The rest of the profile is like that of Bayboro loam. Included, however, are small areas that have a surface soil 24 to 30 inches thick and that compare with Bayboro loam, thick surface phase. This soil occurs in association with other Bayboro soils and with Mucky peat in Mount Hermon, Providence, and Newland Townships.

Use and suitability.—About 4 percent of Bayboro mucky loam, all in northern Newland Township, is cultivated. Corn and soybeans are the only crops grown. With adequate drainage, yields compare with those obtained on Bayboro loam.

Nearly two-thirds of this soil has a thick cover of cane or reeds and scattered pond and loblolly pines. Red maple, swamp blackgum, willow sprouts, and shrubs and vines are numerous, except in places that recently have been severely burned. The rest of this soil not under cultivation has a young growth of red maple, swamp blackgum, yellow-poplar, ash, holly, and a scattering of pond or loblolly pines. (See management group 11.)

Bayboro mucky loam, burned phase (Bf) is mapped in an area that was severely burned several years ago. It is surrounded by Bayboro mucky loam, Bayboro loam, and Mucky peat, which are somewhat deep. Before it was burned, it was largely Bayboro mucky loam, but now most of the dark-colored mucky surface soil, probably 8 to 24 inches thick originally, has been burned away. This soil is nearly level or slightly depressed, and, except where drained, water stands on the surface most of the time.

Representative profile:

Surface soil—

0 to 2 inches, white, gray, and light-gray silty material consisting of ashes and mineral soil residue; layer is about 1 to 3 inches thick.

2 to 5 inches, black loam or mucky loam; friable and granular in some places and moderately hard or compact in others; about 2 to 6 inches thick.

5 to 12 inches, brown silt loam; friable; many dead roots.

Subsoil—

12 to 36 inches, gray and light-gray clay or silty clay finely mottled with yellowish brown; firm; plastic when wet.

36 to 44 inches, gray and light-gray sandy clay loam or silty clay loam interbedded with fine sandy loam; friable.

Substratum—

44 to 60 inches, gray loamy fine sand with pockets or lenses of fine sandy loam or sandy clay loam.

The profile depth to loamy sand varies from 36 to 48 inches but is about 44 inches in most places.

Field tests indicate that the surface soil and subsoil are strongly acid to medium acid and the substratum is nearly neutral. Permeability is moderate in the surface soil and very slow in the subsoil.

Use and suitability.—The relatively large area of this soil is in one body in the north-central part of Mount Hermon Township. About 30 acres was drained and cleared in 1947, and the rest is idle or used for pasture. The cultivated land is used for corn and soybeans.

The soil was originally forested with mixed hardwoods and conifers, including loblolly and pond pines, red maple, swamp blackgum, redbay, and yellow-poplar. The present vegetation is largely black willow and red maple sprouts, gallberry, pine seedlings, cattails, woolgrass, small cane and other coarse grasses, and sphagnum moss. (See management group 11.)

Bertie series

The Bertie series is made up of light-colored soils on flats. The soils are somewhat poorly drained and differ from the associated Mattapex and Othello soils mainly in drainage. They have poorer drainage than the Mattapex soils and better drainage than the Othello soils. In texture they are intermediate between the Dragston and Lenoir soils.

Bertie fine sandy loam (Bg) differs from Bertie very fine sandy loam chiefly in having a coarser textured surface soil and more medium-sized sand grains throughout its profile. It occupies smooth gentle slopes of less than 2 percent. It is somewhat poorly drained. Runoff is slow to medium, and internal drainage is moderately rapid to slow. This fairly extensive soil has developed under forest cover from medium-textured marine sediments deposited on sandy material. It occurs in central Nixonton and Mount Hermon Townships, southeastern Providence Township, and the extreme eastern part of Newland Township.

Representative profile in a cultivated area:

Surface soil—

0 to 6 inches, light brownish-gray fine sandy loam; very friable.
6 to 10 inches, pale-brown fine sandy loam; very friable.

Subsoil—

10 to 36 inches, mottled brownish-yellow, pale-yellow, and light-gray sandy clay loam or loam interbedded with fine sandy loam in the lower part; firm consistence.

Substratum—

36 to 60 inches, mottled light-gray and pale-yellow loamy fine sand or loamy sand with pockets of sandy clay loam or loam.

The surface soil varies from light brownish gray to pale yellow. Texture and degree of interbedding in the subsoil also vary. In forested areas a thin dark-gray to very dark gray fine sandy loam surface layer has developed underneath the duff.

This soil is very low in organic matter. Simple field tests indicate that the upper part of the profile is strongly acid and that the lower part is slightly acid. The surface soil is rapidly permeable to roots, air, and water, but the subsoil is slowly permeable. The water-holding capacity of the soil is moderately low.

Use and suitability.—About 60 percent of this soil is cultivated; a small part is in pasture. Corn and soybeans are the principal crops. Small acreages are used for potatoes, snap beans, peanuts, sweetpotatoes, cotton, collards, turnips, and kale. Forested areas have loblolly pine, various oaks, sweetgum, red maple, elm, and hickory.

This soil is easy to work and has a wide range of suitability. Some artificial drainage is necessary for the successful production of most crops. The soil tends to dry rapidly when temperatures are high and rainfall is low. Crops are injured more in extremely dry seasons than they are in extremely wet seasons if provision is made for removal of excess surface water. (See management group 5.)

Bertie very fine sandy loam (Bh) is a light-colored somewhat poorly drained soil on smooth gentle slopes of less than 2 percent. Surface runoff is slow to medium, and internal drainage is moderate to slow. The soil has developed under forest cover from fine-textured marine sediments deposited on sandy material. The fairly large acreage is in small to medium bodies, mainly in Salem, Nixonton, and Mount Hermon Townships and in the southeastern corner of Providence Township.

Representative profile in a cultivated area:

Surface soil—

0 to 8 inches, light brownish-gray to pale-brown very fine sandy loam; very friable.
8 to 12 inches, pale-brown very fine sandy loam; very friable.

Subsoil—

12 to 30 inches, mottled yellow, yellowish-brown, and light-gray clay loam or loam with lenses of very fine sandy loam; firm; slightly sticky when wet; weak to moderate medium blocky structure.

30 to 38 inches, light-gray fine sandy loam mottled with yellowish brown and interbedded with sandy clay loam; friable.

Substratum—

38 to 60 inches, light-gray loamy fine sand mottled with strong brown and light yellowish brown.

The surface soil varies from grayish brown to pale brown or brown. In forests a thin layer of dark-gray or very dark gray very fine sandy loam is at the surface. This soil grades into the coarser textured Dragston soils in some places and into the heavier textured Lenoir soils in other places. The texture of the subsoil varies in these areas.

The organic-matter content is usually less than 2 percent. Simple field tests indicate that the upper part of the profile is strongly acid and that the lower part is only slightly acid. The surface soil is moderately permeable to roots, air, and water; the subsoil is slowly permeable. This soil has a moderate water-holding capacity.

Use and suitability.—About 58 percent of Bertie very fine sandy loam is used largely for cultivated crops. A small part is in pasture or is idle. The rest is in forest that includes loblolly pine, oaks, sweetgum, red maple, elm, and hickory. Corn and soybeans are the principal crops. Smaller areas are in potatoes, cabbage, sweet corn, and snap beans.

This soil is fairly easy to handle and has a wide range of suitability. Drainage is not so difficult as in areas of heavier textured soils or in poorly drained areas of similar texture. The comparatively fine texture and low organic-matter content of the surface layer cause the soil to pack and clod if worked when too wet and to become very hard when dry. On this soil, as on Bertie fine sandy

loam, crops are injured more in extremely dry seasons than they are in extremely wet seasons if excess surface water is removed. (See management group 5.)

Bertie very fine sandy loam, deep phase (Bk) is an inextensive soil associated with Bertie very fine sandy loam. It differs from that soil mainly in depth to sandy material. The profiles of the two soils are similar to a depth of about 3 feet. This deep phase has loamy soil at 48 inches or more, as compared to loamy material at 36 to 40 inches for Bertie very fine sandy loam.

This soil varies in texture between depths of 3 and 5 feet. At those depths it consists of interbedded fine sandy loam, loam, and clay loam. Apparently this soil has the same drainage needs and moisture relations as Bertie very fine sandy loam. The two were separated only because the maintenance costs for deep open ditches are greater for this deep soil. Scattered areas of this soil occur in Salem and Nixonton Townships and in the eastern parts of Mount Hermon and Providence Townships.

Use and suitability.—About 45 percent of this soil is cleared and largely under cultivation, and a small part is in pasture. The rest is in forest. The main crops are corn and soybeans. Small areas are used for potatoes, cabbage, oats, and sweet corn.

This soil is easy to work, has a wide range of suitability, and offers only a moderate drainage problem. (See management group 5.)

Bibb series

The soils of the Bibb series in this county are mapped as one unit. They consist of recent alluvium deposited in narrow valleys extending from swamps, along large drainage channels, and on alluvial fans at the bases of slopes that border areas of Mucky peat.

Bibb soils (Bm) are somewhat poorly to poorly drained and variable in texture. To a degree, the texture depends on soils from which the materials have washed. Though flooded at times, these soils are normally not covered with water for long periods, as are the associated areas of Swamp. They usually occur in very small scattered areas. The largest area is along the Newland drainage canal in Newland Township.

Bibb soils have gray to dark-gray friable surface soils about 8 inches thick that vary in texture from fine sandy loam to silty clay loam or clay loam. The friable sub-surface layers, about 24 inches thick, are mostly gray or light-gray loam, silt loam, or silty clay loam, streaked and mottled with yellow and brown. This material, in turn, is underlain by alluvial materials that vary in color, texture, and consistence.

Use and suitability.—Almost all of this unit is in forest; the rest is in pasture or is idle. None of it has been drained. The forest cover is mainly cypress, blackgum, red maple, water oak, holly, willow, oak, elm, ash, yellow-poplar, and a thick growth of vines and briars, including rattan, greenbrier, bamboo vine, Japanese honeysuckle, and wild rose. (See management group 15.)

Bladen series

The Bladen series consists of soils that are on flats or in shallow depressions. These soils are associated with

the Bayboro and Elkton soils. In color they are between the nearly black Bayboro soils and the light-colored Elkton soils. In texture, profile, and drainage the three series are somewhat similar. The subsoil of the Bladen series is about 34 to 41 inches thick. In some areas sandy substrata occur at shallower depths and give rise to sandy substratum phases.

Bladen silt loam (Bo) differs from the associated Elkton soils chiefly in having a darker colored surface soil, and from the associated Bayboro soils in having a lighter colored surface soil. It is nearly level and has slow or very slow runoff. Internal drainage is very slow. The soil has developed under mixed hardwoods and softwoods from fine-textured marine sediments. Its principal areas are in Mount Hermon, Providence, and Newland Townships.

Representative profile in a forest:

Surface soil—

0 to 6 inches, dark-gray to very dark gray silt loam; friable.

6 to 10 inches, mingled grayish-brown and light-gray silt loam; friable.

Subsoil—

10 to 38 inches, gray and light-gray silty clay or clay finely mottled with strong brown and yellowish brown; very firm; plastic when wet; weak medium to coarse blocky structure.

38 to 56 inches, gray and light-gray silty clay loam mottled with strong brown; friable.

Substratum—

56 to 66 inches, mottled light-gray, yellowish-brown, and strong-brown loamy sand.

The surface soil in cultivated fields is usually dark gray and about 8 inches thick. In places the material below 4 feet is loamy sand.

This soil is low in organic matter. According to field tests, the surface soil and upper part of the subsoil are strongly acid. The rest of the profile is medium to slightly acid. The surface soil is moderately permeable, and the subsoil is very slowly permeable.

About 100 acres of Bladen clay loam, which is not mapped separately in this county, are included with this soil. The very small widely scattered bodies of this clay loam usually are in slight depressions. After heavy rains, water stands on this clay loam a longer time than it does on the silt loam. The heavy texture makes the included soil more difficult to work.

Use and suitability.—About 34 percent of Bladen silt loam is cultivated, 64 percent is in forest, and 2 percent is in pasture. Corn and soybeans, grown in a 2-year rotation, are the principal crops. In favorable seasons yields of corn and soybeans are good if management is adequate. If the soil is limed and fertilized, adapted pasture mixtures do well. In forested areas the cover is practically the same as that on the Bayboro soils.

Bladen silt loam has more organic matter and somewhat better tilth than the associated Elkton silt loam. It is difficult to drain and work. Good crop growth is hard to establish. Short periods of very dry or excessively wet weather often injure crops. (See management group 12.)

Bladen silt loam, sandy substratum phase (Bp) is similar to Bladen silt loam except that it is underlain by sand or loamy sand at depths of 30 to 40 inches and has slightly more organic matter. In cultivated areas the surface soil is dark gray and is 4 to 5 percent organic matter, but in forests this layer is very dark gray and contains more organic matter. The soil is nearly level and has slow to very slow surface runoff. Internal drainage is very slow. The relatively small acreage is

principally in north-central Newland Township, eastern Mount Hermon Township, and the southeastern corner of Providence Township.

Use and suitability.—Approximately 47 percent of this soil is used for crops, 3 percent for pasture, and 50 percent for forest. The principal crops are corn and soybeans. A small acreage of lespedeza is grown for seed and hay.

Because this soil has more organic matter than Elkton silt loam, it has somewhat better tilth, absorbs water more readily, can be worked over a slightly wider moisture range, and is less droughty. There also is less need for growing and turning under green-manure crops or adding crop residues to increase organic matter and improve tilth. With favorable weather good pasture can be established and fair to good yields of corn and soybeans can be obtained. Intensive drainage is essential for successful production of cultivated crops. (See management group 12.)

Bladen fine sandy loam, sandy substratum phase (Bn) differs from the sandy substratum phase of Bladen silt loam in having a coarser surface soil and in having more fine and medium sand in the subsoil layers. The surface soil is generally dark gray in cultivated fields and very dark gray in forested areas. Relief is nearly level, and runoff is slow to very slow. Internal drainage is very slow. This soil is principally in Newland Township, but some areas are scattered in eastern Providence Township and in the northwestern and northeastern parts of Mount Hermon Township.

Use and suitability.—About 52 percent of this soil is in crops, 3 percent in pasture, and 45 percent in forest. Corn and soybeans occupy 90 to 95 percent of the cultivated land. Oats, lespedeza, and cotton are minor crops.

This soil has only a medium range of suitability. It is difficult to work. Successful production of most cultivated crops requires intensive drainage. (See management group 12.)

Borrow pits

Borrow pits (Br) are pits or excavations, generally 2 to 3 feet deep, where sand or sandy material has been removed for road building and construction purposes. These small widely separated pits occur mostly in areas of Galestown loamy fine sand, Klej loamy fine sand, Woodstown fine sandy loam, and Sassafras loamy fine sand. In some of the older pits there are thick growths of loblolly pine seedlings. (See management group 17.)

Dragston series

The Dragston series consists of light-colored soils that are on flats. The soils of this series are associated with those of the Fallsington, Stono, and Woodstown series and are similar to them in texture. They are intermediate in drainage between the Fallsington soil and the Woodstown soil, and they differ from Stono soils in having a lighter colored surface soil and less organic matter.

Dragston fine sandy loam (Da) is a friable sandy soil on nearly level to very gently sloping relief. It has slow to medium runoff and medium internal drainage. It has developed under forest cover from moderately coarse to medium-textured marine sediments deposited on sandy

material. The areas are relatively small and are mostly in central Nixonton Township, in the extreme eastern part of Newland Township, and in Mount Hermon and Providence Townships.

Profile in cultivated area:

Surface soil—

0 to 10 inches, grayish-brown fine sandy loam; very friable.

Subsoil—

10 to 18 inches, pale-yellow fine sandy loam mottled with yellowish brown and light gray; very friable but heavier than the surface soil.

18 to 34 inches, mottled yellowish-brown, pale-yellow, and light-gray interbedded fine sandy loam and light loam; friable; small pockets of friable sandy clay in places.

Substratum—

34 to 60 inches, mottled yellow, strong-brown, and white loamy fine sand.

In forested areas the upper 2 inches of the surface soil is very dark brown loose fine sandy loam.

This soil has little organic matter. According to field tests, the surface soil and subsoil are strongly acid and the substratum is medium to slightly acid. These layers are moderately permeable to roots, air, and water. The water-holding capacity of the soil is moderately low.

Use and suitability.—About 84 percent of Dragston fine sandy loam is used for crops, and 2 percent for pasture. The rest is in forest. Potatoes, snap beans, corn, soybeans, and sweet corn are the principal crops. Some cabbage, sweetpotatoes, and peanuts are grown. Forested areas consist of loblolly pines and mixed hardwoods.

This soil is easy to work. Although somewhat poorly drained, it is relatively easy to drain artificially. It is suited to many crops and is responsive to fertilization and other good management. (See management group 3.)

Dragston very fine sandy loam (Db) differs from Dragston fine sandy loam in having finer textured surface soil and more very fine sand throughout its profile. The surface soil and subsoil are essentially the same color. At about 36 inches loamy sand occurs. The soil is friable to very friable throughout and has formed from medium-textured marine sediments deposited on sandy material. This inextensive soil is mainly south and southwest of Elizabeth City and northeast of Union Church in Salem Township.

Use and suitability.—About 87 percent of Dragston very fine sandy loam is under cultivation and 5 percent is in pasture. The rest is in forest. The same kinds of crops, in about the same proportion, are grown on this soil as on Dragston fine sandy loam (fig. 1). Mixed hardwoods and loblolly pines grow in forested areas.

Like Dragston fine sandy loam, this soil responds to good management. It is easy to work and has a wide range of suitability. Because it has more very fine sand in its profile, this soil has a slightly greater water-holding capacity than the fine sandy loam, and plant nutrients do not leach out so rapidly. (See management group 3.)

Elkton series

The soils of the Elkton series occur on flats, where they are light-colored poorly drained associates of Bladen, Lenoir, and Othello soils. In texture they are similar to the Bladen and Lenoir soils. They are not as dark in the surface soil as the Bladen soils and are more poorly drained than the Lenoir. Shallower depths to loamy sand differentiate them from the Othello soils.



Figure 1.—Spring cabbage on Dragston very fine sandy loam. This soil is not so well suited to cabbage as the Pasquotank and Barclay soils but produces good yields under good management. This field received 1,200 pounds of 7-7-7 fertilizer an acre when the plants were transplanted, and then 400 pounds of 14-0-14 and 320 pounds of a mixture of ammonium nitrate and calcium carbonate as a side dressing. The yield was about 13 tons an acre.

Elkton silt loam (Eb) is nearly level soil. Runoff is slow or very slow and internal drainage is very slow. The soil has developed under forest cover from fine-textured marine sediments. Except for Mucky peat, it is the most extensive soil in the county. It is fairly well distributed in small to large bodies.

Profile in a forested area:

Surface soil—

0 to 2 inches, grayish-brown to dark grayish-brown silt loam; very friable; weak medium granular structure.

2 to 14 inches, intermingled gray and light-gray silt loam; very friable.

Subsoil—

14 to 26 inches, gray clay or silty clay finely mottled with yellowish brown; very firm; plastic when wet; weak coarse blocky structure.

26 to 48 inches, intermingled gray and light-gray clay finely mottled with yellowish brown; very firm; plastic when wet.

Substratum—

48 to 54 inches, light-gray fine sandy clay loam mottled with yellowish brown and interbedded with fine sandy loam; friable.

54 to 66 inches, pale-yellow loamy fine sand.

In cultivated fields the surface soil is mostly grayish brown or light brownish gray when moist and white when dry. It is smooth and floury, and in many places in the southern part of the county it is questionable whether the texture is a very fine sandy loam, silt loam, or loam. Areas in Newland Township are more nearly very fine sandy loam than silt loam or loam. Depth of the surface soil ranges from about 8 to 18 inches. This depth is important to drainage, moisture relations, and handling.

This soil is low in organic matter. Field tests indicate that the surface soil and subsoil are strongly acid and that the substratum is slightly acid in places. The surface soil is moderately to slowly permeable; the subsoil is very slowly permeable.

About 264 acres of Elkton fine sandy loam, mostly in Newland Township along or near the Pasquotank River, are included with this soil. The inclusion is not mapped

separately in the county. It differs from this soil mainly in the texture of its surface layer, but its subsoil may have slightly more fine sand.

Use and suitability.—About 31 percent of Elkton silt loam is cultivated, and a small portion of this is idle. Four percent of the soil is in pasture and most of the rest is in forest. A small part is in government reservations. Corn and soybeans are the principal crops. Very small acreages are used for lespedeza, cotton, and oats. Under good management, and with favorable weather, corn and soybean yields are good. Lespedeza for hay or seed does well. Some farmers consider the soil good for cotton. Forested areas have a mixed cover of loblolly pine, sweetgum, red maple, blackgum, elm, water and willow oaks, holly, and hickory. There is an undergrowth of Japanese honeysuckle, greenbrier, waxmyrtle, highbush blackberry, and small cane.

This soil has only a medium range of suitability. Intensive drainage is required for successful production of cultivated crops (fig. 2). The soil is one of the most difficult in the area to drain and to cultivate. Because of the silty texture of the surface soil and low content of organic matter, the soil tends to pack after rains and absorbs water very slowly. It clods if worked too wet and becomes hard on drying. For best results, therefore, it can be worked under a narrow range of moisture conditions. Water stands on the surface for long periods after heavy rains. In dry weather the soil loses moisture rapidly and crops are injured. Unless moisture conditions are favorable at planting time, good stands are hard to obtain. (See management group 12.)

Elkton silt loam, thick surface phase (Ed) is associated with Elkton silt loam and differs from it in depth to clay or silty clay. Relief is nearly level, and runoff is slow or very slow. Internal drainage is very slow. This inextensive soil is mainly in Salem and Nixonton Townships.

In the upper 12 inches the surface soil is light brownish-gray or grayish-brown very friable silt loam; the lower 12 to 18 inches is light brownish-gray or grayish-brown friable silt loam or loam with lenses or pockets of silty clay loam. Gray very firm (plastic when wet) clay or silty clay, finely mottled with yellowish brown, composes the upper part of the 18- to 24-inch subsoil. The lower part consists of gray and light-brown very firm clay finely mottled with yellowish brown. The substratum is light-gray friable sandy clay loam mottled with yellowish brown and interbedded with fine sandy loam.



Figure 2.—Field drains or cross drains on Elkton silt loam (foreground) and Pasquotank silt loam (background). The corn is cultivated on beds to facilitate runoff.

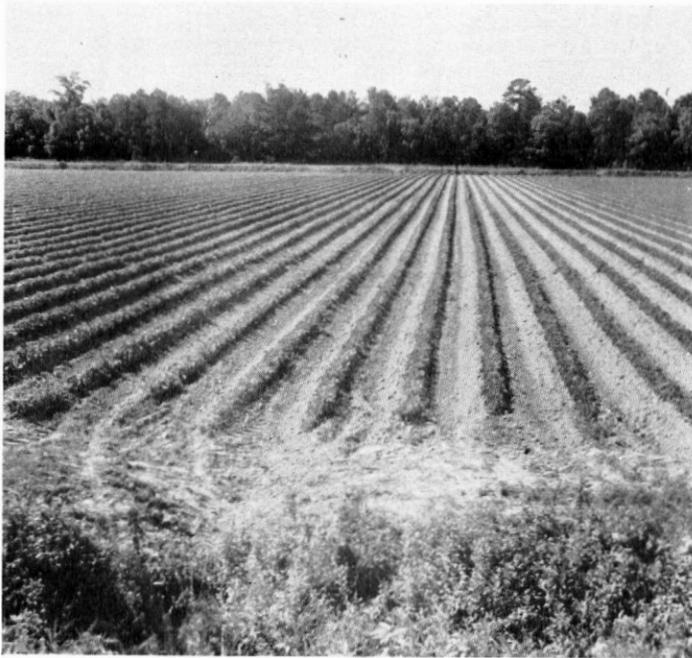


Figure 3.—Young soybeans cultivated in beds on Elkton silt loam, thick surface phase.

Use and suitability.—About 77 percent of this soil is under cultivation, 8 percent is in pasture, and 15 percent is in forest. Corn and soybeans (fig. 3) are the principal crops.

This soil has a medium range of suitability. It usually occupies slightly higher positions than the associated Elkton silt loam, and it has a higher moisture-holding capacity. It is easier to handle and more favorable for general crops, but intensive drainage is necessary for successful production. (See management group 12.)

Elkton silt loam, sandy substratum phase (Ec) is closely associated with Elkton silt loam and differs mainly in having a sandy substratum at depths of 36 to 40 inches. It occurs in nearly level areas and has slow to very slow runoff. Internal drainage is very slow. This is one of the most extensive soils in the southern part of the county. It also occurs in eastern Providence Township and in central and northeastern Newland Township.

Profile in a cultivated area:

Surface soil—

0 to 9 inches, grayish-brown silt loam; very friable; slightly sticky when wet.

Subsoil—

9 to 20 inches, gray and light-gray silty clay finely mottled with yellowish brown; firm; plastic when wet.

20 to 38 inches, gray clay mottled with yellowish brown; firm to very firm; plastic when wet.

Substratum—

38 to 60 inches, mottled gray, light-gray, yellow, and strong-brown loamy fine sand.

Texture of surface soil is the main variation of this soil. In the Newland Township the texture is probably more nearly very fine sandy loam than silt loam. The depth of the surface soil ranges from 8 to 18 inches—an important factor in drainage, moisture relations, and the workability of the soil. In forested areas a thin dark grayish-brown layer is at the surface.

This soil is very low in organic matter. Field tests show that the surface soil and subsoil are strongly acid and that the substratum is medium to slightly acid in places. The surface soil is moderately permeable and the subsoil is very slowly permeable. The water-holding capacity is low.

Use and suitability.—About 30 percent of Elkton silt loam, sandy substratum phase, is under cultivation, but a small part of this is idle every year. About 5 percent is in pasture and 65 percent in forest. Corn and soybeans occupy about 95 percent of the cultivated land, and small acreages are used for oats, lespedeza, and cotton. Most pastures are unimproved. Forested areas have the same species as Elkton silt loam.

This soil has a medium range of suitability. It is very difficult to work, and intensive drainage is required for successful production of cultivated crops. The soil absorbs water slowly, tends to pack after heavy rains, and clods if worked when too wet. It becomes hard on drying and must be worked under a narrow range of moisture conditions. Water stands on the surface for relatively long periods after heavy rains, but the soil dries out rapidly in hot dry weather and crops suffer severely. Unless moisture conditions are favorable at planting time, good stands of corn and soybeans and other crops are difficult to establish. (See management group 12.)

Elkton fine sandy loam, sandy substratum phase (Ea) differs from Elkton silt loam, sandy substratum phase, in having a surface soil with coarser texture, and a subsoil with more fine and medium sand and more interbedded material. It occurs in nearly level areas and is associated with Elkton silt loam, sandy substratum phase, Bladen fine sandy loam, sandy substratum phase, and Othello fine sandy loam. Surface runoff is slow, and internal drainage is very slow. The soil has formed under forest cover from medium- to fine-textured marine sediments deposited on sandy material. It occurs mainly in the central and northern parts of Newland Township. Scattered areas are in the eastern part of Providence, Mount Hermon, and Nixonton Townships.

Profile in a cultivated field:

Surface soil—

0 to 8 inches, light brownish-gray fine sandy loam; very friable.

8 to 12 inches, mottled light-gray and pale-yellow fine sandy loam; very friable.

Subsoil—

12 to 30 inches, light-gray and gray, finely mottled with olive-yellow, sandy clay or clay; thin lenses of fine sandy loam; firm; plastic when wet.

30 to 36 inches, mottled light-gray, yellowish-brown, and strong-brown interbedded sandy clay loam and fine sandy loam; friable.

Substratum—

36 to 60 inches, mottled white, yellowish-brown, and yellow loamy fine sand or loamy sand; contains pockets of loam or friable sandy clay loam.

In places the texture of the surface soil approaches a loam. Where this phase adjoins Othello fine sandy loam the boundaries are somewhat indefinite. In these areas the Elkton soil contains spots of the Othello soil and the Othello contains spots of the Elkton.

This soil is very low in organic matter and has strongly acid surface soil and subsoil. The surface soil is moderately permeable, and the subsoil slowly permeable. The soil has a low water-holding capacity.

Use and suitability.—About 45 percent of Elkton fine sandy loam, sandy substratum phase, is under cultivation and 5 percent is in permanent pasture. The rest is in forest. Corn and soybeans are planted on 90 to 95 percent of the cultivated land. Minor crops are lespedeza, oats, and cotton.

The soil has a medium range of suitability. Intensive drainage is essential for successful production of cultivated crops. This soil, however, is probably slightly more permeable to water than Elkton silt loam because of more interbedding in the subsoil. Furthermore, its surface soil absorbs water more freely, can be worked under a wider range of moisture conditions, and does not pack so hard after heavy rains. (See management group 12.)

Fallsington series

Fallsington fine sandy loam is the only member of the Fallsington series mapped in the county. It is on flats and is associated mainly with soils of the Dragston, Othello, and Pocomoke series.

Fallsington fine sandy loam (Fa) is a light-colored poorly drained soil associated with the fine sandy loam types of the Pocomoke, Dragston, and Othello series. The soil is poorly drained because of the relatively high water table. It differs from Pocomoke fine sandy loam in having a lighter colored surface soil, from Dragston fine sandy loam in being more poorly drained, and from Othello fine sandy loam in having a coarser textured subsoil. Relief is nearly level, and runoff is slow to very slow. Internal drainage is rapid. This soil has formed over fine-textured marine sediments. It occurs mainly northwest of Weeksville and near Elizabeth City. Small bodies are found near Okisko and in northern Newland Township.

Representative profile in a cultivated area:

Surface soil—

0 to 8 inches, grayish-brown fine sandy loam; very friable.

Subsoil—

8 to 24 inches, light-gray or light brownish-gray fine sandy loam faintly mottled with pale yellow; very friable; contains lenses or pockets of loam or sandy clay loam.

Substratum—

24 to 36 inches, mixed gray, light-gray, and yellow loamy fine sand or fine sand.

In forested areas a thin layer of dark grayish-brown to dark-gray loose fine sandy loam is at the surface.

The organic-matter content is very low. Field tests indicate that the surface soil and subsoil are strongly to very strongly acid and that the substratum is medium to slightly acid in places. Permeability is rapid in the surface soil and moderate in the subsoil. The soil has a low water-holding capacity.

About 154 acres of loamy fine sand are included with this soil. The largest areas are about 1 mile northeast and 1½ miles south of Olivet Church. Most included areas are in forest. The surface soil is grayish-brown loamy fine sand, and the subsoil is light-gray or white loamy fine sand.

Use and suitability.—About 58 percent of Fallsington fine sandy loam is under cultivation, but a small part of this tilled acreage is idle. About 2 percent is in pasture and 40 percent is in forest. Corn and soybeans occupy

the largest acreage. Some potatoes, snap beans, sweet corn, peanuts, cotton, and sweetpotatoes are grown.

This soil is neither fertile nor highly productive, and fertilizers and lime leach out fairly rapidly. But the soil is comparatively easy to drain and, with liberal fertilization, crops common to the area can be grown. When the water table is low enough, water passes through the open profile rapidly. All cultivated areas get some surface drainage from shallow open ditches. The ditches, however, tend to cave in and need cleaning out more often than those in heavier soils. Deep ditches are especially difficult and costly to maintain because of the loamy fine sand at depths of 24 to 36 inches. (See management group 6.)

Galestown series

The only soil of the Galestown series mapped in this county is Galestown loamy fine sand. It occupies well-drained positions on low narrow ridges or narrow strips bordering drainageways. It is associated with soils of the Klej, Sassafras, and Woodstown series and has a light-colored sandy profile.

Galestown loamy fine sand (Ga) is a well to somewhat excessively drained sandy soil. About three-fourths of the acreage is on slopes of less than 2 percent; the rest is on slopes of 2 to about 4 percent. Runoff is slow and internal drainage is rapid. This soil is associated with Klej, Sassafras, and Woodstown soils. It is similar to the Sassafras soil in drainage but is somewhat more excessively drained than the Klej and Woodstown soils. The Galestown soil has formed from coarse-textured marine sediments. Most of its areas are south and southeast of Pitts Chapel School and Morgans Corner.

Representative profile in forested areas:

Surface soil—

0 to 2 inches, dark grayish-brown loamy fine sand; loose and fluffy.

2 to 6 inches, brown loamy fine sand; loose.

Subsoil—

6 to 32 inches, light yellowish-brown loamy fine sand; loose.

32 to 44 inches, yellow loamy fine sand with a few faint mottles in the lower part.

Substratum—

44 to 60 inches, light-gray fine sand or loamy fine sand.

Below depths of 36 to 40 inches lenses of fine sandy loam or sandy clay are common. In cultivated areas the surface soil is grayish brown or dark grayish brown. Many borrow pits have been dug in the soil to obtain material for road building and other construction.

This soil is very low in organic matter and strongly to medium acid. It is rapidly permeable to roots, air, and water and has a low water-holding capacity.

Use and suitability.—About 20 percent of Galestown loamy fine sand has been cleared and is being used mostly for general crops. A small part of this is idle or in pasture. The rest is in forest.

This soil is not inherently productive. Since water passes through it rapidly, applied plant nutrients are soon leached out. But the soil is very easy to handle, warms early in spring, and when heavily fertilized is suited to certain vegetables, sweetpotatoes, peanuts, watermelons, and cantaloups. One small peach orchard is located on this soil. (See management group 14.)

Klej series

The only member of the Klej series mapped in the county is Klej loamy fine sand. This soil occurs on flats and very gentle ridges. It is associated with Galestown loamy fine sand and differs chiefly in having somewhat poorer drainage.

Klej loamy fine sand (Ka) is a moderately well drained to somewhat poorly drained soil. It is nearly level to very gently sloping. Runoff is slow to medium, and internal drainage is rapid. This soil has formed from coarse-textured marine sediments. Its relatively small acreage is mostly in small bodies in the central part of Nixonton Township, along the Little River in the west-central part of the county, west and north of Elizabeth City, and along the Pasquotank River in Newland Township.

Representative profile in a cultivated area:

Surface soil—

0 to 6 inches, grayish-brown loamy fine sand; loose.

Subsoil—

6 to 26 inches, yellowish-brown loamy fine sand; loose.

26 to 42 inches, pale-yellow loamy fine sand mottled with light gray and brownish yellow; very friable to loose.

Substratum—

42 to 60 inches, mottled yellow, light-gray, and brownish-yellow loamy fine sand or fine sand.

Forested areas have a dark grayish-brown surface layer in places.

Variations in the profile are mainly in the color of the upper part of the subsoil and in depth to mottling. The upper part of the subsoil ranges from yellowish brown to pale or very pale brown, and depth to mottling varies from about 18 to 30 inches. In places thin layers or pockets of sandy clay loam occur below 40 inches.

This soil is very low in organic matter. Field tests indicate that the surface soil and subsoil are strongly acid and that the substratum is less acid. Permeability of the soil to roots, air, and water is rapid, and the water-holding capacity is low.

About 160 acres having thin layers or pockets of loam or sandy clay loam between depths of 24 to 36 inches are included with this soil. This inclusion has somewhat better moisture relations than the typical soil, and plant nutrients do not leach out so rapidly. It occurs mainly near Pitts Chapel School, about 2 miles north of Elizabeth City, and southeast of Morgans Corner.

Use and suitability.—An estimated 30 percent of this soil has been cleared. Most cleared areas are cultivated, but a very small acreage is in pasture. Potatoes, sweet-potatoes, peanuts, melons, corn, and soybeans are the principal crops. In many areas this soil forms part of a cultivated field that consists principally of another soil type.

The Klej can be worked very easily and over a wide range of moisture conditions. It warms relatively early in spring. Fair yields of good-quality potatoes, peanuts, sweetpotatoes, snap beans, and other special crops are obtained when the soil is liberally fertilized. Peaches seem to do well. High productivity is hard to maintain, because the soil is low in plant nutrients and organic matter and applied nutrients leach out rapidly. The soil is droughty and crops are injured in dry seasons. (See management group 14.)

Lenoir series

The soils of the Lenoir series are on gentle slopes leading to drainageways and on low ridges. They occur in association with the soils of the Elkton series. They are somewhat similar to the associated soils in texture but are better drained.

Lenoir very fine sandy loam (La) is associated with Elkton silt loam and differs mainly in having better drainage. Relief is nearly level to very gently sloping. Runoff is slow to medium, and internal drainage is very slow. This soil has developed under forest cover from fine-textured marine deposits. It is relatively inextensive, and its areas are mainly in the southern part of the county bordering the Pasquotank and Little Rivers and the Albemarle Sound.

Representative profile in a forest:

Surface soil—

0 to ½ inch, very dark brown very fine sandy loam; loose and fluffy.

½ to 9 inches, pale-yellow very fine sandy loam; very friable.

Subsoil—

9 to 30 inches, mottled yellowish-brown, strong-brown, gray, and light-gray clay or silty clay; very firm; plastic when wet; moderate medium blocky structure.

30 to 42 inches, gray and light-gray silty clay mottled with yellowish brown; firm; plastic when wet.

42 to 52 inches, mottled light-gray and yellowish-brown silty clay loam; friable.

Substratum—

52 to 60 inches, mottled yellowish-brown and strong-brown very fine sandy loam.

In some places loamy fine sand occurs in the profile at a depth of only about 48 inches. In cultivated fields the surface soil is light brownish gray to pale brown.

This soil is very low in organic matter. The surface soil and subsoil are usually strongly acid, but the substratum is less acid. The soil is moderately permeable in the surface soil but very slowly permeable in the subsoil. It has a low water-holding capacity.

Use and suitability.—Only about 15 percent of this soil is in cultivation. Corn and soybeans are the principal crops. The rest is in forest composed principally of loblolly pine, sweetgum, red maple, white, water, red, and post oaks, and hickory.

Drainage is not the problem on this soil that it is on the Elkton soils. However, the soil is difficult to handle. The surface soil tends to pack after heavy rains, absorbs water very slowly, and becomes hard on drying. As the amount of available water often is low, crops are likely to be injured in dry seasons. (See management group 13.)

Lenoir very fine sandy loam, sandy substratum phase (Lb) differs from Lenoir very fine sandy loam in having a loamy sand substratum at depths of 30 to 40 inches. It differs from the associated sandy substratum phase of the Elkton series in having better drainage. Slopes are nearly level to very gentle, and runoff is slow to medium. Internal drainage is very slow. The small to fairly large areas are widely separated in Salem, Nixonton, and Mount Hermon Townships and in the eastern parts of Providence and Newland Townships.

Profile in a cultivated area:

Surface soil—

0 to 8 inches, light brownish-gray very fine sandy loam; very friable.

Subsoil—

8 to 30 inches, mottled yellow, strong-brown, and light-gray clay or silty clay; firm; plastic when wet.

30 to 38 inches, mottled light-gray, pale-yellow, and brownish-yellow clay loam interbedded with very fine sandy loam; friable.

Substratum—

38 to 60 inches, white or light-gray loamy fine sand mottled with strong brown.

In forested areas a thin layer of dark-gray or very dark gray very fine sandy loam is at the surface.

This soil is very low in organic matter, and the surface soil and subsoil are usually strongly acid. It is moderately permeable in the surface soil and very slowly permeable in the subsoil. The water-holding capacity is low.

As mapped, this soil includes about 50 acres on slopes of 2 to 4 percent. About 10 acres are moderately eroded. Many small moderately eroded spots in cultivated areas and one moderately eroded 7-acre area are included because of their small extent. About 250 acres having a fine sandy loam texture are also included. These included areas differ in having a slightly higher percentage of fine and medium sand throughout the profile. They are widely separated in Mount Hermon, Providence, and Newland Townships.

Use and suitability.—About 50 percent of Lenoir very fine sandy loam, sandy substratum phase, is used for crops, and about 4 percent for pasture. The rest is in forest. Corn and soybeans are the principal crops. Very small acreages are used for cotton, oats, and lespedeza for grazing, seed, or hay. Most of the pastures are unimproved. Forests have the same species as those on Lenoir very fine sandy loam.

The soil has a medium range of suitability. It is less difficult to drain than Elkton silt loam, sandy substratum phase, but more difficult to handle in other respects. It must be worked under a narrow range of moisture conditions because it absorbs water slowly, tends to pack after heavy rains, and becomes hard on drying. Moisture relations are not good, and crops are injured by lack of moisture in dry seasons. (See management group 13.)

Made land and dumps

Made land and dumps (Ma) have no agricultural value. They include areas covered by sand pumped from the Pasquotank River, areas around Elizabeth City filled in with soil and debris, and areas used as coal dumps or dumps for other material. (See management group 17.)

Matapeake series

The only member of the Matapeake series mapped in the county is Matapeake fine and very fine sandy loams. It is a combination of two soil types occurring in small bodies that need not be mapped as separate soils. These soils are on slopes near or bordering drainageways. They are well-drained, light-colored soils associated with the somewhat poorly drained Bertie soils and the moderately well drained Mattapex soils.

Matapeake fine and very fine sandy loams (Mb) make up small areas that are similar to the associated Bertie and Mattapex series in textural profile. The areas of

fine sandy loam differ from the very fine sandy loam in the texture of the surface soil and in having more fine sand in the subsoil layers.

These soils occupy slopes of 1 to 2 percent and have developed from medium-textured marine sediments laid down on loamy sand. Runoff is slow to medium, and internal drainage is medium to slow. The small total acreage is about evenly divided in texture between fine sandy loam and very fine sandy loam. Areas of very fine sandy loam occur principally near Weeksville and southeast of Elizabeth City. The fine sandy loam occurs mainly northwest of Elizabeth City and along the Pasquotank River in Providence and Newland Townships.

Profile of the very fine sandy loam in cultivated areas:

Surface soil—

0 to 14 inches, grayish-brown to pale-brown very fine sandy loam; very friable.

Subsoil—

14 to 30 inches, dark-brown clay loam or heavy loam; firm.

30 to 36 inches, strong-brown loam or fine sandy loam; friable.

Substratum—

36 to 60 inches, yellow loamy fine sand.

The color of the subsoil varies from dark brown through yellowish brown to yellowish red. In forested areas the top inch of the surface soil is very dark gray very friable very fine sandy loam. Below this thin layer the surface soil is light yellowish-brown very friable very fine sandy loam that extends to a depth of about 14 inches.

This soil has very little organic matter. Field tests indicate that the surface soil and subsoil are strongly acid and that the substratum is medium to slightly acid. Permeability is moderate in the surface soil and slow in the subsoil. The water-holding capacity is moderately low.

Use and suitability.—About 77 percent of Matapeake fine and very fine sandy loams is under cultivation, and a small part of this is idle. About 5 percent is in pasture, and 18 percent is in forest. Potatoes, corn, and soybeans are the chief crops. Small areas are in cabbage and snap beans.

Drainage is no problem on these soils, and they are suited to all crops grown in the area. Yields are generally higher for potatoes, cabbage, corn, and soybeans in wet years than in dry years. Most cultivated areas are small and generally form part of a field composed mainly of another soil type. (See management group 4.)

Mattapex series

The soils of the Mattapex series occur on gentle slopes bordering drainageways. They are associated with the soils of the Bertie and Matapeake series. Their textural profile is similar to that of these associated series, but their drainage is intermediate between the two.

Mattapex very fine sandy loam (Md) is associated with Bertie very fine sandy loam and Matapeake fine and very fine sandy loams. Most of the slopes range from 1 to 2 percent. Runoff is medium and internal drainage is slow. This soil has developed from medium-textured marine sediments deposited on sandy material. The areas are principally near Weeksville, southeast of Elizabeth City, and in the extreme eastern part of Providence Township.

Profile of a representative area in cultivation:

- Surface soil—
 0 to 6 inches, light brownish-gray very fine sandy loam; very friable.
 6 to 14 inches, pale-yellow very fine sandy loam; very friable.
- Subsoil—
 14 to 22 inches, brown clay loam or loam; firm; slightly plastic when wet.
 22 to 38 inches, mottled strong-brown, light-gray, and yellowish-brown clay loam interbedded with fine sandy loam; friable; slightly plastic when wet.
- Substratum—
 38 to 60 inches, mottled yellowish-brown, white, and yellow loamy fine sand.

In forested areas a thin layer of dark-gray to very dark gray very fine sandy loam has developed at the surface.

The organic-matter content is very low. Field tests indicate that the surface soil and subsoil are strongly acid and that the substratum is medium to slightly acid. The surface soil is moderately permeable, and the subsoil is slowly permeable. The water-holding capacity is moderately low.

Small scattered areas totaling about 50 acres on slopes of 2 to 4 percent are included with this soil. About half of this acreage is moderately eroded.

Use and suitability.—About 63 percent of Mattapex very fine sandy loam is under cultivation, and about 2 percent is in pasture. A small part is in military reservations. The rest is in forest. Corn, soybeans, cabbage, and potatoes are the main crops.

On this soil drainage is hardly a problem for the crops commonly grown. The soil is relatively easy to handle and is suitable for many crops. It is somewhat droughty, and crops are subject to more injury in dry seasons than in wet. Some areas, if they are not properly protected, are susceptible to sheet erosion under clean cultivation. The only irrigation system in the county is largely on this soil, and the owner reports that it is profitable. (See management group 4.)

Mattapex very fine sandy loam, deep phase (Me) is associated with Mattapex very fine sandy loam and differs in having interbedded fine sandy loam, loam, clay loam, and silt loam in the profile between depths of 36 and 48 inches. Relief is nearly level to very gently sloping, and runoff is medium. Internal drainage is slow.

Use and suitability.—About 48 percent of the very small area of this soil is cropland, 12 percent is in pasture, and a small part is in military reservations. The rest is in forest. Corn, soybeans, cabbage, and potatoes are the principal crops.

This soil has a wide range of suitability. It requires little or no drainage for crops and can be worked easily. Moisture relations are similar to those of Mattapex very fine sandy loam. (See management group 4.)

Mattapex fine sandy loam (Mc) differs from Mattapex very fine sandy loam in having a coarser textured surface soil and a higher percentage of fine and medium sand in the subsoil, which is loam or clay loam. It is associated with Bertie fine sandy loam on slopes of 1 to 2 percent and is moderately well drained. Runoff is medium, and internal drainage is slow.

The small scattered areas are mainly along the Pasquotank and Little Rivers in Nixonton, Mount Hermon, Providence, and Newland Townships. About 100 acres having slopes of 2 to 4 percent is included, and about 30 acres of this is moderately eroded.

Use and suitability.—Approximately 61 percent of this soil is used for crops, and 4 percent for pasture. The rest is in forest. Corn, soybeans, and potatoes are the principal crops. Small areas are planted to oats, peanuts, sweet corn, sweetpotatoes, and pasture.

Like Mattapex very fine sandy loam, this soil has little or no drainage problem. It is suited to many different crops, is easily worked, and is responsive to good management. Yields of corn, soybeans, and potatoes are higher in wet than in dry years, because the soil is somewhat droughty. Yields average about the same as or are slightly lower than those on the very fine sandy loam. (See management group 4.)

Mucky peat

Mucky peat (Mf) consists of plant remains in various stages of decomposition, that have accumulated under conditions of very poor drainage. The water table is always at or near the surface. This soil is confined to the Dismal Swamp section of the county and to areas along the Pasquotank River north of Elizabeth City. It varies somewhat in color, and in depth it ranges from about 2 feet to 5 feet or more. The underlying mineral material ranges in texture from loamy sand through silty clay to clay. The organic-matter content of the 11 samples on which determinations were made (loss on ignition) ranged from 79 to 84 percent.

To a depth of about 18 inches, Mucky peat contains a tangled mass of roots and underground shoots, living or in various stages of decomposition. When wet it is dominantly black or very dark brown, but it may be very dark gray, dark grayish brown, brown, or dark brown. Below 18 inches the organic material is more highly decomposed; sedge remains and woody material are visible but they are not so evident as in the overlying material.

Tree stumps, trunks, and branches are so numerous that examination of the material with a soil auger is very difficult. Field tests indicate that the surface layer is extremely acid to very strongly acid.

In some places bordering the upland along the Pasquotank River bottom, Mucky peat is covered with a layer of mineral soil ranging from about 6 to 24 inches in thickness. This mineral layer varies from dark gray or dark grayish brown to light gray in color and from silt loam to fine sandy loam in texture. It is deepest near the upland and becomes thinner toward the river.

None of this extensive soil has ever been under cultivation. It has been cut over one or more times, and little merchantable timber is left. All areas, except possibly those along the Pasquotank River and those in the extreme northern part of the county, have been burned, some more often and more severely than others. Severely burned parts have a very uneven surface of low mounds and shallow depressions.

About half of the total acreage of Mucky peat occurs along the Pasquotank River in the northern part of the county and in the southwestern corner of Providence Township. These areas have not been so severely burned as the rest. Their vegetation consists of small- to medium-sized red maple, yellow-poplar, swamp blackgum, a few pond pine, Carolina ash, swampbay, sweetbay, holly, and white-cedar or juniper on the deeper organic soils. The principal shrubs are gallberry, large gallberry, sweet

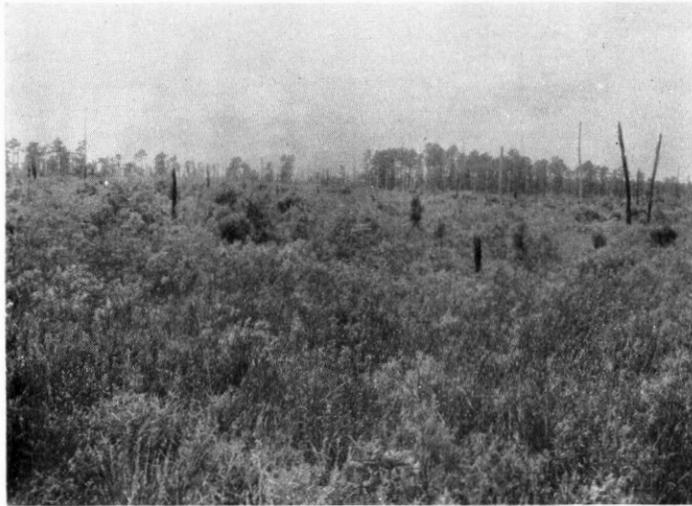


Figure 4.—Burned-over area of Mucky peat in Dismal Swamp section of the county.

pepperbush, swamp huckleberry, large and small cane, greenbrier, bamboo vine, royalfern, and rattan.

Severely burned areas (fig. 4) support a thick growth of large and small cane, swamp blackgum, red maple sprouts, gallberry, sweet pepperbush, greenbrier, bamboo vine, swamp huckleberry, and a scattering of pond pine. Sphagnum moss and royalfern are very common. Dead pines, some standing and some lying on the ground, are common. Recently burned areas, comprising 5 to 10 percent of the total acreage, support practically no tree growth, but there is some growth of small cane, gallberry, greenbrier, swamp huckleberry, willow and red maple sprouts, sphagnum moss, royalfern, cattail, and woolgrass. (See management group 16.)

Considerable thought was given to the type of survey for the Dismal Swamp section. A detailed survey did not seem advisable, because the thick growth, old logs, fallen trees, soft spongy Mucky peat, and the high water table, usually at or near the surface, made traverse slow and difficult.

In spite of this difficulty, enough information on the character and depth of the organic material and the texture of the underlying mineral soil was needed to give a good idea of the entire area. The soils were examined carefully to a depth of 5 feet along the two roads that cross the swamp and along all passable foot trails and old railroad grades. In addition, two trails were cut at approximately right angles through the main body of the swamp. The location of these trails is shown on the soil map. The northwest-southeast trail is 41,780 feet long, and the northeast-southwest trail is 24,540 feet long. Detailed profile studies were made at 300-foot intervals along these trails. The variation in depth of Mucky peat and the texture (somewhat generalized) of the underlying mineral soil are given in figure 5.

The variations, or subdivisions, within Mucky peat shown along the traverses are as follows:

- (1) Mucky peat less than 3 feet thick over moderately fine to fine-textured material.
- (2) Mucky peat less than 3 feet thick over moderately coarse to medium-textured material.
- (3) Mucky peat 3 to 5 feet thick over medium- to fine-textured material.
- (4) Mucky peat 3 to 5 feet thick over moderately coarse to medium-textured material.
- (5) Mucky peat more than 5 feet thick.
- (6) Mucky peat with an overwash of mineral soil.

These subdivisions, based on the thickness of the Mucky peat and texture of the underlying material, are more or less arbitrary. It is felt, however, that this type of information would be very helpful in planning drainage operations for the area or parts of it. Generally the problem of draining and of maintaining the water level at the desired height increases with the depth or thickness of the mucky material. Furthermore, it would be more difficult to maintain open ditches or canals where this material is underlain by loamy sand or light fine sandy loam than where it is underlain by clay loam, silty clay, or clay.

A rough estimate of the acreage of each subdivision just listed was obtained by using the formula $\frac{c}{b} \times a$, in which a represents the total acreage of the swamp, b the

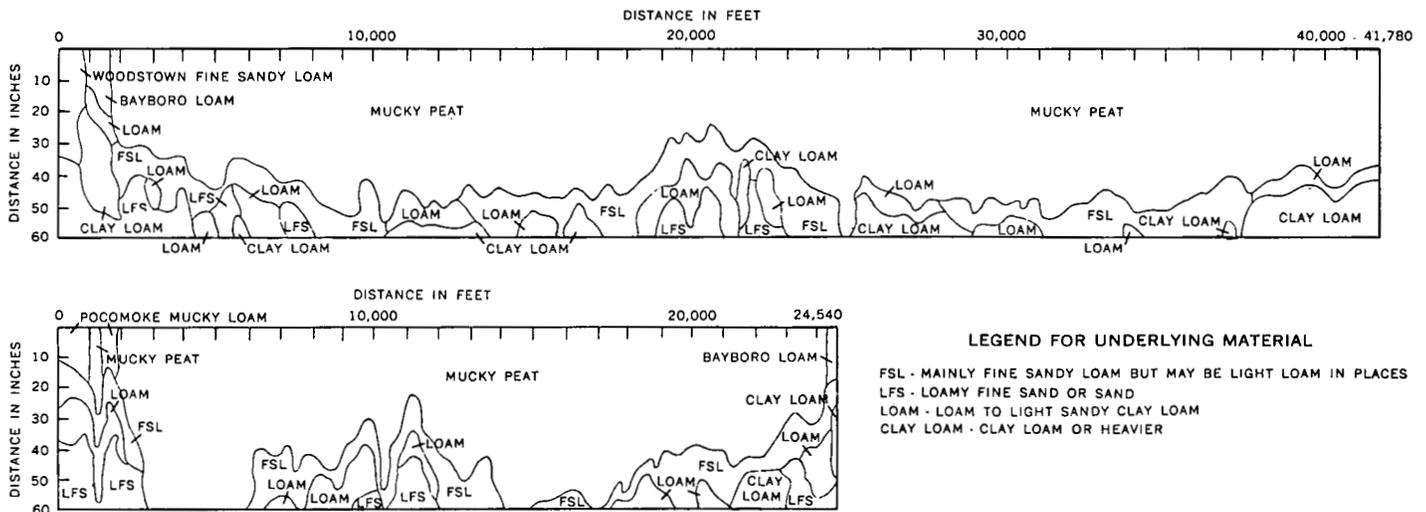


Figure 5.—Profile sections along two trails cut through the Dismal Swamp in Pasquotank County, N. C., showing variation in depth of Mucky peat and the texture of the underlying mineral soil. The upper section shows the profile along the northwest-southeast trail, and the lower section, the profile along the northeast-southwest trail.

total length of traverse within the area, and *c* the total length of traverse for each subdivision. Profile descriptions of a representative area of each subdivision of Mucky peat follow.

Profile of (1) Mucky peat less than 3 feet thick over moderately fine to fine-textured material:

1. 0 to 16 inches, black or very dark brown peaty muck consisting of tangled mass of roots and partly to well decomposed plant remains.
2. 16 to 30 inches, black fairly well decomposed material; plant remains occur throughout.
3. 30 to 48 inches, gray silty clay loam.
4. 48 to 60 inches, gray silty clay.

The total thickness of layers 1 and 2 ranges from 24 to 36 inches. In places the organic material is underlain by 6 to 8 inches of brown or dark grayish-brown loam or fine sandy loam that rests on sandy clay loam or heavier material. The estimated area is 2,937 acres.

Profile of (2) Mucky peat less than 3 feet thick over moderately coarse to medium-textured material:

This profile differs from the foregoing profile only in the character of the underlying material. The organic material ranges from about 2 to 3 feet in thickness. The underlying material is mainly fine sandy loam or loam that overlies loamy fine sand, but in places it is silt loam or light sandy clay loam. The estimated extent is about 2,965 acres.

Profile of (3) Mucky peat 3 to 5 feet thick over medium- to fine-textured material:

1. 0 to 18 inches, black or very dark gray partly decayed to well decayed organic material well matted with roots; open and and loose.
2. 18 to 46 inches, black fairly well decomposed organic material; more highly decomposed than layer 1, but some plant remains, especially woody material, are evident; soft and smooth.
3. 46 to 52 inches, dark grayish-brown loam.
4. 52 to 60 inches, gray silty clay loam or silty clay; firm.

The combined thickness of layers 1 and 2 ranges from 36 to 60 inches. The underlying material is generally clay loam or heavier, but it is sandy clay loam in places. Loamy sand occurs at depths of about 5 feet in some areas. The estimated area is 5,777 acres.

Profile of (4) Mucky peat 3 to 5 feet thick over moderately coarse to medium-textured material:

This profile is similar to the foregoing in all respects except character of the underlying material. The organic material ranges from 3 to 5 feet in thickness, and the underlying material is mostly fine sandy loam, loam, or silt loam. Loamy sand occurs at depths of about 5 feet in places. The estimated area is 7,288 acres.

Profile of (5) Mucky peat more than 5 feet thick:

1. 0 to 18 inches, dark grayish-brown fibrous organic material in various stages of decomposition ranging from raw to well decomposed; well matted with roots; loose and open.
2. 18 to 60 inches, black or very dark brown fairly well decomposed organic material; plant remains visible; soft and smooth; material variable in color but mainly dark grayish brown to black.

Some areas of this subdivision occurring along the Pasquotank River in association with subdivision 6 are covered with 1 to 4 inches of mineral soil.

Profile of (6) Mucky peat with an overwash of mineral soil:

1. 0 to 18 inches, dark-gray or dark grayish-brown silt loam; soft and smooth.
2. 18 to 60 inches, dark grayish-brown fairly well decomposed organic material; much woody material present in the upper part; plant remains visible throughout.

The mineral soil varies from dark gray to light gray in color and from silt loam to fine sandy loam in texture. It ranges from about 4 to 24 inches in thickness. This overwash phase was found only along the Pasquotank River north of Elizabeth City, and it borders the upland. The total extent is about 831 acres.

Nixonton series

The only soil representing the Nixonton series in this county is Nixonton very fine sandy loam. This soil occupies gentle slopes near or bordering drainageways. It has a deep friable profile and very little textural differentiation.

Nixonton very fine sandy loam (Na) is a light-colored soil associated with Barclay very fine sandy loam. It differs from that soil chiefly in having somewhat better drainage. It has developed under forest cover from marine sediments that are dominantly very fine sand and silt. Relief is nearly level to very gently sloping, and runoff is medium. The relatively small acreage is mostly near Weeksville and Symonds Creek.

Representative profile in a cultivated area:

Surface soil—

0 to 9 inches, brown very fine sandy loam; very friable.

Subsoil—

9 to 20 inches, yellowish-brown loam or silt loam; very friable to friable; slightly sticky when wet.

20 to 42 inches, light yellowish-brown or light brownish-gray very fine sandy loam or loam finely mottled with light gray and brownish yellow; very friable; slightly sticky when wet.

Substratum—

42 to 60 inches, mottled light-gray and yellowish-brown intermixed fine sandy loam and loamy fine sand.

The surface soil ranges in color from pale brown to dark grayish brown. In places the substratum varies in texture.

This soil is very low in organic matter. Field tests indicate that, except where limed, the surface soil and the upper part of the subsoil are strongly to medium acid, and that the lower part of the subsoil and the substratum are slightly acid in places. The soil is very friable to friable throughout and moderately permeable to roots, air, and water. Its water-holding capacity is moderate.

Use and suitability.—Approximately 93 percent of this soil is under cultivation, 3 percent is in pasture, and 4 percent is in forest. Potatoes, corn, soybeans, and cabbage are the principal crops. Small acreages are used for sweet corn, snap beans, and pasture. The trees of forested areas are like those on Barclay very fine sandy loam.

This is one of the best general-purpose soils in the county. It is easily worked and is responsive to good management. It retains applied plant nutrients and its productivity can be built up and maintained. Because of the soil's favorable position and profile characteristics, little or no drainage is required for production of the crops commonly grown in the area. (See management group 1.)

Othello series

The soils of the Othello series occur on flats. They are poorly drained associates of soils of the Bertie, Fall-

sington, and Mattapex series. In some areas the profile is relatively deep.

Othello fine sandy loam (Oa) is a light-colored moderately coarse textured soil that occupies poorly drained positions in association with Bertie, Mattapex, and Portsmouth soils. Relief is nearly level, and runoff is slow to very slow. Internal drainage is moderate to slow. The ground-water level is relatively high. This soil has developed from medium-textured marine sediments deposited on sandy material. It is one of the more extensive soils of the county and occurs principally in Elizabeth City Township, central Nixonton Township, the eastern and extreme western parts of Mount Hermon Township, and southeastern Providence Township.

Representative profile in a forest:

Surface soil—

0 to 1½ inches, very dark gray fine sandy loam; very friable.
1½ to 12 inches, light brownish-gray fine sandy loam; very friable.

Subsoil—

12 to 28 inches, gray or light-gray clay loam or heavy loam mottled with yellowish brown; firm; slightly sticky when wet.
28 to 34 inches, light-gray fine sandy loam mottled with yellowish brown; friable.

Substratum—

34 to 60 inches, light-gray loamy fine sand mottled with pale yellow and strong brown.

In cultivated fields the surface soil varies from light brownish gray to dark grayish brown but is mainly grayish brown. The texture ranges from light to heavy fine sandy loam.

There are some variations in the texture of the subsoil layers where this soil grades into Elkton fine sandy loam, sandy substratum phase, or into Fallsington fine sandy loam. Small spots that have fine sandy loam or loam subsoil are included where this soil is associated with the Fallsington soil. Where it is associated with Elkton soils, small spots with sandy clay layers in the subsoil are included.

This soil is very low in organic matter. According to field tests the surface soil and subsoil are strongly acid and the substratum is medium to slightly acid. The surface soil is moderately permeable. The subsoil is slowly permeable. Where the water table is low enough, permeability is moderately rapid. The water-holding capacity of the soil is moderate to moderately low.

Use and suitability.—About 40 percent of Othello fine sandy loam is under cultivation, and a small part of this is idle. About 4 percent is in pasture, and 56 percent in forest. Corn and soybeans occupy about 95 percent of the cultivated land. Small areas are used for potatoes, cotton, and lespedeza. Loblolly pine, red gum, red maple, yellow-poplar, hickory, and water, willow, and swamp chestnut oaks, with an undergrowth of waxmyrtle, gallberry, and other shrubs and vines, cover the forested areas.

This soil has a medium range of suitability and is difficult to work. Moderately intensive drainage is necessary for crops, and all cultivated areas are drained by open shallow ditches. These ditches are fairly stable, but ditches more than 3 feet deep are subject to caving because of the loamy sand substratum. This soil is less difficult to drain than soils with extremely heavy subsoils, such as those of the Elkton and Bladen series. (See management group 9.)

Othello very fine sandy loam (Ob) differs from Othello fine sandy loam in having a finer textured surface soil and a higher percentage of very fine sand and silt throughout the profile. It is associated with Bertie very fine sandy loam in poorly drained positions. Relief is nearly level, and runoff is slow to very slow. Internal drainage is medium to slow. This fairly extensive soil occurs in relatively small scattered bodies, mainly in Salem and Nixonton Townships and in the northeastern corner of Providence Township.

In cultivated fields the surface soil is about 8 inches of grayish-brown to dark grayish-brown very friable very fine sandy loam or silt loam. The subsoil is gray and light-gray (finely mottled with yellowish brown or strong brown) clay loam or silty clay loam interbedded with very fine sandy loam or silt loam. The substratum, mostly loamy fine sand and light fine sandy loam, occurs at depths of 36 to 40 inches.

Some gradation occurs where this soil adjoins Elkton silt loam, sandy substratum phase, or Pasquotank silt loam and Pasquotank very fine sandy loam. The mapped boundaries between these soils are arbitrary. Included in mapping is an area about 1½ miles southwest of Elizabeth City that has a dark-gray surface soil, a color somewhat darker than is usual for Othello soils.

Use and suitability.—About 47 percent of Othello very fine sandy loam is under cultivation, 5 percent is in pasture, and 48 percent is in forest. Probably 5 percent of the cultivated acreage is used for cabbage and sweet corn, and the rest is used for corn, soybeans, and lespedeza. Forested areas support the same type of cover as Othello fine sandy loam.

This soil is difficult to work. Because it has more fine material throughout the profile, its drainage is somewhat slower than that of Othello fine sandy loam. The soil is, however, moderately permeable to roots, air, and water. Its water-holding capacity is moderate to moderately low. Shallow open ditches drain all cultivated areas, and moderately intensive drainage practices are adequate. This soil retains applied nutrients and responds to good management. It is more suitable for corn, soybeans, and pasture (fig. 6) than for potatoes, cabbage, and other truck crops. (See management group 9.)

Othello very fine sandy loam, deep phase (Oc) is closely associated with Othello very fine sandy loam and differs from it mainly in having greater depth to sandy



Figure 6.—Ladino clover pasture on Othello very fine sandy loam.

material. In this phase the layer that is mainly clay loam, loam, or silty clay loam continues to a depth of at least 48 inches before sandy material occurs, whereas in the normal soil, loamy sand or fine sandy loam occurs at 36 to 40 inches. This phase has nearly level relief, slow to very slow runoff, and medium to slow internal drainage. Its water-holding capacity is moderate to moderately low. The areas of this relatively inextensive soil are widely separated in Salem Township, in southeastern Providence Township, and in north-central Newland Township.

Use and suitability.—Approximately 67 percent of this soil is under cultivation, 3 percent is in pasture, and 30 percent is in forest. The principal crops are corn and soybeans, and yields are similar to those on Othello very fine sandy loam. The range of suitability is only medium, and the soil is difficult to work. Moderately intensive drainage is necessary for crops. Deep ditches in this soil are more stable than in Othello very fine sandy loam. (See management group 9.)

Pasquotank series

The Pasquotank series consists of light-colored poorly drained soils on flats. They are associated with the soils of the Barclay and Weeksville series, and like those soils they have little textural profile development.

Pasquotank silt loam (Pa) is a deep, silty, nearly level soil (fig. 7). It is associated mainly with Barclay and Weeksville soils. It differs from the Barclay soil in having poorer drainage, and from the Weeksville soil in having a lighter color. Runoff is slow to very slow, and internal drainage is medium to slow. The water table is relatively high. This soil has developed under forest cover from fine-textured marine sediments. It is relatively extensive and occurs principally in Salem Township. Scattered areas are in Nixonton Township.

Profile in a representative cultivated area:

- Surface soil—
 - 0 to 10 inches, grayish-brown to dark grayish-brown silt loam; very friable.
- Subsoil—
 - 10 to 30 inches, light brownish-gray silt loam or loam; friable; slightly plastic when wet.
 - 30 to 42 inches, light brownish-gray loam or silt loam finely mottled with light olive gray; friable; slightly plastic when wet.
- Substratum—
 - 42 to 60 inches, mottled light-gray and yellowish-brown interbedded fine or very fine sandy loam and loamy fine sand.

The surface soil varies from gray to dark grayish brown. In places, especially where this soil is associated with Elkton soils, thin lenses of smooth silty clay loam or clay loam occur below a depth of about 40 inches.

This soil is very low in organic matter. Field tests indicate that the surface soil and subsoil are strongly acid, except where limed, and that the substratum is medium to slightly acid. The surface soil is moderately permeable, and the subsoil is moderately to slowly permeable. The water-holding capacity is moderate.

Use and suitability.—About 95 percent of Pasquotank silt loam is under cultivation; the rest is about evenly divided between pasture and forest. The principal crops are cabbage, potatoes, corn, and soybeans. Small tracts are used for snap beans and sweet corn. Excellent pasture



Figure 7.—Dusting potatoes on Pasquotank silt loam to control late blight and the potato bug.

can be developed, but the soil is too valuable for cultivated crops to be used to any extent for grazing.

This soil has a wide range of suitability. It is easy to fairly difficult to work. Moderately intensive drainage is essential for removing excess surface water.

This is one of the most desirable and productive soils in the county for cabbage, corn, soybeans, and pasture grasses. High yields of potatoes are obtained, but some of the better drained soils are workable somewhat earlier and are more suitable for potatoes in wet years. This soil responds to good management, retains soil moisture and plant nutrients, and is easily kept productive. Except in extremely wet periods, water seldom stands very long on the surface. In dry periods crops are rarely injured for lack of moisture. (See management group 2.)

Pasquotank very fine sandy loam (Pb) differs from Pasquotank silt loam mainly in having slightly less silt and slightly more fine sand throughout the profile. Usually it has slightly less organic matter. The surface soil is light brownish-gray or grayish-brown very friable very fine sandy loam. The subsoil is light olive-gray very friable loam or silt loam. The lower part of the subsoil and places in the substratum have pockets or thin lenses of loam or clay loam. The soil has nearly level relief, slow to very slow runoff, medium internal drainage, and a relatively high water table. It is very low in organic matter. It is moderately permeable and has a moderate water-holding capacity. Most of it is in Salem and Nixonton Townships.

A few scattered areas of Pasquotank fine sandy loam in south-central Nixonton Township are included with this soil. This soil is not mapped separately in the county. Its surface soil is grayish-brown fine sandy loam, and the subsoil is light-gray loam finely mottled with yellowish brown. This included soil has more fine and medium sand and less silt throughout the profile than Pasquotank very fine sandy loam.

Use and suitability.—About 88 percent of Pasquotank very fine sandy loam is under cultivation, 4 percent is in pasture, and 8 percent is in forest. Potatoes, cabbage, corn, and soybeans are the main crops. Some snap beans are grown. Yields average about the same or slightly

lower than on Pasquotank silt loam. Like Pasquotank silt loam, this soil is productive of the general and special crops of the area. It is relatively easy to drain, responds to good management, and is easily kept productive. (See management group 2.)

Pocomoke series

The soils of the Pocomoke series are on flats and in very slight depressions. They are associated with the soils of the Elkton and Fallsington series and with Bayboro mucky loam. These soils have a dark-colored surface soil and a light-colored subsoil. They differ from Portsmouth soils in having a dominantly coarser textured subsoil.

Pocomoke fine sandy loam (Pc) is a very friable soil on nearly level relief. It is associated with Fallsington fine sandy loam and differs mainly in having a surface soil that is darker colored because it contains more organic matter. Surface runoff is slow to very slow. Internal drainage is slow, largely because of a high water table rather than because of impervious soil layers. This soil has formed from medium-textured marine sediments. It is principally in central Nixonton Township, near Elizabeth City, and in the central and northern parts of Newland Township.

Representative profile in a forested area:

- Surface soil—
0 to 12 inches, very dark gray fine sandy loam; very friable; weak fine granular structure.
- Subsoil—
12 to 22 inches, light-gray fine sandy loam finely mottled with pale yellow; very friable.
22 to 36 inches, gray loam finely mottled with olive yellow and interbedded with fine sandy loam; friable.
- Substratum—
36 to 60 inches, light-gray or white loamy fine sand mottled with pale yellow.

The thickness of the surface soil ranges from 6 to about 18 inches. The subsoil layers are mainly loam or fine sandy loam with lenses or pockets of sandy clay loam. In cultivated fields the surface soil varies from dark gray to very dark gray.

This soil has about 10 percent organic matter in forests and about 4½ to 6 percent in cultivated areas. Field tests indicate that the surface soil and subsoil are strongly acid. The substratum is medium acid in places. The soil is moderately permeable and has a moderate water-holding capacity.

As mapped this soil includes about 593 acres with a lighter textured profile than is typical. Areas of this inclusion occur principally near Pitts Chapel School and Olivet Church in Nixonton Township. The surface soil is dark-gray to very dark gray very friable fine sandy loam. The subsoil is gray or light gray and consists of fine sandy loam or interbedded fine sandy loam and loam. Loamy fine sand is usually at depths of 24 to 36 inches. In areas of this inclusion dark-brown slightly compact or cemented layers occur just beneath the surface soil in places, but they are not extensive enough to justify mapping separately.

Use and suitability.—About 40 percent of the fairly large area of Pocomoke fine sandy loam is under cultivation, a small part is in pasture, and the rest is in forest. Corn and soybeans are the chief crops, and some cabbage,

potatoes, sweet corn, and snap beans are grown. Forested areas have a cover of loblolly pine, sweetgum, red maple, blackgum, holly, and water, swamp chestnut, and swamp white oaks. The undergrowth is greenbrier, gallberry, sweet pepperbush, poison-ivy, wild grape, and small cane.

When drained this soil has good tilth and is easy to work. It is well suited to truck crops such as cabbage, potatoes, and sweet corn, and to corn and soybeans. Because of its more friable and permeable subsoil layers, the soil is not as difficult to drain as the Bayboro soils, and, when it is drained, its moisture is more readily available to plants. (See management group 7.)

Pocomoke loam (Pd) differs from Pocomoke fine sandy loam in having more very fine sand and silt in the surface soil and subsoil. It is intermediate in textural profile between Pocomoke fine sandy loam and Weeksville silt loam. Relief is nearly level, and runoff is slow or very slow. Internal drainage is slow; it is retarded by the relatively high water table rather than by impervious soil layers. This inextensive soil occurs in the central and northern parts of Newland Township, where it is associated with the other Pocomoke soils and with the sandy substratum phase of Elkton fine sandy loam.

In cultivated fields the surface soil is dark-gray to very dark gray friable loam containing about 6 percent organic matter. The upper subsoil is gray or light-gray loam or silt loam, and the lower subsoil is fine sandy loam containing lenses of loam. The substratum, beginning at depths of 30 to 36 inches, consists of light-gray loamy sand or sand.

Use and suitability.—About 88 percent of this soil is drained and used for corn and soybeans. It is one of the most desirable soils in the county for these crops. About 2 percent is in pasture, and 10 percent in forest. The soil has good tilth and very good water-holding capacity. It is easy to work and retains applied plant nutrients. It is easier to drain than the associated Elkton soil. (See management group 7.)

Pocomoke mucky loam (Pe) is similar to Pocomoke fine sandy loam except that its surface soil has more organic matter and is more open and friable. This mucky soil is associated with Bayboro mucky loam around the edge of the Mucky peat areas in the Dismal Swamp section of the county. It has developed under forest cover where the water table stays near the surface most of the year. Only a small part was mapped in detail, but it is estimated that there are 1,817 acres of this soil in the Dismal Swamp section that have not been mapped in detail.

Profile in a forested area:

- Surface soil—
0 to 12 inches, black or very dark brown loam high in organic matter; well matted with roots; loose and open.
- Subsoil—
12 to 24 inches, brown fine sandy loam; very friable.
24 to 38 inches, mottled light-gray and brown loam; friable.
- Substratum—
38 to 60 inches, light-gray or white loamy fine sand or sand.

The surface soil ranges in thickness from about 8 to 18 inches and in organic-matter content from about 20 to 45 percent. It is strongly to very strongly acid.

Use and suitability.—None of Pocomoke mucky loam is under cultivation. Areas that have not been severely burned support a forest cover of red maple, swamp blackgum, yellow-poplar, holly, a few loblolly or pond

pinus, Carolina ash, and swampbay. There is a dense undergrowth of gallberry, sweet pepperbush, greenbrier, bamboo vine, swamp huckleberry, small cane, rattan, and royalfern. Severely burned areas have a thick growth of small cane, many swamp blackgum, red maple, and swampbay sprouts, greenbrier, and a scattering of pond pines. (See management group 7.)

Portsmouth series

The only soil of the Portsmouth series in this county is Portsmouth fine sandy loam, sandy substratum phase. It occurs on flats and in very slight depressions, where it is associated with Othello fine sandy loam. It is very poorly drained and has a dark-colored surface soil and a light-colored subsoil. In typical areas, it is heavier textured than the Pocomoke soils.

Portsmouth fine sandy loam, sandy substratum phase (Pf) differs from the associated Othello fine sandy loam mainly in the darker color of its surface soil. It has nearly level relief, slow or very slow runoff, and slow internal drainage. It has formed from moderately fine textured marine sediments. All areas of this soil except a small area in the southwestern corner of Providence Township are in Newland Township. About 886 acres are mapped in detail. It is estimated that about 340 acres occur in a body of Swamp; this acreage has not been mapped separately.

Representative profile in a cultivated area.

Surface soil—

0 to 12 inches, very dark gray fine sandy loam; very friable.

Subsoil—

12 to 32 inches, gray and light-gray sandy clay loam or clay loam finely mottled with yellow and interbedded with fine sandy loam; friable; plastic when wet.

Substratum—

32 to 60 inches, light-gray loamy fine sand mottled with pale yellow.

The color of the surface soil ranges from dark gray to black.

This soil has a low to medium organic-matter content. The range is from 4 to 5 percent in cultivated areas and from 8 to 10 percent in forested areas. The surface soil and the upper subsoil are strongly acid. Permeability is moderate in the surface soil and slow in the subsoil.

Use and suitability.—About 25 percent of the relatively small area of this soil is under cultivation, and 75 percent is in forest. Most of the cultivated land is used for corn and soybeans. The forest is of the same type as on Pocomoke fine sandy loam except in those areas that have been severely burned in recent years. In burned forest the vegetation is mainly a dense growth of small cane, a scattering of loblolly or pond pines, and some sweetgum, red maple, and blackgum sprouts.

This soil has a medium range of suitability. It can be easily worked, and only moderately intensive drainage is needed for cultivated crops. (See management group 10.)

Sassafras series

Only one member of the Sassafras series—Sassafras loamy fine sand—is mapped in the county. This soil occurs mainly on low sandy ridges that are well drained to somewhat excessively drained. It is associated with

soils of the Dragston, Fallsington, and Woodstown series. It is somewhat leached and has little or no mottling.

Sassafras loamy fine sand (Sa) is one of the sandier soils of the county. It occupies low narrow ridges and has better drainage than the associated Dragston, Fallsington, and Woodstown soils because water moves through the profile more rapidly. Relief is nearly level to very gently sloping. About 75 percent of the soil is on 2- to 3-percent slopes; the rest is on slopes of less than 2 percent. Runoff is slow. This soil has formed from medium-textured marine sediments. Its principal areas are west and north of Elizabeth City and near Morgans Corner.

Representative profile in a cultivated field:

Surface soil—

0 to 6 inches, brown loamy fine sand or light fine sandy loam; very friable.

6 to 10 inches, yellowish-brown loamy fine sand or fine sandy loam; very friable.

Subsoil—

10 to 24 inches, yellowish-red loam or fine sandy loam; friable.

24 to 36 inches, strong-brown light fine sandy loam; very friable.

Substratum—

36 to 60 inches, pale-yellow loamy fine sand.

The surface soil varies in texture from loamy fine sand to fine sandy loam and in color from brown to dark grayish brown. The subsoil is mainly loam or fine sandy loam, but, in places, it has layers or pockets of sandy clay loam.

This soil has a very low organic-matter content and, except where limed, is strongly acid in both surface soil and subsoil. Its surface soil is rapidly permeable, and the subsoil is rapidly to moderately permeable. The water-holding capacity is moderately low.

Use and suitability.—Practically all of Sassafras loamy fine sand is under cultivation; a very small part is in pasture. Corn, soybeans, sweetpotatoes, peanuts, and cotton are the principal crops. Potatoes are grown to a lesser extent.

This soil does not require drainage for successful production of the general crops of the area, and it is very easy to handle. Although not inherently fertile, it responds to good management and is suited to many crops, including peanuts, sweetpotatoes, early sweet corn, and peaches. If the soil is liberally fertilized, yields are fair to good. Because of the relatively coarse texture of the surface soil and subsoil, applied plant nutrients tend to leach more rapidly than in finer textured soils. As the water-holding capacity is only fair, some crops are injured in dry seasons. (See management group 8.)

Stono series

The soils of the Stono series occur on flats. They are associated with the soils of the Dragston series and are similar to them except for their darker colored surface soil and higher content of organic matter. They resemble the Pocomoke soils in their dark surface soil color but differ somewhat in subsoil mottling.

Stono fine sandy loam (Sb) is a somewhat poorly drained moderately dark colored friable soil on nearly level to very gently sloping relief. Runoff is slow to medium, and internal drainage is medium. The soil has developed from moderately coarse textured marine sediments deposited on loamy sand and sand. The areas of this relatively inextensive soil are mainly near Pitts Chapel

School in Nixonton Township; southwest, west, and north of Elizabeth City; and near Morgans Corner.

Profile of a cultivated area:

Surface soil—

0 to 8 inches, dark gray to very dark gray fine sandy loam; very friable.

Subsoil—

8 to 14 inches, intermingled pale-brown and dark-gray fine sandy loam; very friable.

14 to 36 inches, mottled pale-yellow, brownish-yellow, and light-gray fine sandy loam or loam; friable.

Substratum—

36 to 60 inches, mottled light-gray or white and brownish-yellow loamy fine sand or fine sand.

The surface soil is 12 to 18 inches thick in a few places. Its color in forested areas is usually very dark gray to black. In places the subsoil has pockets or lenses of sandy clay loam.

Organic matter is low in this soil. The amount ranges from 4 to 5 percent in cultivated fields but may be as high as 8 percent in forests. Field tests indicate that the surface soil and the subsoil are strongly acid in all areas except those limed. The substratum is only slightly acid in some places. This soil is moderately permeable and has a moderate water-holding capacity.

Some small areas of loamy fine sand are included with this soil as mapped. They total about 69 acres and occur mainly near Nixonton and near Olivet Church. Their surface soil is dark-gray loamy fine sand, and their subsoil is mottled yellowish-brown, yellow, gray, and white loamy fine sand. Another inclusion occupies about 20 acres in north-central Newland Township. It is surrounded by swamp and is wet most of the time. The lowest part of the area has a dark-gray to black loamy fine sand surface soil and a light-gray loamy fine sand or sand subsoil. The slightly higher part has an intermingled dark-gray and white surface soil and a weak to well-developed very dark brown organic pan.

Use and suitability.—About 75 percent of Stono fine sandy loam is under cultivation; the rest is in forest. Potatoes and early sweet corn are grown rather extensively. Other crops are corn, soybeans, cabbage, and snap beans. Forested areas have a cover of loblolly pine, sweetgum, red maple, and water and willow oaks. The undergrowth is waxmyrtle, greenbrier, and small cane.

This soil is easy to work and has good tilth. For best results some drainage is necessary for removal of excess surface water. Although not a serious problem, leaching is more rapid than in some of the finer textured soils. The soil responds to good management, including the use of fertilizers and lime. Productivity is not hard to maintain. This soil is exceptionally good for potatoes and early sweet corn. (See management group 3.)

Stono very fine sandy loam (Sc) differs from Stono fine sandy loam mainly in texture of surface soil and in the higher percentage of very fine sand and silt throughout the profile. The surface soil is very friable very fine sandy loam. The subsoil is mottled very fine sandy loam that contains pockets of loam in some places. Like the fine sandy loam, this soil is nearly level to very gently sloping and is somewhat poorly drained. Its inextensive areas are principally near Elizabeth City. A few small areas near Morgans Corner and Hudson Store in Newland Township occupy slight depressions in Woodstown and



Figure 8.—Potatoes on Stono very fine sandy loam—a highly desirable soil for a sure crop of good-quality potatoes. Potatoes have been grown on this field every year for 30 years and still make good yields.

Dragston soils. They are more nearly loam in texture and have more fine sand in the subsoil than is normal.

Use and suitability.—About 95 percent of this soil is under cultivation. The rest is in forest. The soil is largely used for potatoes (fig. 8) and is highly desirable for this crop. The other crops are mainly corn, soybeans, sweet corn, snap beans, and cabbage.

This soil is permeable to roots, air, and water. It has good water-holding capacity and good tilth and is easy to work. It responds to good management and retains more applied nutrients than Stono fine sandy loam. Some provision for removal of excess water is necessary for best use of the soil for crops. (See management group 3.)

Swamp

Swamp (Sd) consists of low wet land where water stands on the surface most of the time. It occurs along sluggish drainageways at or just above sea level and along the Albemarle Sound and the Pasquotank River. It is variable in texture and in content of organic matter. Where observed, it was mostly gray to very dark gray mineral soil ranging from fine sandy loam through silty clay loam or clay loam in texture. The subsurface layer is mostly light gray or gray and is variable in texture. A few areas were observed that had shallow mucky material on the surface, and in one area there was a light-gray silt loam, 24 to 36 inches deep, underlain by peaty muck.

Swamp is well distributed throughout the southern part of the county, the eastern part of Providence Township, and Newland Township. The largest areas are along the Little River in the east-central part of the county.

Use and suitability.—Except for a few areas in the extreme southern part of the county in grass, Swamp is entirely forested. The principal species are cypress, swamp blackgum, red maple, yellow-poplar, Carolina ash or water ash, and swampbay. In places there is an undergrowth of black alder, rattan or supplejack, wild rose, greenbrier, bamboo vine, and small cane. Swamp has nowhere been artificially drained. (See management group 15.)

Weeksville series

Weeksville silt loam is the only soil of the Weeksville series in the county. This soil occurs on flats and in very slight depressions. It is a moderately dark colored associate of the light-colored Pasquotank soils. It has an organic-matter content of about 5 to 8 percent. The medium-textured subsoil differentiates this soil from the dark-colored soils of the Bayboro series, which have fine-textured subsoils.

Weeksville silt loam (Wa) differs from the associated Pasquotank silt loam mainly in having a darker color to depths of 12 to 24 inches. It has about 5 percent organic matter, whereas the Pasquotank soil has only about 1½ to 2½ percent. Both soils have similar texture profiles, each being a deep silty soil with little difference between the surface soil and subsoil texture. This soil has developed on nearly level relief from moderately fine textured marine sediments. Runoff is slow to very slow, and internal drainage is medium to slow. A relatively high water table in wet seasons retards internal drainage. Almost all this soil is in Salem and Nixonton Townships. The principal areas are southeast of Weeksville and 3 or 4 miles south of Elizabeth City.

Profile in a cultivated area:

Surface soil—

0 to 16 inches, very dark gray or very dark brown silt loam; friable; weak medium granular structure.

16 to 22 inches, intermingled very dark gray and light brownish-gray loam or silt loam; very friable; slightly sticky when wet.

Subsoil—

22 to 36 inches, mottled gray, light brownish-gray, and white loam or silt loam; friable.

36 to 40 inches, mottled light brownish-gray and yellowish-brown silt loam; contains lenses or pockets of silty clay loam; friable.

Substratum—

40 to 60 inches, light-gray interbedded fine sandy loam and loamy fine sand mottled with strong brown and yellowish brown; contains lenses or pockets of silty clay loam.

The thickness of the surface soil ranges from about 12 to 24 inches. The average is about 12 inches for nearly half the soil area, and for the other half the range is from 18 to 24 inches. The substratum is variable in texture but is mainly fine sandy loam and loamy fine sand in which there are lenses and pockets of heavier material. In places several miles south of Elizabeth City, the substratum is mainly loamy fine sand.

The organic-matter content is low in this soil. Field tests indicate that, except where limed, the surface soil and subsoil are strongly to medium acid, and that the substratum is slightly acid in places. The surface soil is moderately permeable, and the subsoil is moderately to slowly permeable. The water-holding capacity is high.

Use and suitability.—Practically all of Weeksville silt loam is under cultivation. Only about 5 percent is in pasture, and 2 percent in forest. Potatoes, cabbage, corn, and soybeans are the principal crops.

Although this soil is poorly to very poorly drained, farmers speak of it as loose and open and say that crops seldom drown after heavy rains. The soil does not warm as early in spring as some of the lighter textured and better drained soils. It is not as easy to work as some of the other soils, but it responds to good management and can be built up and kept productive. Commercial fertilizers and lime do not leach out rapidly. For best results, moderately intensive drainage is necessary. In favorable

years potato yields are high. Potatoes usually mature later than on some of the lighter textured and better drained soils, such as the Dragston and Stono. In wet years harvesting the crop is a problem. (See management group 2.)

Woodstown series

Only Woodstown fine sandy loam of the Woodstown series is mapped in this county. This soil occupies low ridges and gentle slopes leading to drainageways and is moderately well drained. It is associated with soils of the Dragston, Fallsington, and Klej series.

Woodstown fine sandy loam (Wb) is light colored like the associated Dragston, Fallsington, and Klej soils, but it is better drained. About 95 percent of this soil is on slopes of less than 2 percent; the rest is on slopes of 2 to 3 percent. Runoff is slow to medium and internal drainage is medium. This soil has developed from moderately coarse to medium textured marine sediments deposited on loamy sand or sand. It occurs in small scattered bodies, principally southwest, west, and north of Elizabeth City; along the Little River in the west-central part of the county; along the Pasquotank River in Newland Township; and in Nixonton Township.

Profile in a forested area:

Surface soil—

0 to 1 inch, very dark gray fine sandy loam; very friable to loose.

1 to 6 inches, grayish-brown fine sandy loam; very friable to loose.

6 to 16 inches, brownish-yellow fine sandy loam; very friable.

Subsoil—

16 to 26 inches, reddish-yellow fine sandy loam or loam; friable.

26 to 36 inches, yellowish-brown fine sandy loam mottled with light gray and strong brown; contains pockets of sandy clay loam; friable.

Substratum—

36 to 60 inches, yellow and light-gray loamy fine sand.

In places the texture of the surface soil ranges from fine sandy loam to loamy fine sand. The texture of the subsoil varies somewhat. In most places in cultivated fields the surface soil is grayish brown.

This soil is very low in organic matter. The surface soil and subsoil are usually strongly acid, and the substratum is medium acid. The soil is rapidly permeable in the surface soil and moderately permeable in the subsoil. It has a moderately low water-holding capacity.

As mapped this soil includes scattered areas, totaling about 180 acres, that are somewhat better drained and have less than the typical development of texture in the profile. These areas are associated with Dragston fine sandy loam. They have a brown to grayish-brown fine or very fine sandy loam surface soil. The subsoil, a light yellowish-brown or yellowish-brown fine sandy loam, is underlain by loamy fine sand. In some places faint mottlings appear in the lower part of the subsoil, but these included areas are essentially well drained.

Use and suitability.—About 85 percent of Woodstown fine sandy loam is under cultivation, and 2 percent is in pasture. The rest is in forest. Potatoes, sweet corn, snap beans, peanuts, sweetpotatoes, corn, and soybeans are the principal crops. Cotton and cabbage are lesser crops.

This soil is suited to a wide variety of crops but inherently is not very productive. It warms early in spring and is very easy to work. In growing general crops of the area, drainage is no problem. The soil is somewhat open and droughty, and applied plant nutrients leach rapidly when the land is left bare. If handled properly areas on slopes of 2 percent or more are not subject to serious erosion. This soil responds to proper management, and fair to good yields of high-quality potatoes, sweetpotatoes, peanuts, sweet corn, and other crops result from liberal fertilization. (See management group 8.)

Management Groups of Soils

The various soil types, soil phases, and land types have been described in some detail in the preceding section. As can be seen from the descriptions, these soils have appreciable differences in natural characteristics and, consequently, different suitabilities for crops and different management requirements. Sassafras and Woodstown soils, for example, are low in organic matter and plant nutrients but do not need artificial drainage to make them suitable for a wide variety of crops. Bayboro and Bladen soils, on the other hand, are fairly high in organic matter but require intensive artificial drainage to make them suitable for cultivated crops. Even when so improved, their suitability for crops has only a medium range.

The evaluation of soils is based on the experiences of farmers and on the observations of soil surveyors, extension workers, experiment station personnel, and others who work with the soil. On the basis of opinions formed, the soils of Pasquotank County have been grouped according to their use suitabilities and their management needs.

In this section each management group is discussed from the standpoint of (1) characteristics common to the soils of each group, (2) present use and management, (3) suitability for agriculture, and (4) requirements for proper management.

Management Group 1

The light-colored moderately permeable loamy soils of management group 1 are:

Barclay very fine sandy loam (Ba). Nixonton very fine sandy loam (Na).

These soils are deep and friable. Their texture ranges from very fine sandy loam to silt loam. They are nearly level to gently sloping and moderately well drained to somewhat poorly drained. They are low to very low in organic matter, low in plant nutrients, and strongly to very strongly acid.

Almost all the acreage of these soils is used for crop production. Potatoes, cabbage, snap beans, and sweet corn are very important. Corn and soybeans occupy an extensive acreage. Practically all the acreage of these soils, especially that of Barclay very fine sandy loam, has been artificially drained.

Only short rotations are used. Potatoes are often planted on the same land year after year, and they may be followed in the same year by soybeans, fall cabbage, or fall snap beans. Some sweet corn is grown, and it is

normally followed by soybeans or fall cabbage. Spring cabbage is normally followed the same year by soybeans or corn. Some farmers practice a 4-year rotation: Potatoes are followed by soybeans the second year, corn the third year, and soybeans or fall cabbage the fourth year. A 2-year rotation of corn and soybeans is used on a small acreage.

Potatoes commonly receive 2,000 to 2,500 pounds of a 6-8-6⁵ fertilizer, or its equivalent, an acre. Soybeans following potatoes usually are not fertilized; but when they follow corn or some other crop that has not been fertilized heavily, they are commonly treated with 200 to 400 pounds of 0-10-20 or its equivalent. Cabbage following potatoes receives 600 to 800 pounds of 6-8-6, or its equivalent, and a side dressing of 200 to 300 pounds of complete fertilizer or about 200 pounds of nitrate of soda. Cabbage following corn or soybeans usually is fertilized with 1,200 to 1,500 pounds of 6-8-6, or its approximate equivalent, and a side dressing of about 200 pounds of nitrate of soda. Most corn is fertilized with 200 to 400 pounds of 6-8-6, or its approximate equivalent, and a side dressing of 200 to 300 pounds of a nitrate fertilizer. A few farmers make heavier applications of both of these fertilizers for corn. Sweet corn receives somewhat heavier fertilization than most field corn.

Occasionally ½ to 1 ton of lime an acre is used for soybeans, cabbage, and corn. Some winter cover crops, such as vetch, crimson clover, wheat, rye, and oats, are grown for green manure and are seeded mainly in fall cabbage.

The soil is prepared for planting by first disking with a tandem disk or by breaking with a 4- or 5-blade disk tiller and then by bedding with middlebreakers or disk tillers. This preparation is carried out in winter for potatoes and spring cabbage and late in winter and early in spring for corn and soybeans. Practically all crops are planted on beds to increase runoff and to reduce the effect of heavy rains that may occur at planting time or during the growing season.

Use suitability and management requirements.—In general, most of the acreage of the soils of management group 1 is not well suited to the production of crops unless drained. But experience shows that these soils respond well to artificial drainage by open ditches. Where adequately drained, they are well suited to many crops, particularly the common truck crops; corn and soybeans; and some legumes and grasses for hay and pasture. Heavy fertilization, however, is needed to maintain good yields for many years. The present rates of fertilization are thought to be at a comparatively high level, and the rather short rotations used are considered suitable for these soils. Every 2 or 3 years, however, a winter legume crop, such as crimson clover, Austrian winter peas, or vetch, should be added to the rotation and turned under the following spring as green manure. Most crops respond to light applications of dolomitic limestone (½ to 1 ton an acre), but lime should not be added where potatoes are to be grown, because potato scab seems to be induced by a neutral or slightly alkaline soil.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are in table 4.

⁵ Percentages, respectively, of nitrogen, phosphoric acid, and potash.

Management Group 2

The light- to dark-colored loamy soils of management group 2 have moderately permeable surface soils and moderately to slowly permeable subsoils. They are:

Pasquotank silt loam (Pa). Weeksville silt loam (Wa).
Pasquotank very fine sandy loam (Pb).

These soils have friable or very friable silt loam or very fine sandy loam surface soils. Their subsoil layers are friable and open, and water passes through them fairly easily if the water table is low enough. These soils are nearly level and are poorly to very poorly drained. This poor drainage is caused by slow or very slow runoff and a relatively high water table. The reaction is strongly to medium acid. The Pasquotank soils of the group have light-colored surface soils containing 1½ to 2½ percent organic matter. The Weeksville soil has a darker colored surface soil containing 4 to 6 percent organic matter.

The same type of crops are grown on the soils of this group as on those of management group 1. Fertilization and tillage practices are essentially the same for both groups, but drainage of excess surface water is a greater problem on soils of group 2. Practically all crops are planted on beds for better drainage.

Use suitability and management requirements.—The soils of management group 2 are well suited to potatoes, cabbage, corn, and soybeans. However, they are better suited to cabbage and corn than to potatoes and snap beans. Weeksville silt loam is considered the least desirable soil of the group for potatoes because it warms slowly in spring, and harvesting is sometimes difficult in wet seasons. High yields of potatoes, however, are produced in favorable seasons. The soils of the group have small acreages in sweet corn and snap beans. The bean yield is high, but the beans usually grow too large for best quality.

The soils of group 2 are relatively easy to handle. They retain moisture and applied plant nutrients, respond well to good management, and are fairly easy to keep productive. The soils give up excess water freely when drained, unless the water table is very high.

Moderately intensive drainage practices are needed to remove surface water. Ditches generally should be closer together than on Barclay very fine sandy loam of management group 1. Weeksville silt loam must be cultivated at the moisture content suitable for good tilth and for best structure condition. If more green-manure crops were turned under in the rotations and better use were made of crop residues, Pasquotank soils would benefit greatly in organic matter and in tilth. As on soils of group 1, soybeans and cabbage normally respond to applications of lime; however, because of the hazard of potato diseases in limed soil, the amount of lime used should be determined with care if potatoes are grown in the rotation. Excellent pasture can be established on all the soils of this group by using suitable grass mixtures and by proper liming and fertilizing.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are given in table 4.

Management Group 3

The soils of management group 3 are light to dark colored and moderately permeable. They are:

Dragston fine sandy loam (Da). Stono fine sandy loam (Sb).
Dragston very fine sandy loam (Db). Stono very fine sandy loam (Sc).

These loamy soils are friable throughout. The surface soil ranges from fine sandy loam to very fine sandy loam. The subsoil is fine sandy loam, very fine sandy loam, or loam. Loose loamy sand occurs at a depth of about 3 feet. Its unstable consistence may cause the walls of deep ditches to break down. The soils of this group are nearly level to very gently sloping and have slow to medium runoff. Their somewhat poor drainage is caused by a relatively high water table rather than by impervious soil layers. The surface soils and subsoils are strongly acid in all areas that have not been limed. The organic-matter content is very low (less than 2 percent) in the Dragston soils and low (4 to 5 percent) in the Stono soils.

Potatoes, corn, soybeans, sweet corn, cabbage, and snap beans are the principal crops on soils of this management group. Less extensive crops are cotton, oats, and lespedeza. The soils of this group differ physically from those of management groups 1 and 2, and although generally less productive, they may be more desirable for some crops.

Short rotations are used on these soils. Potatoes are planted year after year on many fields and are followed by soybeans, corn, or snap beans. Both fall and spring cabbage are grown. Fall cabbage usually follows potatoes, and the spring cabbage is followed by soybeans or corn. Sweet corn is followed by soybeans or fall snap beans. Green-manure crops are seldom grown except in rotation with fall cabbage. On a few farms, a 2-year rotation of corn and soybeans is used.

Potatoes are fertilized with 2,000 to 3,000 pounds of 6-8-6 or 8-8-8 an acre. Yields on the Stono soils are equal to or may be slightly higher than those on the Dragston soils. Soybeans that follow potatoes in the rotation receive no fertilizer, but when grown alone they receive 200 to 400 pounds of 0-10-20 or 0-9-27. Corn normally receives 200 to 300 pounds of 6-8-6, 8-8-8, or 5-10-5 and a side dressing of 200 pounds of nitrogen carrier. Cabbage usually receives 1,200 to 1,600 pounds of 8-8-8 plus 100 pounds of nitrogen carrier. A few farmers, however, use 400 to 500 pounds of a complete fertilizer and a side dressing of 400 to 500 pounds of a nitrogen carrier for corn. Sweet corn receives 400 to 500 pounds of a complete fertilizer and a side dressing of 300 to 400 pounds of nitrate of soda. Snap beans are fertilized with about 600 pounds of 6-8-6 or 8-8-8.

Practically all crops, especially those planted in winter and spring, are grown on beds. The land is prepared by disking or breaking with a disk tiller and then bedding with a middlebreaker or disk tiller.

Use suitability and management requirements.—Although inherently not so productive as the soils of management groups 1 and 2, the soils of management group 3 have unusually favorable physical qualities. They warm relatively early in spring and are suitable for many crops, especially early potatoes, early sweet corn, and snap

beans. They respond to good management and are easy to handle. Stono soils have more organic matter than Dragston soils. Because of this advantage, they have much better tilth, absorb water more readily and retain it longer, and can be worked under a wider range of moisture content than Dragston soils.

Moderate drainage practices are essential for successful production of most crops. Shallow ditches, spaced at intervals of 300 to 500 feet, suffice to remove excess water. Turning under more green manure in the rotation would be beneficial, particularly on Dragston soils. This practice would increase organic matter and improve tilth. Soybeans and cabbage normally respond to applications of lime. However, where potatoes are grown in the rotation, it is best to test the soil before applying lime, since too much lime may induce potato disease.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group, in table 4.

Management Group 4

The soils of management group 4 are light colored and loamy and have moderately permeable surface soils and slowly permeable subsoils. They are:

Matapeake fine and very fine sandy loams (Mb).	Mattapex very fine sandy loam (Md).
Mattapex fine sandy loam (Mc).	Mattapex very fine sandy loam, deep phase (Me).

These soils have very friable fine sandy loam to very fine sandy loam surface soils and friable clay loam or loam subsoils. They occupy gentle slopes near or bordering streams. All the soils are moderately well drained except Matapeake fine and very fine sandy loams, which are well to somewhat excessively drained. Except for Mattapex very fine sandy loam, deep phase, all the soils are underlain by loamy fine sand at a depth of 40 inches or less. The surface soils and subsoils of the group are strongly acid except where lime has been recently applied. All the soils are very low in organic matter.

Corn and soybeans are the principal crops on soils of group 4. Some areas are used for truck crops such as potatoes, snap beans, and sweet corn, and some for lespedeza. Peanuts and sweetpotatoes are grown to a small extent on Mattapex fine sandy loam and on the fine sandy loam parts of Matapeake fine and very fine sandy loams. Average acre yields of corn, soybeans, potatoes, sweet corn, and snap beans are the same as or slightly lower than on soils of group 3. Crop rotations and fertilizer practices are essentially the same as for the soils of that group.

Use suitability and management requirements.—The four inextensive soils of management group 4 generally occupy small parts of fields consisting mainly of group 5 soils. Their surface soils are moderately permeable to water and roots, but their subsoils are slowly permeable. The very fine sandy loam types tend to pack after heavy rains. Because of their coarser texture, the fine sandy loams absorb moisture more readily and can be worked under a wider range of moisture content. All the soils retain applied plant nutrients, but moisture relations are only fair for crop production. Crops are injured by dry weather but are seldom damaged by excess water in wet

periods. Crop yields vary with the weather and are usually higher in wet than in dry years.

Group 4 soils can be built up and kept fairly productive. They respond to good management practices that include suitable rotations, heavy fertilization, and lime for certain crops. Their tilth, moisture-holding capacity, and organic-matter content can be improved by growing more green-manure crops and by using crop residues more effectively.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group in table 4.

Management Group 5

The soils of management group 5 are light colored and have moderately to rapidly permeable surface soils and slowly permeable subsoils. They are:

Bertie fine sandy loam (Bg).	Bertie very fine sandy loam, deep phase (Bk).
Bertie very fine sandy loam (Bh).	

These soils have very friable fine sandy loam or very fine sandy loam surface soils and friable sandy clay loam, clay loam, or loam subsoils. They are nearly level to very gently sloping and are somewhat poorly drained. They are low to very low in organic matter. Their upper part is strongly acid and their lower part slightly acid. They are comparable in texture to the Mattapex soils of group 4, but they are less well drained.

The soils of this group have a lower percentage of their acreage under cultivation than the soils of group 4. Corn and soybeans are the principal crops. Relatively small acreages are used for potatoes, cabbage, snap beans, sweet corn, and cotton. Peanuts are planted to a small extent on Bertie fine sandy loam. The corn and soybeans are grown in a 2-year rotation. Potatoes are followed by soybeans or fall cabbage, and sweet corn is followed by soybeans or fall snap beans. Green-manure crops or winter cover crops are seldom grown. Fertilization is essentially the same as for the soils of group 3.

Use suitability and management requirements.—Good drainage is somewhat more difficult to obtain on soils of management group 5 than on the somewhat poorly drained Stono and Dragston soils of management group 3, because the subsoils of group 5 are less permeable and retard internal movement of water. All of the soils of group 5 except Bertie very fine sandy loam, deep phase, are underlain by loamy sand at a depth of about 3 feet. This sand tends to cave in rapidly, and deep lead ditches are therefore expensive to dig and difficult to maintain. The very fine sandy loam types absorb water fairly slowly and they pack and clod if worked when too wet. All the soils of this group have subsoils that are slowly permeable to water, roots, and air.

Each soil of group 5 responds well to good management, such as suitable rotation, fairly heavy fertilization, and proper liming for certain crops. Tilth can be greatly improved and the absorptive capacity of the soils increased by growing more deep-rooted cover crops in the rotations and by turning under crop residues. Sufficiently limed and fertilized areas can produce good to excellent Ladino clover-grass pasture.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are in table 4.

Management Group 6

Fallsington fine sandy loam is the only member of management group 6. This light-colored loamy soil has a rapidly permeable surface soil and a moderately permeable subsoil. The surface soil is very friable. The subsoil consists of a very friable fine sandy loam containing lenses or pockets of loam or sandy clay loam. Because this soil has a subsoil that is soft and unstable when saturated and a loose and sandy substratum, some farmers believe it has a quicksand subsoil. The soil is nearly level and has developed under conditions modified by a high water table. It is poorly drained. The surface soil and subsoil are strongly to very strongly acid, and the organic-matter content is very low.

The principal crops are corn, soybeans, potatoes, sweet corn, and green beans. Small acreages are used for cabbage, peanuts, and pasture. In some areas potatoes are planted in spring and, after they are harvested, either soybeans or fall snap beans are planted. If sweet corn is planted in spring, it is normally followed by a fall crop of snap beans. Late cabbage, instead of snap beans, may follow the sweet corn. The only systematic crop rotation is corn for 1 year followed by soybeans for 1 year. The very small acreage of peanuts is normally grown in a rotation of corn and soybeans.

Fertilization is essentially the same as for soils of group 3. All crops are planted and cultivated on beds to increase runoff and to prevent damage by heavy rains. The land is prepared in winter and spring by disking or by breaking with a disk tiller and by bedding with a middlebreaker or disk tiller.

Use suitability and management requirements.—The soil of management group 6 is generally low in natural fertility, and its fertility is difficult to build up because applied plant nutrients leach fairly rapidly. The soil is easily worked and is suited to many crops. Its poor drainage is due mainly to a high water table and not to impervious soil layers.

Artificial drainage is essential for successful production of cultivated crops, hay, or pasture. All areas under cultivation have been drained by shallow open ditches. As the soil is strongly to very strongly acid, soybeans and cabbage, especially, respond to applications of lime. More green-manure crops would increase the soil's organic matter and improve tilth.

General fertilizer recommendations for crops are given in table 3, and a suitable crop rotation for the soil of this group is in table 4.

Management Group 7

The soils of management group 7 are dark colored and have moderately to rapidly permeable surface soils and moderately or moderately to slowly permeable subsoils. They are:

Pocomoke fine sandy loam (Pc). Pocomoke mucky loam (Pe).
Pocomoke loam (Pd).

These soils have developed under conditions modified by a high water table. Their dark-colored surface soils are very friable, friable, or loose, and their subsoils are friable to very friable. The soils are nearly level and are poorly drained. Their organic-matter content ranges from low to high. Pocomoke fine sandy loam and Pocomoke

loam are strongly acid in their surface soil and subsoil and medium acid in their substratum. Pocomoke mucky loam is strongly acid throughout.

Corn and soybeans have the largest acreage, but cabbage, potatoes, and sweet corn are fairly extensive on Pocomoke fine sandy loam. Fertilization and rotations are about the same as for groups 3 and 6. A 2-year rotation of corn and soybeans is most commonly used. Average yields of corn and cabbage are somewhat higher than on Fallsington fine sandy loam of group 6.

To increase runoff and to prevent injury to crops by heavy rains, all crops are planted and cultivated on beds. The land is prepared in winter and spring by disking or breaking with a disk tiller and by bedding with a middlebreaker or disk tiller.

Use suitability and management requirements.—Soils of management group 7 differ from those of management group 6 mainly in having a higher content of organic matter. Consequently, drained areas of the soils have better tilth, can be worked under a wider range of moisture content, and retain more moisture and applied plant nutrients. High water tables, not impervious soil layers, cause insufficient drainage in these soils. Therefore they can be drained more easily than soils having less permeable subsoil layers, because water percolates readily through the soil to the water table.

The soils of this group must be artificially drained for successful production of cultivated crops, hay, or pasture. All cultivated areas have been drained by shallow open ditches. These soils do not need green-manure crops as badly as the soils of group 6, but such crops would be beneficial. Because soils of group 7 are strongly to very strongly acid, cabbage and soybeans respond to applications of lime. Before potatoes are planted the soil should be tested for lime requirements, because adding lime may increase the risk of potato disease.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are in table 4.

Management Group 8

The soils of management group 8 are light colored and have rapidly permeable surface soils and rapidly to moderately permeable subsoils. They are:

Sassafras loamy fine sand (Sa). Woodstown fine sandy loam (Wb).

These soils have very friable to loose, coarse to moderately coarse textured surface soils, and friable, medium to moderately coarse textured subsoils. The lower parts of some areas have pockets of moderately fine textured soil. The soils occupy nearly level or very gentle slopes on low narrow ridges or narrow strips near or along drainage-ways. They are moderately well drained to somewhat excessively drained. The Woodstown soil has a somewhat higher water table than the Sassafras soil. Both soils are very low in organic matter and in fertility. Their surface soils and subsoils are strongly acid.

Early potatoes, early sweet corn, sweetpotatoes, peanuts, and snap beans are grown. No definite rotation is followed. If corn and soybeans are the only crops grown, corn is planted 1 year and soybeans the next. Normally, potatoes are followed by soybeans or fall snap beans, and sweet corn by snap beans. Sweetpotatoes and

peanuts are grown on small acreages. Each of these crops may be planted for several consecutive years on the same tract or may be grown in rotation with other crops. Some tobacco is planted on Woodstown fine sandy loam.

Potatoes are fertilized with 2,000 to 2,500 pounds of 6-8-6 or 8-8-8 an acre. Snap beans receive 800 to 1,000 pounds of 6-8-6. Sweet corn receives 600 to 1,000 pounds of 6-8-6 or 5-10-5 and a side dressing of a nitrogen carrier. Corn receives about 400 pounds of 6-8-6 and a side dressing of 200 pounds of nitrate of soda. Soybeans get 200 to 400 pounds of 0-10-20.

Use suitability and management requirements.—Applied plant nutrients leach out of the soils of this group fairly rapidly. The soils, however, have good workability, warm early in spring, and respond well to good management. Though not inherently fertile, these soils are well suited to a wide variety of crops, including early potatoes, early sweet corn, sweetpotatoes, peanuts, and snap beans. The soils are only moderately well suited to pasture because they tend to be droughty. Management that includes heavy fertilization can result in fair to good yields of all crops common to the area. High fertility, however, is difficult to maintain.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are in table 4.

Management Group 9

The soils of management group 9 are light colored and have moderately permeable surface soils and slowly permeable subsoils. They are:

Othello fine sandy loam (Oa). Othello very fine sandy loam,
Othello very fine sandy loam deep phase (Oc).
(Ob).

These soils have very friable surface soils and friable clay loam, silty clay loam, or loam subsoils that contain moderately fine-textured to medium-textured interbedded material in some areas. The soils occur on flats and are poorly drained. They are very low in organic matter. Their surface soils and the upper part of their subsoils are strongly acid. Internal drainage is slower than in soils of group 8 but not so slow as in those of groups 11 and 12. Othello fine sandy loam has a higher percentage of fine and very fine sands and a lower percentage of silt throughout the profile than the two very fine sandy loam soils of group 9.

Corn and soybeans occupy about 90 percent of the cultivated land. Other crops are potatoes, cabbage, sweet corn, lespedeza, and oats. A small acreage lies idle because of insufficient drainage. The potatoes and cabbage are planted mostly on Othello very fine sandy loam and Othello very fine sandy loam, deep phase.

Corn and soybeans are grown in a 2-year rotation. Corn normally receives 200 to 300 pounds of 6-8-6 or 5-10-5 an acre and a side dressing of 200 pounds of nitrate of soda or other nitrogen carrier. Some farmers apply 400 to 600 pounds of the same complete fertilizers and a side dressing of 300 to 500 pounds of a nitrogen carrier. If the weather is favorable and cultivation good, average yields are higher under this increased fertilization. Normally, soybeans receive 200 to 400 pounds of 0-10-20 or 0-9-27, but in a few fields they receive heavier applica-

tions. Some fields are not fertilized for soybeans. About ½ to 2 tons an acre of ground limestone is normally applied ahead of soybeans in the rotation. Potatoes receive 2,000 to 2,500 pounds of 6-8-6 or 8-8-8. Cabbage normally follows potatoes and receives 600 to 800 pounds of 6-8-6 or 5-10-5. Cover crops are seldom grown with any crop except fall cabbage.

All crops are planted and cultivated on beds. Cropland is prepared in winter and spring by disking or by breaking with a disk tiller and then bedding with a middlebreaker or disk tiller.

Use suitability and management requirements.—Except for the small area of Othello very fine sandy loam, deep phase, all the soils of management group 9 are underlain by loamy sand at depths of 36 to 40 inches. The walls of ditches dug into this friable sandy soil tend to cave in. Unfavorable weather, particularly heavy rains during the growing season, make crop yields uncertain on all the soils. These soils retain applied plant nutrients and respond well to good management.

Moderately intensive drainage is needed for successful production of cultivated crops. Organic matter can be increased and tilth improved by turning under cover crops. Corn yields can be considerably increased by turning under a leguminous cover crop before the corn is planted in the rotation.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are in table 4.

Management Group 10

Portsmouth fine sandy loam, sandy substratum phase, is the only soil of management group 10. It is dark colored and has a moderately to rapidly permeable surface soil and a moderately permeable subsoil. The surface soil is very friable, and the subsoil is friable sandy clay loam or sandy clay. A very friable loamy sand substratum occurs at depths of 32 to 40 inches. This soil is on flats and in very slight depressions and it is very poorly drained. The organic-matter content is low to medium. The surface soil and upper part of the subsoil are strongly acid.

Corn and soybeans are almost the only crops planted on this soil. They are grown in a 2-year rotation. Fertilization is the same as for similar crops on the soils of group 9, but yields are slightly higher.

Use suitability and management requirements.—The loamy sand substratum of this soil is unstable, and ditches dug into it are subject to filling by caving ditchbanks. The soil is comparable to Othello fine sandy loam of group 9. It differs mainly in having a higher content of organic matter, which is 4 to 5 percent in cultivated fields and 10 to 12 percent in forests. Because of this higher content, the soil has better tilth, absorbs and holds water better, and can be worked under a wider range of moisture content than the Othello soil. The need for turning under cover crops is not so great as for soils of group 9. Moderately intensive drainage is required for successful production of cultivated crops.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the soil of the group are in table 4.

Management Group 11

The soils of management group 11 are dark colored and have moderately or rapidly permeable surface soils and clayey very slowly permeable subsoils. These soils are:

Bayboro loam (Bb).	Bayboro mucky loam (Be).
Bayboro loam, sandy substratum phase (Bc).	Bayboro mucky loam, burned phase (Bf).
Bayboro loam, thick surface phase (Bd).	

The loamy or mucky loam soils of group 11 have friable surface soils and firm clay or silty clay subsoils that are plastic when wet. They occupy flats and broad shallow depressions and are very poorly drained. They are strongly acid in the upper part but normally are less acid in the lower part. The organic-matter content is medium to high and ranges from 8 to 15 percent in the loams and from 20 to 45 percent in the mucky loams.

Corn and soybeans, the principal crops, are usually grown in a 2-year rotation. A few fields are in potatoes, chiefly on Bayboro loam, thick surface phase. Fall oats follow corn on a small acreage. The oats are followed by soybeans, or lespedeza may be sown in them in spring for hay, seed, or temporary pasture. The need for winter-cover or green-manure crops is not great and they are not grown. Some excellent Ladino clover-fescue pasture is on Bayboro loam and Bayboro loam, thick surface phase.

Corn is usually fertilized with 300 to 400 pounds of 6-8-6 or 5-10-5 an acre and a side dressing of 100 to 200 pounds of nitrate of soda or a mixture of ammonium nitrate and calcium carbonate. Some farmers, however, do not sidedress with a nitrogen fertilizer. A few farmers apply 400 to 500 pounds of a complete fertilizer and a side dressing of 300 to 400 pounds of a nitrogen carrier. Soybeans usually receive 200 to 300 pounds of 0-9-27 or 0-10-20, although a few farmers make larger applications and others apply no fertilizer. Lime is used fairly extensively in quantities of $\frac{1}{2}$ to 2 tons an acre. Most of it is used for soybeans.

Tilled crops are planted and cultivated on row beds 12 to 18 inches high. Lespedeza is normally planted on wide low beds. The land is prepared in spring for corn and soybeans by disking or breaking and then by bedding with a middlebreaker or disk tiller. Before planting, the beds are smoothed down with a disk or spring-tooth harrow, or with a rotary-hoe cultivator.

Use suitability and management requirements.—Because of their medium to high organic-matter content, the soils of management group 11 have better tilth and more permeable surface soils than the soil of management group 10. Furthermore, they can be tilled under a wider range of moisture content. In wet weather water percolates freely to the firm subsoil. These soils retain moisture better than those of group 12, and crops are injured less during dry periods. Except for content of organic matter, profile characteristics of all the soils of group 11 are similar to depths of 36 to 40 inches. Below these depths Bayboro loam, sandy substratum phase, is underlain by loamy sand, which is highly unstable. Drainage ditches dug into this loamy sand are difficult and costly to maintain.

It is difficult to establish crops and to control weeds and grass on the soils of this group. Furthermore, crops are damaged in both dry and excessively wet periods and harvesting is a problem in wet years. Consequently crop

returns are uncertain. As intensive drainage is essential for successful production of tilled crops, all cultivated areas have been drained.

The soils of this group need more lime to correct the acidity than those of group 12. They are strongly acid in the upper part, and some crops, especially soybeans, respond to lime. However, they are fairly well supplied with organic matter and have less need of green-manure crops. Better control of weeds and undesirable grasses would generally benefit corn and soybeans and improve their yields.

Under common management, average corn yields on most of the soils are about 35 bushels an acre. With improved management that includes proper fertilization, the average can be nearly doubled in favorable years. About $2\frac{1}{2}$ acres of unimproved pasture will supply grazing for 1 cow through the normal grazing period of 220 days. However, about 1 acre of improved Ladino clover-fescue pasture will support 1 cow through the same period.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are in table 4.

Management Group 12

The soils of management group 12 are light to dark colored and have loamy moderately or slowly permeable surface soils and clayey very slowly permeable subsoils. They are:

Bladen fine sandy loam, sandy substratum phase (Bn).	Elkton silt loam (Eb).
Bladen silt loam (Bo).	Elkton silt loam, sandy substratum phase (Ec).
Bladen silt loam, sandy substratum phase (Bp).	Elkton silt loam, thick surface phase (Ed).
Elkton fine sandy loam, sandy substratum phase (Ea).	

These soils have friable to very friable surface soils and firm to very firm subsoils that are plastic when wet. They are on flats and in shallow depressions and are poorly to very poorly drained. The supply of organic matter is low to very low. These soils are strongly acid in the surface soil and subsoil but are less acid in the lower part of the profile. The principal difference between the Bladen and Elkton soils in this group is in color. The Bladen soils are darker than the Elkton. All the soils of the group are much lighter colored than the Bayboro soils of group 11.

Cultivated areas of each soil of group 12 are managed essentially in the same way, and, except for cotton, the same kind of crops are grown on all. Corn and soybeans are the chief crops and are grown in 2-year rotations. Lespedeza, oats, and cotton are minor crops. Cotton is produced principally on the Elkton soils. Considerable acreage is used for pasture, mostly unimproved. Fertilization, except for cotton, is practically the same as for soils of group 11, and tillage practices are about the same. However, yields for the crops on soils of group 12 average slightly lower. Cotton usually receives about 300 pounds of 3-9-9 or 8-8-8 an acre.

Use suitability and management requirements.—The soils of group 12 have poor tilth and absorb water very slowly. They pack and crust after heavy rains and clod if worked when too wet. These soils dry slowly after rains, but they are droughty in dry seasons. The fine sandy loams of the

group have somewhat better tilth and are easier to handle than the silt loams.

Loose sandy layers occur at depths of 36 to 40 inches in the soils that have sandy substrata. Because of these unstable layers, ditchbanks cave in readily; consequently ditches are more difficult and expensive to maintain than in other soils of the group. These soils, however, can be cultivated sooner after rains than the other soils of the group.

Establishing crops and preventing damage to them in dry and extremely wet periods are difficult management problems on the soils of group 12. Weeds and grass are very difficult to control by plowing, because the soils can be worked only under a narrow range of moisture conditions. If not controlled, these plants generally tend to decrease corn and soybean yields. Each area under cultivation has been artificially drained, as intensive drainage is needed for the successful growing of tilled crops.

Probably no soils of the county are in greater need of green-manure crops, especially legumes, than those of this group. These crops are needed to increase organic matter and to improve tilth. Cattle and hogs are allowed to eat vegetation in many fields during the winter months. This practice is not good because the animals leave very little plant residue to be turned under for soil improvement.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are in table 4.

Management Group 13

The soils of management group 13 are light colored and have loamy moderately permeable surface soils and clayey very slowly permeable subsoils. They are:

Lenoir very fine sandy loam (La). Lenoir very fine sandy loam, sandy substratum phase (Lb).

These soils are somewhat poorly drained associates of the Bladen and Elkton soils of group 12. They have very friable surface soils and very firm subsoils. The soils are on nearly level to very gentle slopes bordering drainageways. There is generally enough slope to allow surface water to flow off freely, but in some places runoff is slow. Internal drainage is very slow. These soils are very low in organic matter, and their surface soils and subsoils are strongly acid.

Corn and soybeans, grown in a 2-year rotation, are the principal crops on these soils. Cultivation and fertilization are the same for these crops as for similar crops on group 11, but average yields are somewhat lower.

Use suitability and management requirements.—Cultivated fields on soils of management group 13 are relatively small. Both soils of this group have similar profiles to depths of 36 to 40 inches. At this depth the sandy substratum phase is underlain by very unstable loamy sand. Deep ditches dug into this sand are difficult to maintain because they cave in easily. The soils dry readily because of their unfavorable physical qualities. They are difficult to work, and if worked when wet, tend to bake and clod on drying. Moisture relations are very poor, and crops are injured even in short droughts. Under clean cultivation most areas are subject to slight to moderate erosion.

The soils of this group require less intensive drainage for successful production of cultivated crops than do those of groups 11 and 12. Increasing organic matter by turning

under more crop residues and green-manure crops, including legumes, will greatly improve tilth. Moderately eroded spots should be used for lespedeza or other close-growing crops wherever possible.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are in table 4.

Management Group 14

Management group 14 consists of light-colored rapidly permeable sandy soils. They are:

Galestown loamy fine sand (Ga). Klej loamy fine sand (Ka).

These soils have loose loamy fine sand surface soils and subsoils. They are very low in organic matter and inherently the least fertile soils in the county. Both soils of the group are level or very gently sloping. The Galestown soil has rapid internal drainage and is well drained to somewhat excessively drained. It is strongly to medium acid. The Klej soil also has rapid internal drainage, but it is moderately well drained to somewhat poorly drained. It has a higher water table than the Galestown soil. It is strongly acid in the surface soil and subsoil but is less acid in the substratum.

The principal crops on these soils are potatoes, sweet corn, snap beans, sweetpotatoes, peanuts, corn, and soybeans. Most of the potatoes, corn, and soybeans are grown on the Klej soil. Small peach orchards are located on both the Klej and Galestown soils. The pasture that occupies a small acreage of the Klej soil is unimproved.

No definite crop rotation is followed. Potatoes usually receive about 2,000 pounds of 6-8-6 an acre; sweet corn, about 600 pounds of 6-8-6 and a side dressing of nitrate of soda; and sweetpotatoes, 600 to 800 pounds of 3-9-9 or 6-8-6. Peanuts normally are not fertilized, but land plaster is sometimes applied in quantities of 400 to 600 pounds an acre.

Use suitability and management requirements.—The soils of group 14 are very easy to work. They warm early in spring, and potatoes and sweet corn can be planted 2 or 3 weeks earlier than on most of the other soils of the county. They are naturally low or very low in plant nutrients. Because of their open porous sandy profiles and rapid internal drainage, applied nutrients leach out rapidly. The Klej soil is not so droughty as the Galestown because its water table is higher. It is therefore more desirable for the crops commonly grown in the area, and its drainage is satisfactory for the growing of general crops, potatoes, peanuts, and sweetpotatoes.

These soils are droughty, low in plant nutrients, and difficult to keep productive. However, if properly fertilized and otherwise well managed, they could profitably grow early truck crops, melons, sweetpotatoes, and peaches.

General fertilizer recommendations for crops are given in table 3, and suitable crop rotations for the group are in table 4.

Management Group 15

The soils of management group 15 are gray to very dark gray and are moderately to slowly permeable. They are:

Bibb soils (Bm).

Swamp (Sd).

These soils are composed of mineral materials and small to relatively large quantities of organic matter. Bibb soils consist of recent alluvial materials that range considerably in texture and are very low in organic matter. They are poorly drained and have a water table that remains at or near the surface most of the year. The areas of Swamp are permanently wet, and water stands on the surface most of the time. The organic-matter content of Swamp ranges from very low to very high.

Practically all areas of the soils of this group are in forest. Because of the difficult drainage problem, these soils can best be used for forest.

Management Group 16

Mucky peat, the only member of management group 16, is dark colored and has a mucky loam surface soil underlain by decomposed plant remains. It ranges from about 2 to more than 5 feet in depth. The mucky material is underlain by mineral soil that ranges from loamy sand to silty clay or clay. The water table is at or near the surface all year. None of the acreage of Mucky peat has been drained and used for cultivated crops. All areas have been cut over and now support little merchantable timber. Most areas of Mucky peat have been burned over.

Management Group 17

Management group 17 consists of Borrow pits and Made land and dumps. These land types have no agricultural value. Borrow pits are excavations from which soil material has been removed for construction work. Made land and dumps are used for different purposes around military establishments.

General Management Practices for Pasquotank County Soils

The successful farmer strives to build up and maintain productivity on his farm. Like any other business or enterprise, a farm should be understood and operated in such a way as to make it successful. Since the soil is an important part of the farm, a farmer should know his soil and have a sound basis for every step in its management. Different soils present different problems of use and management that should be studied and understood so that crops may be most satisfactorily and profitably produced. No system of management can be satisfactory unless it produces profitable returns in the long run. Certain methods may be profitable for a time but ruinous if followed for long periods.

The chief problems of soil use and management in this county concern drainage, fertilizing and liming, maintenance of organic matter, crop rotations, tillage, planting and harvesting, and control of insect pests.

Drainage

Improvement of drainage is necessary on a great part of the soils of this county if high productivity of the commonly grown crops is to be had. Very few, if any,

farms are entirely on well drained or moderately well drained soils. Well-drained soils cover about 0.8 percent of the total acreage of the county; moderately well drained, 3.5 percent; and somewhat poorly drained, 12.2 percent. The rest of the county consists either of poorly drained or very poorly drained soils.

In some areas the moderately well drained soils may benefit from drainage. The somewhat poorly drained soils need some drainage for successful production of most crops. The poorly drained and very poorly drained soils occur on nearly level or slightly depressed relief, and runoff is slow or very slow. Downward movement of water through the soil varies with soil texture and structure and with the height of the water table. The somewhat poorly drained soils normally are on nearly level to very gently sloping relief (1 to 2 percent), and runoff is slow to medium. In some areas the slope of the moderately well drained and well drained soils is as much as 4 percent.

Farmers of the county are experienced in artificial drainage. They have found that a system of open ditches consisting of small lateral or feeder ditches and larger canals or lead ditches is a practical means of removing excess water. This drainage system is notably effective in removing excess surface water, but it rarely lowers the water table to a depth of more than 2 feet.

Practically all planting and cultivating is on beds (fig. 3). The field drains (fig. 2) are narrow furrows that intersect the crop rows and lead to laterals that drain off the excess water. This system provides adequate drainage and at times prevents damage to crops after heavy rains. Most laterals are 1½ to 2½ feet deep, and the lead ditches are normally 3 to 4 feet deep and rarely more than 4 feet. The lead ditches empty into a natural drainageway. The laterals are spaced at distances that vary from about 100 to 600 feet, according to the character of the soil. Laterals on somewhat poorly drained soils need not be spaced so closely as those on poorly drained soils. Soils with nearly impervious layers, however, must have closer laterals than the more friable and permeable soils. Although this system of drainage seems satisfactory, losses may occur in wet seasons because of poor germination of the seed, drowning of the crop, and delayed planting, cultivating, and harvesting.

These open drainage systems are expensive to maintain. Every 2 or 3 years they must be cleaned out, and every year weeds, brush, and briars must be removed from the banks. The ditchbanks are unstable, and, unless they are stabilized by vegetation, they cave in, especially after freezing and thawing. In winter cattle and hogs run in many fields and damage this drainage system. The cattle and hogs help fill the ditches by trampling, and the hogs add to this fill by rooting along the banks. Ditches in fine-textured soils are more stable than those coarser soils.

Many soils are underlain by loamy sand at 36 to 40 inches. Because this sand is very unstable, the deep lead ditches must be dug with care. Very few lateral ditches are deep enough to reach this loamy sand. Little artificial drainage is done with tile.

The physical characteristics that affect internal movement of water vary considerably in those soils of the county that can be improved by drainage. The texture and organic-matter content of the surface layers and the texture and consistence of the subsoil layers are very important

from the standpoint of drainage. Soils with slowly permeable subsoils, such as the Elkton and Bladen, are very difficult to drain. In these soils runoff is slow or very slow and internal drainage is very slow. Ditches must be closely spaced in order to carry off the surface water. Poorly drained soils with friable and permeable subsoils, such as the Pasquotank and Fallsington, do not require ditches to be spaced so closely. In such soils part of the surface water will pass downward through the soil unless the water table is very high. Somewhat poorly drained soils either have slopes that allow water to drain off fairly freely or water tables low enough to let it move downward through the soil.

Soils grouped according to their drainage requirements:

1. Soils requiring no artificial drainage: Galestown, Matapeake, and Sassafras. These soils are well drained to somewhat excessively drained.
2. Soils requiring little or no artificial drainage: Klej, Mattapex, Nixonton, and Woodstown. The Klej soil is moderately well drained to somewhat poorly drained; the others are moderately well drained.
3. Soils requiring moderate artificial drainage: Barclay, Bertie, Dragston, Lenoir, and Stono. The Lenoir soils have slow to medium runoff and very slow internal drainage.
4. Soils requiring moderately intensive artificial drainage: Bibb, Fallsington, Othello, Pasquotank, Pocomoke, Portsmouth, and Weeksville. These soils have permeable subsoils but have a relatively high water table.
5. Soils requiring intensive artificial drainage: Bayboro, Bladen, and Elkton. All of these have fine-textured subsoils. Loamy sand underlies the sandy substratum phases of these series at 36 to 40 inches, and deep ditches are therefore subject to caving.

The Bibb soils and the two miscellaneous land types, Mucky peat and Swamp, have not been artificially drained. Mucky peat and Swamp have very slow runoff.

Fertilizing and Liming

The soils of Pasquotank County are acid and low in natural fertility. If their productivity is to be built up and maintained, they must be substantially fertilized, and for several important crops, they must be limed. Commercial fertilizers leach more rapidly from the coarse-textured sandy soils, such as the Woodstown, Sassafras, and Klej, than from the medium- and fine-textured soils, such as the Bertie, Mattapex, Barclay, Elkton, and Othello. Consequently, the coarse-textured soils generally require more frequent applications and greater total quantities of fertilizer, especially nitrogen, for best results. Generally, larger applications of nitrogen are needed on the light-colored soils than on the dark-colored soils, such as the Pocomoke and Bayboro, which are fairly high in organic-matter content.

Blanket recommendations for kind and quantity of fertilizer for different crops cannot be made because of variations in the soils and in their management history. Soil quick tests for reaction and content of the important plant nutrients are of considerable value in determining fertilizer needs. This testing service for farmers is available through the Soil Testing Division of the North Carolina State Department of Agriculture. Quick tests made on Elkton and Bladen soils indicate that where corn and soybeans have been the main crops and have not been heavily fertilized, the content of available potassium is low, but that of phosphorus is somewhat higher.

On Barclay, Pasquotank, Stono, and Dragston soils, where potatoes have been grown and always heavily fertilized, there is a good supply of available phosphorus and potassium. The tests indicate that generally the cultivated soils are low in organic matter and deficient in nitrogen.

The North Carolina Agricultural Experiment Station and the North Carolina Extension Service make general fertilizer recommendations according to crops. These recommendations apply fairly well to the soils of Pasquotank County and are summarized in table 3.

Valuable experimental and demonstrational projects have been conducted to determine fertilizer requirements and responses for specific crops on certain soils. Probably one of the most conclusive projects was directed toward raising corn yields. This project is particularly significant, because, from the standpoint of acreage, corn is the most important crop in the county. The average corn yield per acre increased from about 27 bushels in 1944 to 32 bushels in 1949. Probably this rise in yield resulted chiefly from better fertilization, along with use of improved varieties and hybrids and improved cultural practices. Agricultural extension work with Hundred-Bushel Corn Clubs has demonstrated that much higher yields than those indicated by the 1949 average are feasible. On the better soils yields of 100 bushels an acre are possible under proper management. Proper management consists of: (1) use of a rotation that includes, every other year, a legume to be turned under; (2) use of a superior variety of hybrid; and (3) applying 400 to 600 pounds of a high-grade mixed fertilizer at the time of planting and adding 300 to 400 pounds of nitrate of soda, or its equivalent, as a side dressing.

Other informative research on fertility and responses of the soils has been done. In 1946 the North Carolina Agricultural Experiment Station conducted an experiment with soybeans on Pasquotank silt loam in the Weeksville section of the county. Analysis of this soil before the experiment showed that it (1) was strongly acid (pH 5.2); (2) had a low capacity (9.1 milliequivalents per 100 grams of soil) for exchangeable bases; (3) had a very low amount of exchangeable calcium and magnesium (1.41 and 0.27 milliequivalents, respectively); (4) held a low supply of exchangeable potassium (0.18 milliequivalents); and (5) held a low supply of soluble phosphorus (72 parts per million).

Yields of Ogden soybeans on Pasquotank silt loam after applications of specified amounts of lime and fertilizer were as follows:

Treatment:	Bushels per acre
No lime; no fertilizer	42. 4
No lime; 400 pounds 0-10-20	46. 3
1 ton lime; no fertilizer	42. 0
1 ton lime; 200 pounds 0-20-0	42. 1
1 ton lime; 160 pounds 0-0-50	44. 1
1 ton lime; 400 pounds 0-10-20	48. 3

In 1947 the county agricultural agent conducted a demonstration on Bayboro loam to show the effect of potassium and lime on the yield of Ogden soybeans. Following are the results:

Treatment:	Bushels per acre
No lime or fertilizer	5
1 ton of dolomitic limestone	22
1 ton of dolomitic limestone; 100 pounds of muriate of potash	27

TABLE 3.—General fertilizer recommendations for the important crops of Pasquotank County, N. C., and methods of applying the fertilizer

Crop	Fertilizer		How to apply	Remarks
Corn	Grade 8-8-8	Per acre 200 to 300 lbs.	In bands 2 to 3 inches to the side and 1 or 2 inches below the seed. In bands 2 to 3 inches to the side and 1 or 2 inches below the seed. As a side dressing when corn is about 2½ feet high.	In rotation with heavily fertilized crop, such as potatoes or cabbage. In rotation with lightly fertilized crop, such as soybeans. Vary application according to soil fertility and desired yield increase. Apply about 2 pounds of nitrogen for desired increase of 1 bushel of corn per acre.
	or 8-8-8	300 to 500 lbs.		
	and Nitrogen fertilizer	Variable		
Soybeans	0-10-20	400 lbs.	In bands 2½ inches to side and 1 inch below the seed.	In rotation with heavily fertilized crop, such as potatoes or cabbage, fertilizer is usually not needed. In rotation with heavily fertilized crop, such as potatoes or cabbage, fertilizer is usually not needed.
	or 0-9-27	350 lbs.	In bands 2½ inches to side and 1 inch below the seed.	
Potatoes	6-8-6	2,000 lbs.	In bands to the side	Potash should be derived from sulfate of potash.
Cabbage	or 8-8-8	1,750 lbs.	In bands to the side	
	8-8-8	1,500 lbs.	At planting time	
	and Nitrogen fertilizer	15 lbs. of actual nitrogen.	As a side dressing	Fertilizer should carry 20 pounds of borax per ton.
Sweet corn	8-8-8	600 lbs.	At planting time	
Snap beans	and Nitrogen fertilizer	80 lbs. of actual nitrogen.	As a side dressing 3 to 4 weeks after planting.	
	6-12-6	1,000 lbs.	At planting time	
	and Nitrogen fertilizer	15 lbs. of actual nitrogen.	As a side dressing when blooms begin to form.	

Limited field work with rare elements indicates that no response to boron and zinc can be expected from soybeans.

Field tests indicate that practically all the soils in the county are naturally strongly to very strongly acid. Much of the cultivated land has been treated with ground dolomitic limestone. This treatment makes the plow layer medium acid to neutral, the result depending on the rate of application and length of time since lime was applied. Legumes, such as crimson and Ladino clovers, are among the crops that respond best to lime. Soybeans and cabbage usually respond well, but if potatoes are grown in the rotation, the amount of lime used must be carefully determined because of the danger of potato scab in limed soil. If soybeans are grown in a rotation with potatoes, the lime requirement for the beans can be met by applying 200 to 300 pounds of lime an acre in the row.

Maintenance of Organic Matter

The content of organic matter in the soils of the county ranges from less than 1 percent to about 90 percent. The relative content in the surface layers of the soils of Pasquotank County is given in the table, Summary of Important Characteristics of the Soils of Pasquotank County, N. C. Mucky peat probably has the highest content of organic matter, but it is not cultivated. This content normally ranges from 40 to 90 percent and greatly exceeds the amount a productive soil requires.

Possibly 35 percent of the cultivated land of the county consists of soils having an organic-matter content of less than 3 percent. This percentage is considered very low.

Special attention should be given to raising and maintaining the organic-matter content of these soils. Considering the very small amount of organic matter available from barnyard manure, the incorporation of organic matter from crop residues and green-manure crops is of particular importance in the management of Pasquotank County soils. Crimson clover, vetch, and Austrian winter peas are among the most desirable winter-legume cover crops to be used for green manure. Some of the better grains and grasses for this purpose are ryegrass, oats, wheat, and barley. These grains are also suited to temporary grazing late in winter and early in spring.

Crop Rotations

Short crop rotations are most commonly used. Where potatoes, cabbage, and snap beans are grown, only a few farmers use regular rotations. Many farmers grow potatoes on the same land year after year and follow them with soybeans, fall cabbage, or corn. Rotations of this type are suited to the tillable soils of the county if they are adequately fertilized and a green-manure crop of winter legumes is grown every 2 or 3 years. On farms having enough land to rotate potatoes with other crops, a rotation roughly as follows is used: First year, potatoes followed by soybeans, snap beans, or fall cabbage; second year, soybeans or corn; and third year, potatoes followed by soybeans or fall cabbage.

Winter cover crops of wheat, barley, ryegrass, vetch, crimson clover, or Austrian winter peas are generally seeded in fall cabbage. Sweet corn normally is followed

TABLE 4.—*Suitable crop rotations by management groups for soils of Pasquotank County, N. C.*

Management group ¹ and soil	Rotations		
	First-year crops	Second-year crops	Third-year crops
Group 1: Barelay very fine sandy loam..... Nixonton very fine sandy loam.....	Potatoes followed by fall cabbage; legume cover crop ² in fall. Spring cabbage followed by soy- beans.	Corn.....	
Group 2: Pasquotank silt loam..... Pasquotank very fine sandy loam..... Weeksville silt loam.....		Potatoes followed by soybeans; crimson clover or vetch in fall.	Potatoes followed by snap beans; cover crop in fall. Corn.....
Group 3: Dragston fine sandy loam..... Dragston very fine sandy loam..... Stono fine sandy loam..... Stono very fine sandy loam.....	Potatoes followed by soybeans; crimson clover or vetch in fall. Sweet corn followed by snap beans.	Corn followed by oats in fall....	Soybeans.
Group 4: Matapeake fine and very fine sandy loams..... Mattapex fine sandy loam..... Mattapex very fine sandy loam..... Deep phase.....	Potatoes followed by snap beans...	Potatoes followed by fall cab- bage; legume cover crop in fall. Soybeans; legume cover crop in fall. Corn.....	Corn. Potatoes followed by soybeans.
Group 5: Bertie fine sandy loam..... Bertie very fine sandy loam... Deep phase.....	Spring cabbage followed by soy- beans; legume cover crop in fall. Sweetpotatoes; cover crop in fall...	Cotton.....	Peanuts; rye or wheat in fall. ³
Group 6: Fallsington fine sandy loam.....	Sweet corn followed by snap beans; cover crop of rye or wheat in fall.	Potatoes followed by soybeans; cover crop in fall.	Corn.
Group 7: Pocomoke fine sandy loam..... Pocomoke loam..... Pocomoke mucky loam.....	Potatoes followed by fall cabbage; legume cover crop in fall. Corn.....	Corn..... Soybeans.....	
Group 8: Sassafras loamy fine sand..... Woodstown fine sandy loam.....	Potatoes followed by soybeans..... Sweetpotatoes; cover crop in fall...	Sweet corn followed by snap beans; legume cover crop in fall. Cotton.....	Corn. Peanuts.
Group 9: Othello fine sandy loam..... Othello very fine sandy loam..... Deep phase.....	Soybeans; crimson clover or vetch in fall. Spring cabbage followed by soy- beans.	Corn..... Corn.....	Soybeans; legume cover crop in fall.
Group 10: Portsmouth fine sandy loam, sandy substratum phase.			
Group 11: Bayboro loam..... Sandy substratum phase..... Thick surface phase..... Bayboro mucky loam..... Burned phase.....	Corn..... Corn followed by oats in fall.....	Soybeans..... Soybeans.....	
Group 12: Bladen fine sandy loam, sandy sub- stratum phase. Bladen silt loam..... Sandy substratum phase..... Elkton fine sandy loam, sandy sub- stratum phase. Elkton silt loam..... Sandy substratum phase..... Thick surface phase.....	Corn followed by oats in fall..... Same..... Soybeans; crimson clover or vetch in fall. Corn; oats in fall..... Cotton.....	Soybeans; crimson clover or vetch in fall. Lespedeza 1 or 2 years..... Corn..... Lespedeza 1 or 2 years..... Soybeans; crimson clover or vetch in fall.	Corn. Corn.
Group 13: Lenoir very fine sandy loam..... Sandy substratum phase.....			
Group 14: Galestown loamy fine sand..... Klej loamy fine sand.....	Sweetpotatoes; rye in fall..... Peanuts; rye or wheat in fall.....	Potatoes followed by soybeans... Cotton.....	Corn or soybeans.

¹ Groups 15 to 17 are omitted; except for a very small acreage of Bibb soils, they do not include any cultivated land.

² Cover crop will normally depend on the crop to follow and conditions at seeding time.

³ This rotation suitable only for the fine sandy loam areas of Matapeake fine and very fine sandy loams, and Mattapex fine sandy loam.

by snap beans or fall cabbage. Spring cabbage is usually followed by soybeans, corn, or fall snap beans. On land where truck crops are not grown, a 2-year rotation of corn and soybeans is the general practice, and winter cover crops are seldom grown. Oats are planted in the fall following corn. In some fields oats are followed in the spring by lespedeza for seed or hay.

Suggested rotations for soils of most of the management groups are given in table 4.

Tillage

Good tilth is somewhat difficult to maintain in the soils commonly cultivated because of fine surface textures or poor drainage. Soils are prepared in winter for early potatoes, spring cabbage, and lespedeza and early in spring for corn, sweet corn, soybeans, and spring snap beans. The most common practice is to disk thoroughly with a tandem disk and bed with a disk tiller or middle-breaker. Some land is flat broken with a 4- or 5-blade disk tiller and then bedded. Practically all crops are planted on beds, especially in winter and spring, to facilitate surface drainage. Generally tractors are used for soil preparation and cultivation. The soil is often plowed when wet so that crops can be planted early and so that grass and weeds can be controlled after the crops have come up. This method is used particularly on the finer textured soils, and as a result the surface soil or tilled layer frequently becomes hard or packed.

Planting and Harvesting

Dates for planting and harvesting in Pasquotank County are given in table 5. About 75 to 80 percent of the corn crop is harvested with mechanical pickers. Cattle and hogs are turned into many fields to eat the corn the picker misses and to graze on cornstalks and other forage in the field. About 80 percent of the soybeans and oats are harvested with combines.

TABLE 5.—Planting and harvesting dates of principal crops in Pasquotank County, N. C.¹

Crop	Date of planting	Date of harvesting
Corn.....	Apr. 1–May 15...	Oct. 1–Feb. 1.
Following potatoes.....	June 1–30.....	Oct. 1–Feb. 1.
Oats.....	Oct. 10–Nov. 10...	May 15–June 30.
Soybeans.....	May 1–30.....	Oct. 15–Feb. 1.
Following potatoes.....	June 1–15.....	Nov. 15–Feb. 1.
Peanuts.....	May 1–20.....	Sept. 15–30.
Lespedeza.....	Feb. 1–15.....	Nov. 1–30. ²
Potatoes.....	Feb. 1–Mar. 15...	June 1–July 15.
Sweet potatoes.....	June 1–July 15 ³ ...	Sept. 15–Oct. 10.
Snap beans:		
Spring.....	Apr. 1–15.....	May 15–June 15.
Fall.....	July 1–Aug. 31....	Sept. 1–Nov. 30.
Cabbage:		
Spring—transplanted.....	Dec. 15–Jan. 30...	May 1–June 30.
Fall—planted in drill.....	July 15–Sept. 15...	Nov. 1–Jan. 15.
Cotton.....	Apr. 20–May 10...	Sept. 20–Nov. 15.
Pasture mixtures.....	Sept. 1–Oct. 10...	Mar. 15–Nov. 30. ⁴

¹ Information from county agricultural agent.

² For seed.

³ Sweetpotato slips set.

⁴ Period grazed.

Control of Insect Pests

The principal insect pests are the Mexican bean beetle, Colorado potato beetle, cabbageworm, and corn earworm. Insecticides are commonly used against these pests. Many crops will not produce satisfactory yields unless insecticides are used.

Estimated Expectable Yields

Estimated average acre yields of the principal crops on the soils of the county are given in table 6. Crop yields in columns A result from practices most generally followed by the farmers of the county; yields in columns B are those to be expected under the best practices followed. Two yield levels are given for corn, soybeans, and pasture. Only one yield level is given for potatoes, cabbage, snap beans, and sweet corn because normally only the best management practices are employed for these crops. Although not widely grown, peanuts, sweet potatoes, and lespedeza are cultivated under the best management and only one yield level is given for them.

The management practices currently followed and those suggested are given for each management group in the section, Management Groups.

Some of the common management practices that produce the yields of corn and soybeans shown in columns A are as follows. From 200 to 300 pounds an acre of 6-8-6, 8-8-8, 5-10-5, or 4-10-6 fertilizer is used for corn at planting time, and most farmers use 100 to 200 pounds of nitrate of soda or a mixture of ammonium nitrate and calcium carbonate as a side dressing. Green-manure crops are seldom grown. Soybeans usually receive 200 to 300 pounds of 0-10-20, 0-10-10, or 0-9-27, except when they follow potatoes or other heavily fertilized crops. Applications of ½ to 1 ton of lime an acre are not uncommon, and many farmers use no fertilizer for soybeans when lime is applied. Soil drainage is inadequate in many areas.

The following practices, which are the best generally followed, are used to obtain the estimated average yields of corn and soybeans given in columns B. Corn receives applications of 300 to 500 pounds of a complete fertilizer and a side dressing of 300 to 500 pounds of a nitrogen carrier, such as nitrate of soda. Green-manure crops are commonly grown in the rotation. Soybeans usually receive 300 to 400 pounds of 0-10-20 or 0-9-27. Under the best management, the use of lime for the crop is more general than under the management that produces the yields given in columns A. Furthermore, more consideration is generally given to drainage of the somewhat poorly drained and poorly drained soils.

Potatoes, cabbage, snap beans, and sweet corn receive liberal applications of fertilizers and are generally grown on the best suited soils. Levels of management are about the same for each crop. Potatoes receive 2,000 to 3,000 pounds of 6-8-6 or 8-8-8. Cabbage receives 600 to 1,500 pounds of 6-8-6 or 8-8-8, the quantity depending on whether the crop follows potatoes or not. Cabbage is also sidedressed with nitrate of soda or a complete fertilizer. Snap beans receive 600 to 800 pounds of 6-8-6 or 8-8-8. Sweet corn receives 400 or 500 pounds of the same fertilizer and a side dressing of 200 to 500 pounds of nitrate of soda or a mixture of ammonium nitrate and calcium carbonate.

TABLE 6.—Estimated average acre yields of the principal crops on soils of Pasquotank County, N. C.

[Yields in columns A are those to be expected under common management practices; those in columns B, under good management practices. Absence of yield indicates crop is not commonly grown]

Soil	Corn		Soy-beans		Pea-nuts	Lespe-deza hay	Pota-toes	Sweet-pota-toes	Snap-beans (fall)	Cab-bage	Sweet-corn	Permanent pasture		Man-agement group
	A	B	A	B	B	B	B	B.	B	B	B	A	B	
	Bu.	Bu.	Bu.	Bu.	Lbs.	Tons ⁽³⁾	Bu.	Bu.	Bu.	Tons	Doz.	Cow-acre-days ¹	Cow-acre-days ¹	
Barelay very fine sandy loam ²	45	70	25	30			240		⁴ 110	9	800	88	220	1
Bayboro loam ²	35	60	18	23			⁴ 160					86	210	11
Sandy substratum phase ²	35	60	18	23								86	210	11
Thick surface phase ²	35	60	18	23			⁴ 160					88	220	11
Bayboro mucky loam ²	35	60	18	23								86	210	11
Burned phase ²	⁴ 25	⁴ 45												11
Bertie fine sandy loam ²	35	60	18	23	⁴ 750	1.5	190		85	6	700	71	170	5
Bertie very fine sandy loam ²	38	63	20	25		1.5	180		95	6	700	73	183	5
Deep phase ²	38	63	20	25		1.5	180		95	6	700	73	183	5
Bibb soils.....														15
Bladen fine sandy loam, sandy substratum phase ²	28	48	15	20		1.3						67	155	12
Bladen silt loam ²	28	48	15	20		1.3				⁴ 6		67	155	12
Sandy substratum phase ²	28	48	15	20		1.3						67	155	12
Borrow pits.....														17
Dragston fine sandy loam ²	38	63	20	25	⁴ 750	⁽³⁾	210		98	⁴ 8	750	73	183	3
Dragston very fine sandy loam ²	38	63	20	25		⁽³⁾	220		100	8	750	73	183	3
Elkton fine sandy loam, sandy substratum phase ²	25	45	12	17		1.3						65	150	12
Elkton silt loam ²	25	45	12	17		1.2						65	150	12
Sandy substratum phase ²	25	45	12	17		1.3						65	150	12
Thick surface phase ²	25	45	12	17		1.2						65	150	12
Fallsington fine sandy loam ²	30	55	18	23		1.4	190		85	6	700	71	170	6
Galestown loamy fine sand.....	⁴ 10	⁴ 20	⁴ 7	⁴ 10	600		⁴ 120	80	⁴ 40			40	90	14
Klej loamy fine sand.....	12	25	8	13	700		150	90	50		300	50	110	14
Lenoir very fine sandy loam.....	20	40	10	15		1.0						65	150	13
Sandy substratum phase.....	20	40	10	15		1.0						65	150	13
Made land and dumps.....														17
Matapeake fine and very fine sandy loams.....	38	63	18	23	⁵ 900	⁽³⁾	200	⁵ 150	90	⁴ 6	700	68	160	4
Mattapex fine sandy loam.....	35	60	18	23	900	⁽³⁾	190	150	90	6	750	68	160	4
Mattapex very fine sandy loam.....	40	65	20	25		⁽³⁾	200		100	7	750	71	170	4
Deep phase.....	40	65	20	25		⁽³⁾	200		100	7	750	71	170	4
Mucky peat.....														16
Nixonton very fine sandy loam.....	43	68	25	30		⁽³⁾	250		⁴ 110	8	800	85	210	1
Othello fine sandy loam ²	30	55	15	20		1.4	⁴ 170		85	⁴ 6	600	73	183	9
Othello very fine sandy loam ²	30	55	15	20		1.5	⁴ 170			⁴ 6		73	183	9
Deep phase ²	30	55	15	20		1.5	⁴ 170			⁵ 6		73	183	9
Pasquotank silt loam ²	45	70	25	30		⁽³⁾	240		⁴ 110	9	800	88	220	2
Pasquotank very fine sandy loam ²	45	70	25	30		⁽³⁾	240		110	9	800	85	210	2
Pocomoke fine sandy loam ²	38	63	18	23		⁽³⁾	180		⁴ 65	7	700	73	183	7
Pocomoke loam ²	40	65	20	35		1.5	⁴ 170					85	210	7
Pocomoke mucky loam.....														7
Portsmouth fine sandy loam, sandy substratum phase ²	35	60	18	23		1.4						73	183	10
Sassafras loamy fine sand.....	⁴ 20	⁴ 40	⁴ 10	⁴ 15	800		⁴ 160	120	65		400	60	125	8
Stono fine sandy loam ²	40	65	20	25		⁽³⁾	220		100	⁴ 8	750	73	183	3
Stono very fine sandy loam ²	40	65	20	25		⁽³⁾	230		100	8	800	75	185	3
Swamp.....														15
Weeksville silt loam ²	47	72	25	30		⁽³⁾	230			9		88	220	2
Woodstown fine sandy loam.....	20	40	10	15	800		190	125	65	⁴ 5	500	64	130	8

¹ The term "cow-acre-days" is used to express the carrying capacity of pasture. In this table, the carrying capacity of pasture is the product of the number of animal units to the acre multiplied by the number of days during the grazing season the pasture can be grazed without injury. For example, a soil able to support 1 animal unit for 220 days, assumed to be the average grazing period, rates 220. An animal unit is equivalent to 1 mature cow, steer, or horse, 5 hogs, or 7 sheep or goats.

² Practically all areas under cultivation are drained by open ditches. Poorly drained areas used for pasture usually are artificially drained to some extent.

³ Lespedeza is not usually grown because the soil is considered more valuable for other crops.

⁴ Not grown extensively.

⁵ Grown mainly on the fine sandy loam type.

The pasture estimates in columns A are for permanent pasture that is—given practically no treatment. In columns B the estimates are for permanent pasture of an adapted grass mixture that is limed, fertilized with 600 to 800 pounds of 2-12-12 an acre at seeding, and topdressed when needed.

The yield data for crops is based on information obtained from many farmers of the county, the county agricultural agent, and other agricultural leaders, and from observations made during the survey. The information from farmers covers only 3 or 4 years and comes largely from memory. It therefore is not as complete as desired. Information on the carrying capacity of pasture is limited, but for improved pasture it represents conservative estimates.

The estimated yields are given as average yields that can be expected over a period of years under broadly defined levels of management and may not apply to specific tracts of land for any particular year. Management practices vary from farm to farm, and climatic conditions fluctuate from year to year. In years with favorable weather, for example, yields of 15 to 18 tons of cabbage an acre are common on some soils, and at times an acre may produce 400 bushels of potatoes. Such yields, however, are far above the average. On the contrary, yields may be generally low for some or all crops in the same year because of unfavorable weather, poor management, insects and diseases, or a combination of these factors.

Different crops on the same soil, as well as the same crop on different soils, have different requirements. The point at which it is no longer profitable to intensify management to produce higher yields depends on the size of the farm, the soils that make up the farm unit, adapted crops, number and kind of farm enterprises, prices, and many other considerations. Practical limits to production cannot be defined because knowledge about all factors involved is incomplete.

Capability Groups of Soils

The capability grouping is an arrangement of soils to show relative suitability for tilled crops, hay, pasture, forestry, wildlife, or recreation and to show the difficulties or risks in using them. It is widely used in helping farmers plan land use and practices for soil and water conservation.

Eight broad classes are provided in the capability classification, although not all classes are used in Pasquotank County. Each soil is placed in one of these broad classes according to the degree of its limitation or suitability for use. Soils are placed in classes after joint study by a number of persons who have knowledge of the soils and agriculture of the area.

Soils that are easy to farm and have no serious limitations for use are placed in capability class I. Such soils are subject to only slight erosion, drought, wetness, or other limitations and are at least fairly fertile. They are good for many uses. The farmer can use his class I soils for crops without special practices, other than those needed for good farming anywhere, and can choose one of several cropping patterns; or if he wishes he may use the soil for pasture, trees, or other purposes.

Soils are placed in class II if they are a little less widely adaptable, in other words more limited, than those in class I. For example, a fertile, easily tilled soil may have moderate limitations because of wetness, and may need artificial drainage for good crop production. Other soils may be placed in class II because they have a moderate erosion hazard, or are too droughty to be in class I.

Class III contains the soils that are suitable for regular cropping but have more stringent management requirements than those in class II. The soils that are even more limited and have narrower crop adaptations than those in class III, but that are still suitable for tillage part of the time, or with special precautions, are placed in class IV.

Soils not suitable for cultivation, or on which cultivation is not advisable, are in classes V, VI, VII, or VIII. Class V consists of soils not subject to erosion but unsuited to cultivation because of stoniness, standing water, or frequency of overflow. Class VI contains soils that are steep, droughty, or shallow but will produce fairly good amounts of forage, orchard crops, or forest products. As a rule, class VI soils should not be cultivated; but some can safely be disturbed enough to prepare them for planting trees or seeding extremely long producing pastures. In Pasquotank County no soils are placed in class V or class VI.

Soils in class VII are more limited than those in class VI, require more care in handling, and usually give only fair to poor yields of forage or wood products. Class VIII ordinarily consists of soils so severely limited that they produce little useful vegetation. In this county the areas placed in class VIII have had the soil removed by excavation or covered up by dumping. They may have value as wildlife habitats.

Subclasses.—Although the soils within a single capability class have limitations and, therefore, use and management problems of about the same degree, the kinds of problems may differ greatly. These problems and limitations may result from risk of erosion, designated by the symbol (e), excess water (w), shallow soil, low capacity for holding moisture available, or low fertility (s), or unfavorable climate (c). The subclass symbol, indicating the kind of limitation, is added to the capability class number. In Pasquotank County, which lies at a very low elevation and is almost level, erosion is not a serious hazard and the erosion subclass designated by the symbol (e) is not used. Climate is also not a limiting factor in the county, and the symbol (c) is not used.

Capability Classes and Subclasses in Pasquotank County

Class I.—Soils without important limitations for use; good for many uses and cropping systems.

Class II.—Soils that can be used for tilled crops; moderate limitations caused by wetness or other properties.

IIw: Soils with inadequate natural drainage, that can be readily drained by artificial means.

IIs: Somewhat sandy droughty soils.

Class III.—Soils with severe limitations because of wetness or droughtiness, but suitable for regular use for tilled crops if properly managed.

IIIw: Somewhat poorly to poorly drained soils that can be drained adequately by artificial means for growth of tilled crops.

IIIs: Sandy, droughty soil.

Class IV.—Soils that have very severe limitations because of overflow, wetness, or other properties and, if used for cultivation, require special management and extreme care.

IVw: Slowly to very slowly drained soils. Some are subject to serious overflow.

Class VII.—Soils that are unsuited to cropping or any cultivation because of extreme wetness or standing water that cannot be drained practicably.

VIIw: Swampland.

Class VIII.—Soils in this class are not suited to commercial production of vegetation. They may be useful as food and shelter areas for wildlife.

VIIIs: Borrow pits and Made land and dumps.

The capability class and subclass for each soil is shown in the following list:

	<i>Capability class and subclass</i>
Barclay very fine sandy loam (Ba).....	IIw.
Bayboro loam (Bb).....	IIIw.
Bayboro loam, sandy substratum phase (Bc).....	IIw.
Bayboro loam, thick surface phase (Bd).....	IIIw.
Bayboro mucky loam (Be).....	IIIw.
Bayboro mucky loam, burned phase (Bf).....	IIIw.
Bertie fine sandy loam (Bg).....	IIIw.
Bertie very fine sandy loam (Bh).....	IIIw.
Bertie very fine sandy loam, deep phase (Bk).....	IIIw.
Bibb soils (Bm).....	IVw.
Bladen fine sandy loam, sandy substratum phase (Bn).....	IIIw.
Bladen silt loam (Bo).....	IVw.
Bladen silt loam, sandy substratum phase (Bp).....	IVw.
Borrow pits (Br).....	VIIIs.
Dragston fine sandy loam (Da).....	IIw.
Dragston very fine sandy loam (Db).....	IIw.
Elkton fine sandy loam, sandy substratum phase (Ea).....	IIIw.
Elkton silt loam (Eb).....	IVw.
Elkton silt loam, sandy substratum phase (Ec).....	IVw.
Elkton silt loam, thick surface phase (Ed).....	IIIw.
Fallsington fine sandy loam (Fa).....	IIw.
Galestown loamy fine sand (Ga).....	IIIs.
Klej loamy fine sand (Ka).....	IIIw.
Lenoir very fine sandy loam (La).....	IIIw.
Lenoir very fine sandy loam, sandy substratum phase (Lb).....	IIIw.
Made land and dumps (Ma).....	VIIIs.
Matapeake fine and very fine sandy loams (Mb).....	I.
Mattapex fine sandy loam (Mc).....	IIw.
Mattapex very fine sandy loam (Md).....	IIw.
Mattapex very fine sandy loam, deep phase (Me).....	IIw.
Mucky peat (Mf).....	VIIw.
Nixonton very fine sandy loam (Na).....	IIw.
Othello fine sandy loam (Oa).....	IIIw.
Othello very fine sandy loam (Ob).....	IIIw.
Othello very fine sandy loam, deep phase (Oc).....	IIIw.
Pasquotank silt loam (Pa).....	IIw.
Pasquotank very fine sandy loam (Pb).....	IIw.
Pocomoke fine sandy loam (Pc).....	IIIw.
Pocomoke loam (Pd).....	IIIw.
Pocomoke mucky loam (Pe).....	IIIw.
Portsmouth fine sandy loam, sandy substratum phase (Pf).....	IIIw.
Sassafras loamy fine sand (Sa).....	IIs.
Stono fine sandy loam (Sb).....	IIw.
Stono very fine sandy loam (Sc).....	IIw.
Swamp (Sd).....	VIIw.
Weeksville silt loam (Wa).....	IIw.
Woodstown fine sandy loam (Wb).....	IIw.

Soil Associations

A soil association map (fig. 9) has been made from the data on the detailed soil map of Pasquotank County.

Six soil associations composed of soil series and one soil association composed of miscellaneous land types are represented on this map. A soil association is a group of defined and named taxonomic soil units, geographically associated in a defined proportional pattern (12). Soils within an association do not necessarily occur in equal proportions. They may make an intricate pattern or a simple one.

One of the characteristics that makes farms differ from one another is the pattern of soils (1). After the soils of a county have been classified and mapped in detail, it is possible to delineate areas within it where most farms have somewhat similar soil patterns. If other factors are equal, farms in these areas will have somewhat similar soil use.

The soil association map of Pasquotank County has been made to show the pattern, extent, and geographic distribution of relatively broad groups of soils having somewhat similar characteristics. It is intended only as a general guide to the characteristics or relative physical capabilities of the soils in different parts of the county. The map cannot be used as a basis for farm planning or management recommendations because it is generalized. In any one soil association, therefore, a particular farm may not be representative or may not have the combination of soils and physical capabilities that characterizes the association as a whole. The composition, present use, and general suitability for agriculture of each soil association are discussed in the following pages.

1. Pasquotank-Barclay-Weeksville

The Pasquotank-Barclay-Weeksville soil association covers about 8 percent of the county and is nearly all under cultivation. It is composed largely of Barclay, Pasquotank, Weeksville, and Nixonton soils. The soils of this association are considered the most desirable for agriculture in the county. Potatoes, cabbage, corn, and soybeans are the main crops; small grains, pasture grasses, and similar crops are also suitable. On farms composed of these soils first consideration is usually given to potatoes and cabbage, and cropland not used for these crops is planted to corn and soybeans. Some cattle and hogs are raised.

These soils have desirable physical characteristics. They are open and friable throughout and have good moisture relations. They respond to good management and are relatively easy to keep highly productive. Land use on the Pasquotank and Weeksville soils is affected mainly by drainage. The Barclay soil requires some provision for removal of storm water. All these soils are relatively easy to drain, however, and when ditched or tiled, they give up excess water freely.

2. Bertie-Othello

The Bertie-Othello soil association is composed mainly of the Bertie, Othello, Matapeake, and Mattapex very fine sandy loam soil types. It occurs principally in the southern part of the county and covers about 6 percent of the county area. About 65 percent is under cultiva-

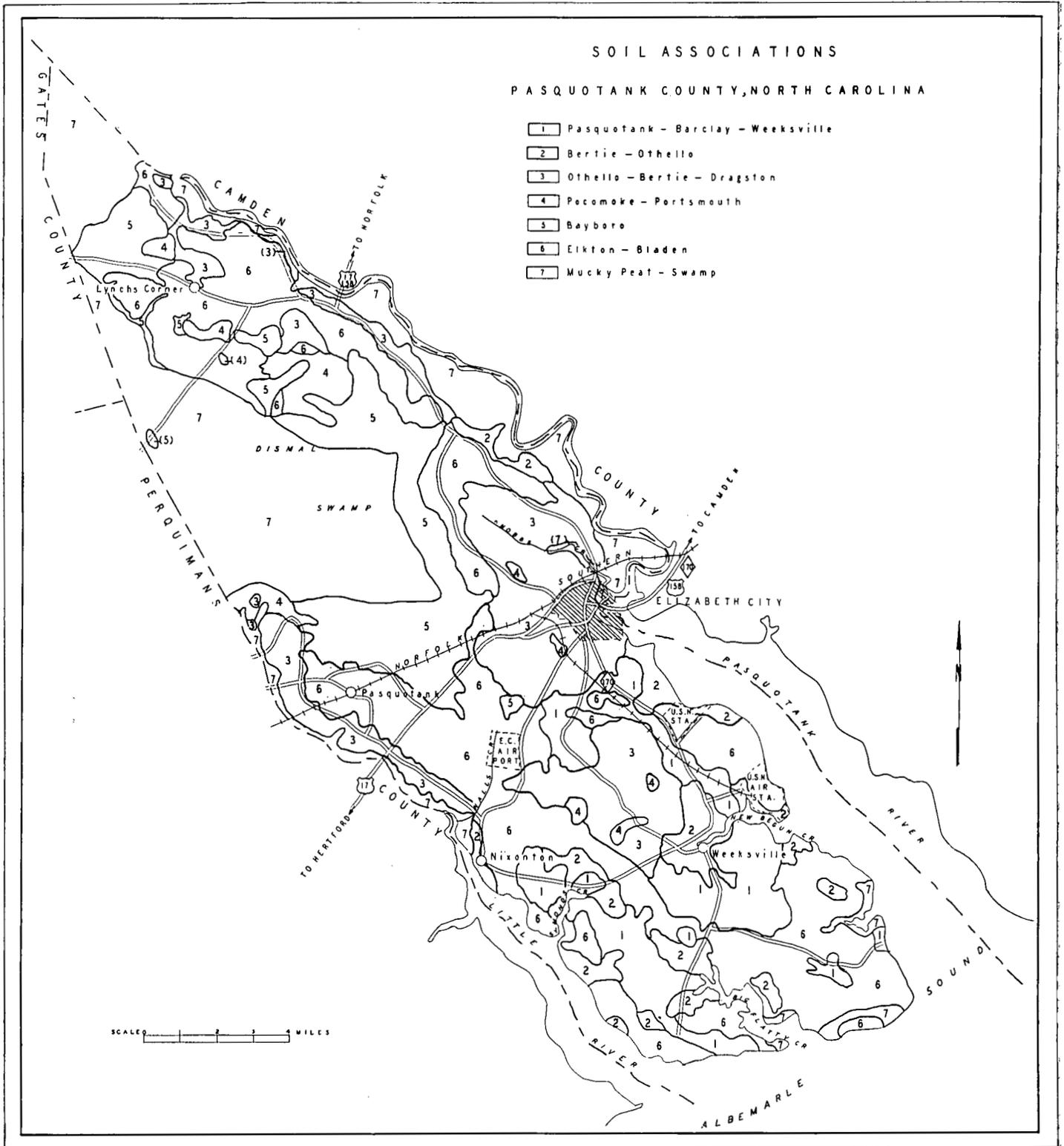


Figure 9.—Soil association map of Pasquotank County, N. C.

tion; the rest is in forest. On the whole, the soils of this association are less desirable than those of the Pasquotank-Barclay-Weeksville soil association. They are used for the same kinds of crops, however, but a smaller part is used for potatoes and cabbage and a greater part for corn and soybeans. Some oats and snap beans are grown. A small acreage is in pasture.

The Matapeake and Mattapex soils do not require drainage. Their water-holding capacity is not so good as that of the soils of the Pasquotank-Barclay-Weeksville soil association, and crops are injured in dry seasons. The Bertie soils require some drainage. The Othello soils require drainage and are somewhat difficult to drain. Their principal crops are corn and soybeans. Cabbage and potatoes are grown on these soils only on farms where more suitable soils are not available.

3. Othello-Bertie-Dragston

The Othello-Bertie-Dragston soil association is mostly in the central and southern parts of the county. It covers 14 percent of the county. The soils of this association make up the most intricate soil association pattern in the county and have a relatively wide range in physical characteristics. They are the Othello, Bertie, and Mattapex fine sandy loam types, the Matapeake, Dragston, Stono, Woodstown, Sassafras, Fallsington, Klej, and Galestown soils, and small areas of Pocomoke fine sandy loam. The Othello, Bertie, Dragston, Fallsington, and Woodstown soils are the most extensive. The areas of the remaining soils are relatively small. Except for the coarse-textured Woodstown, Galestown, and Klej soils, all the soils have a moderately coarse textured or medium textured surface soil and a moderately fine or moderately coarse textured friable subsoil.

About 65 to 70 percent of this soil association is under cultivation, in pasture, or idle; the rest is in forest. Agriculture is more diversified than on any of the other soil associations in the county. The soils grow practically all the sweetpotatoes and peanuts of the county, and a large part of the snap beans. Some potatoes, cabbage, corn, soybeans, sweet corn, and cotton are also grown, and small acreages are in pasture. The Stono and Dragston soils are exceptionally good for potatoes. This crop is also grown on the Fallsington, Klej, Bertie, and Mattapex soils. Corn and soybeans are the principal crops on the Othello and Bertie soils. The Galestown soil is largely in forest. Bertie fine sandy loam has the only commercial apple orchard in the county. Several young peach orchards are on the Galestown and Klej soils. During the survey the only tobacco noted in the county was on Woodstown fine sandy loam. The type of farming in this association is somewhat adjusted to the soils that make up the farm units.

On some soils, such as the Othello, Fallsington, and Bertie, drainage and maintenance of fertility are the major problems. The Woodstown, Sassafras, Mattapex, and Matapeake soils have no drainage problem, but maintenance of fertility is difficult, especially in the Woodstown and Sassafras soils. The imperfectly drained Stono and Dragston soils are the most desirable in the association for the general crops of the area.

4. Pocomoke-Portsmouth

The Pocomoke-Portsmouth soil association covers about 4 percent of the county. It includes Pocomoke loam, Pocomoke mucky loam, some areas of Pocomoke fine sandy loam, and Portsmouth fine sandy loam, sandy substratum phase. Only the most extensive areas are shown on the soil association map (fig. 9). Areas too small to be shown occur in other soil associations, especially the Othello-Bertie-Dragston.

All of the soils of this association are dark colored and have friable subsoils. The content of organic matter ranges from 4 to 8 percent in cultivated areas of the fine sandy loam or loam to 40 percent in the areas of Pocomoke mucky loam. The subsoil is mainly fine sandy loam or loam in all the soils except Portsmouth fine sandy loam, sandy substratum phase. This soil is light clay loam or sandy clay loam interbedded with fine sandy loam.

About 45 percent of this association has been drained, and all the soils except Pocomoke mucky loam are used for cultivation. Corn, soybeans, potatoes, cabbage, sweet corn, and snap beans are grown on Pocomoke fine sandy loam. Corn and soybeans are the principal crops on Pocomoke loam and Portsmouth fine sandy loam, sandy substratum phase. When drained, soils of this association have good tilth and good moisture relations and are relatively easy to handle. The main problems that affect their use are drainage, maintenance of fertility, and correcting acidity for soybeans and cabbage grown in the rotation. Potassium and phosphoric acid are especially difficult to maintain.

5. Bayboro

The Bayboro soil association is made up of Bayboro loam; Bayboro mucky loam; Bayboro mucky loam, burned phase; and Bayboro loam, sandy substratum phase. Bayboro loam, the most extensive member of the group, occurs in relatively large bodies. This association covers about 12 percent of the county, and approximately one-fourth of it is cleared and under cultivation. The cleared land is used mostly for corn, soybeans, and pasture. Some oats are grown, and a very small acreage is in potatoes. Only a few farms are located entirely on this association. Most farms having soils of this association also have soils of the Elkton-Bladen association.

Good drainage is relatively difficult to obtain on the soils of this association because of their heavy subsoil layers. These soils have adequate organic matter, and their nitrogen supply is fairly easy to maintain. But potassium, phosphorus, and lime deficiencies normally limit crop production. When adequately drained and properly fertilized, these soils produce good to excellent yields of corn and soybeans in favorable years. Because of their friable and permeable surface soil, they can be worked under a wider range of moisture content than soils of the Elkton-Bladen soil association.

6. Elkton-Bladen

The Elkton-Bladen soil association is composed of Elkton, Bladen, and Lenoir soils. It covers about 29 percent of the county, and 40 to 45 percent of its area is

under cultivation, in pasture, or idle. The Elkton and Bladen soils are much more extensive than the Lenoir soils.

The principal crops on this association are corn and soybeans. Lespedeza, oats, and cotton are less important. A relatively small acreage is in unimproved pasture. Cattle and hogs are sources of income on numerous farms. Many farms are located partly on soils of this association and partly on those of other soil associations. On these farms agriculture is diversified.

All the soils of this association have somewhat similar physical characteristics. The subsoils are fine textured and very slowly permeable to water. The surface soils are medium to moderately coarse textured and very low to low in organic matter. The areas that are very low in organic matter are the most difficult to manage. Drainage is the principal management problem, but even after drainage has been improved, fertility is difficult to build up and maintain.

7. Mucky Peat-Swamp

The Mucky peat-Swamp soil association is made up of Mucky peat, Swamp, and Bibb soils. It covers about 27 percent of the county. Practically all of it is in forest, but some burned-over brushland is included. Mucky peat and Swamp are very poorly drained, and Bibb soils are somewhat poorly to poorly drained. The soils of this association have not been artificially drained.

Morphology and Genesis of Soils

Soil is produced by the forces of weathering and soil development that act on the parent material deposited or accumulated by geologic agencies. The characteristics of the soil at any given point depend on (1) the physical and mineralogical composition of the parent material, (2) the climate under which the soil material has accumulated and has existed since accumulation, (3) the plant and animal life in and on the soil, (4) the relief or lay of the land, and (5) the length of time the forces of development have acted on the material. The influence of climate on soil and plants depends not only on temperature, rainfall, and humidity but also on the physical characteristics of the soil or soil material and on the relief. Relief, in turn, strongly influences drainage, aeration, runoff, and exposure to sun and wind.

The five soil-forming factors are interdependent; each modifies the effects of the others. Climate and vegetation are the active forces that change the parent material and from it gradually form a soil. Relief largely controls runoff and therefore influences the effectiveness of climate and vegetation. The time during which the forces of soil development act is a factor in determining the character of the soil.

Pasquotank County lies in the lower, or seaward, portion of the Atlantic Coastal Plain of northeastern North Carolina. The area is in a transition zone between the Gray-Brown Podzolic soils of the eastern and midwestern parts of the United States and the Red-Yellow Podzolic soils of the southeastern part of the United States (8). Most of the soils are intrazonal.

Factors of Soil Formation in Pasquotank County

Parent material

Geologically, the area consists of a smooth terrace, or terraces, of marine origin, which probably were under some fluvial influence in the Recent or Pleistocene epochs. In 1912 Stephenson first applied the name Pamlico terrace to the Coastal Plain of North Carolina below an elevation of about 25 feet (13). In Virginia the Coastal Plain below an elevation of 25 feet is divided into the Princess Anne and Dismal Swamp terraces. The Princess Anne terrace ranges in elevation from sea level to about 15 feet above, and the Dismal Swamp terrace ranges from about 15 to 25 feet above. The Princess Anne formation is mainly assorted fine sand having some gravel in lenses or as a basal layer. The Dismal Swamp formation is mainly well-sorted sand that commonly has coarse, well-sorted gravel in the inland part of the formation (16). No gravel has been noted in the strata of Pasquotank County. The logs of several wells in various parts of the county and conversations with farmers indicate that shells are common at a depth of about 50 feet.

The unconsolidated sediments from which the soils have developed accumulated when the sea stood about 25 feet above its present level (2). These sediments vary widely in texture. The area is relatively young, and the soil-forming factors have not been acting long enough for the development of extensive areas of soils having well-developed profiles. The soils, therefore, closely resemble the original sediments, especially in texture. In places 36 to 40 inches of fine-grained or fine-textured sediments were deposited on sandy material, but this sandy material has probably had little effect on profile development. The sandy substratum phases in the Elkton and Bayboro series are examples of firm profiles underlain by loamy sand. The substratum is generally coarser in texture than that of the B horizons and is loamy fine sand in extensive areas.

Climate

Because of the influence of the Atlantic Ocean and the Albemarle Sound, the climate is oceanic. It is essentially the same over the entire county. Summers are long and temperate. Winters are short and mild but have a few days of below-freezing temperature. The average annual rainfall is 47.5 inches.

The moderately warm weather that prevails most of the year favors rapid chemical reactions under the existing moist conditions. High rainfall promotes leaching of the soluble materials (as bases) and the translocation of less soluble materials (as colloidal matter) downward in the soil. Weathering and translocation of the materials are further intensified by brief periods of shallow freezing, rarely to depths of more than 3 inches. Climate is directly or indirectly the cause of variations in plant and animal life. Thus, climate affects the changes in soils that are brought about by plant and animal life.

Vegetation

Plants and micro-organisms have had a primary influence in the formation of the soils. Where the vegetation varies significantly, the general type of soil normally

varies accordingly. The soils of the county have developed under three broad types of forest vegetation. The well drained to poorly drained mineral soils have developed under loblolly pine and mixed hardwoods. The very poorly drained mineral soil (classified as Swamp) has developed under cypress, swamp hardwoods, and some pond pine. The organic soil, Mucky peat, has developed under southern white-cedar, swamp hardwoods, and some cypress and pond pine.

In about one-half of the county the soils have light-colored surface layers that are from about 1 to 3 percent organic matter. These soils are well drained to poorly drained and have developed under pine-hardwoods forest. In about 16 percent of the county the soils have dark-gray to black surface layers. The organic-matter content of these layers ranges from 5 to 15 percent in forested areas. About 26 percent of the county has organic soils—Mucky peat, and Bayboro and Pocomoke mucky loams. The mucky loams contain 20 to 45 percent organic matter, and Mucky peat contains 50 to 90 percent. These mucky soils have formed under the influence of a very high water table. The ground water in Mucky peat remains at or near the surface most of the time. Although the poorly drained mineral soils vary greatly in organic matter, no evidence indicates that the water table is generally higher in the darker colored soils than in the light-colored ones of comparable texture and similar drainage.

Relief

Pasquotank County occupies a nearly level to very gently undulating plain ranging in elevation from near sea level to about 18 feet above. Less than 0.5 percent of the county has slopes greater than 2 percent. Large areas have no natural drainage outlets. Runoff is slow to very slow, and internal drainage varies according to the texture of the soil and the position of the ground-water level. Well-drained soils occupy about 1 percent of the county; moderately well drained soils, about 3.5 percent; and somewhat poorly drained soils, about 12 percent. The rest is occupied by poorly and very poorly drained soils. The well drained and moderately well drained soils occur mainly on breaks bordering natural drainageways. They have coarse- and medium-textured profiles. These better drained soils approach profile maturity, but most of the soils of the county have drainage unfavorable for normal profile development.

Time

Time is important in the development of parent material and is necessary for the development of soils from the parent material. The length of time required for the formation of a soil depends on the other factors involved. The degree of profile development is dependent on the intensity of the activity of the different soil-forming factors, on the length of time they have been active, and on the nature of the materials from which the soils have been developed. If the factors of soil formation have not operated long enough to form a soil that is nearly in equilibrium with its environment, the soil is considered young, or immature. Most of the soils in this county are young.

Classification of Soils

Soils may be classified several ways to bring out their relation to one another. The simple classification units commonly used in the field are the series, type, and phase. These units are discussed in the section Soil Survey Methods and Definitions. Soil series may be grouped into higher categories called soil orders and great soil groups. All three soil orders—zonal, intrazonal, and azonal—are represented in this county.

Zonal soils are defined as soils having well-developed characteristics that reflect the influence of the active factors of soil genesis—climate and living organisms, chiefly vegetation (15). As this county lies in the transition belt between the Red-Yellow Podzolic (8) and Gray-Brown Podzolic soils, the zonal soils have some characteristics of both these great soil groups. They are classified, however, as Gray-Brown Podzolic soils. These soils generally have thinner leaf mats and thinner A_0 and A_1 horizons than are typical of the Gray-Brown Podzolic soils. They are generally less highly leached and have less well developed A_2 horizons than is typical of the Red-Yellow Podzolic soils. The zonal soils of the county have developed from moderately coarse to medium textured, permeable, and easily modified marine sediments. No zonal soils have developed on the finer textured and less permeable sediments.

Intrazonal soils have more or less well developed soil characteristics that reflect the dominating influence of some local factor of relief, parent material, or age over the normal effect of the climate and vegetation. Any one of these soils may be associated with two or more of the zonal groups (15). Intrazonal soils in this county belong to the Low-Humic Gley and Humic Gley great soil groups. These soils are characterized by impeded drainage.

Azonal soils are without well-developed profile characteristics because their youth, parent material, or relief have prevented the development of definite soil-profile characteristics (15). Azonal soils in this county belong to the Regosols great soil group. They have loamy sand profiles.

Less than 5 percent of the county has zonal soils with well-developed profile characteristics that reflect the influence of the active factors of soil genesis. Most of these soils occupy very slightly elevated areas and very gentle ridges. The intrazonal soils cover most of the county and generally occur on flats and in very slight depressions. The azonal soils are in small scattered areas, mostly on very gentle ridges.

To show their relation to the higher categories, the various soil series of Pasquotank County are classified in table 7 under soil orders and great soil groups. The relief, parent material, and degree of profile development are given for each soil series. This classification is based principally on characteristics observed in the field, but some of the series may not be properly classified and further study may make modifications necessary.

The relation of the soil series of the county to the great soil groups can be shown by soil catenas. A soil catena is a group of soils developed from similar parent materials but differing in characteristics of the solum that are caused by differences in relief or drainage (15).

In this county the Matapeake, Mattapex, Bertie, Othello, and Portsmouth soils make up a catena of soils occurring over medium- to fine-textured marine sediments. These soils, however, differ considerably in physical characteristics because each has formed under different conditions of drainage, not because of any significant difference in the parent material. Within every catena different great soil groups common to the region may be present. In the catena cited, for example, the Matapeake and Mattapex soils are Gray-Brown Podzolic soils; the Bertie and Othello, Low-Humic Gley; and the Portsmouth soil, Humic Gley.

TABLE 7.—*Soil series of Pasquotank County, N. C., classified by soil orders and great soil groups, and their relief, parent material, and degree of profile development*

Zonal				
Great soil group and series	Relief	Parent material	Degree of profile development	
			As indicated by number of major horizons	As indicated by contrast in horizons
Gray-Brown Podzolic:				
Matapeake.....	Nearly level to very gently sloping....	Medium-textured marine sediments deposited on loamy sand.	Medium....	Medium.
Sassafras.....	Nearly level to very gently sloping....	Medium-textured marine sediments.....	Medium....	Medium.
Mattapex.....	Nearly level to very gently sloping....	Medium-textured marine sediments deposited on sandy material.	Strong.....	Strong.
Woodstown.....	Nearly level to very gently sloping....	Moderately coarse to medium textured marine sediments deposited on loamy sands or sands.	Medium....	Medium.
Nixonton.....	Nearly level to very gently sloping....	Marine silts and very fine sands.....	Medium....	Weak.
Intrazonal				
Low-Humic Gley:				
Fallsington.....	Nearly level.....	Moderately coarse textured marine sediments.	Medium....	Weak.
Othello.....	Nearly level.....	Medium-textured marine sediments deposited on sandy material.	Weak.....	Medium. ¹
Elkton.....	Nearly level.....	Fine-textured marine sediments.....	Weak.....	Strong. ¹
Pasquotank.....	Nearly level.....	Fine-textured marine sediments.....	Weak.....	Weak.
Bladen.....	Nearly level.....	Fine-textured marine sediments.....	Weak.....	Medium.
Bibb.....	Nearly level or depressed.....	Medium to moderately fine textured alluvium.	Weak.....	Weak.
Dragston.....	Nearly level to very gently sloping....	Moderately coarse to medium textured marine sediments deposited on sandy material.	Medium....	Weak.
Bertie.....	Nearly level to very gently sloping....	Medium- or fine-textured marine sediments deposited on sandy material.	Medium....	Medium. ¹
Lenoir.....	Nearly level to very gently sloping....	Fine-textured marine sediments.....	Medium....	Strong. ¹
Barclay.....	Nearly level to very gently sloping....	Fine-textured marine sediments.....	Weak.....	Weak.
Stono.....	Nearly level to very gently sloping....	Moderately coarse to medium textured marine sediments deposited on loamy sands and sands.	Medium....	Medium.
Humic Gley:				
Weeksville.....	Nearly level.....	Moderately fine textured marine sediments.	Weak.....	Strong.
Bayboro.....	Nearly level to slightly depressed....	Fine-textured marine sediments.....	Weak.....	Strong.
Pocomoke.....	Nearly level.....	Medium-textured marine sediments.....	Weak.....	Strong.
Portsmouth.....	Nearly level.....	Moderately fine textured marine sediments.	Weak.....	Strong.
Azonal				
Regosols:				
Galestown.....	Nearly level to gently sloping.....	Coarse-textured marine sediments.....	Weak.....	Weak.
Klej.....	Nearly level to very gently sloping....	Coarse-textured marine sediments.....	Weak.....	Medium.

¹ The contrast in horizons is caused chiefly by geologic differences.

In addition to the classification of soil series according to orders and great soil groups, as shown in table 8, series can be classified by catenas and soil families. This has been done in table 9, where the series are grouped in catenas and families and the relations to great soil groups

are shown. Although not given in the table, the parent material of the soils of each catena (except the Bibb series) is similar and is composed of marine sediments. The parent material of the Bibb series consists of alluvium that varies somewhat in texture and other qualities.

TABLE 8.—*Soil series of Pasquotank County, N. C., arranged by catenas and families, and their profile development, natural drainage, and great soil group*

[The series on each horizontal line make up a catena; those in each column make up a soil family]

Profile development-----	Azonal		Zonal		Intrazonal				
	Regosols		Gray-Brown Podzolic		Low-Humic Gley			Humic Gley	
	Well to somewhat excessively drained	Moderately well to somewhat poorly drained	Well to somewhat excessively drained	Moderately well drained	Somewhat poorly drained	Somewhat poorly to poorly drained	Poorly drained	Poorly to very poorly drained	Very poorly drained
Great soil group-----									
Natural drainage-----									
Profile texture: Loamy sand or sand; little or no textural profile development.	Galestown	Klej							
Sandy loam, loam, or friable sandy clay loam subsoils.			Sassafras	Woodstown	Dragston Stono. ¹		Fallsington.		Pocomoke.
Smooth silt loam or very fine sandy loam throughout the profile.				Nixonton	Barclay		Pasquotank	Weeksville	
Firm loam, or clay loam, silty clay loam, or sandy clay loam subsoils.			Matapeake	Mattapex	Bertie		Othello		Portsmouth.
Sandy clay, silty clay, or clay subsoils; sandy strata present in places.					Lenoir		Elkton-Bladen ²		Bayboro.
Alluvium of variable texture.						Bibb			

¹ The Stono series differs from the Dragston series in having a darker surface soil that contains a larger quantity of organic matter.

² Poorly to very poorly drained.

Morphology of Soils by Great Soil Groups

Gray-Brown Podzolic soils

Gray-Brown Podzolic soils are a zonal group of soils having a comparatively thin organic covering and organic-mineral layers over a grayish-brown leached A horizon that rests upon an illuvial B horizon. The soils developed under deciduous forest in a temperate moist climate. They have a surface covering of leaf litter, normally from deciduous trees, over a dark, thin, mild (only slightly or moderately acid) humus somewhat mixed with mineral soil. The A₁ horizon is grayish brown, crumb structured, and loamy. The B horizon is moderately heavy, blocky, and yellowish brown, brown, brownish yellow, or reddish brown; it becomes lighter colored with depth. The total depth of the solum varies considerably but seldom exceeds 4 feet (15). Podzolization is the chief process in the development of these soils (8, 15). In this county the Gray-Brown Podzolic soils are in the Matapeake, Sassafras, Mattapex, Woodstown, and Nixonton series. The Sassafras soil grades toward Red-Yellow Podzolic soils,

and the Mattapex, Woodstown, and Nixonton soils grade toward Low-Humic Gley soils.

The normal or mature soil of the county is well expressed in the profile of Matapeake very fine sandy loam observed in a thinly forested area of loblolly pines and mixed hardwoods. This soil occupies a gentle slope of less than 2 percent bordering the Pasquotank River. Its profile is as follows:

A₀ ½ to 0 inch, partly decomposed forest litter.

A₁ 0 to 1 inch, variegated very dark gray (10YR 3/1) and grayish-brown (10YR 5/2) very fine sandy loam; very friable; weak medium granular structure; well matted with small roots; many wormholes.

A₂ 1 to 12 inches, light yellowish-brown (10YR 6/4) very fine sandy loam, with some variegations of lighter and darker color; very friable; weak medium subangular blocky structure; many fine pinholes; some fine roots and wormholes.

A₃ or B₁ 12 to 15 inches, intermingled light yellowish-brown (10YR 6/4) and dark-brown (7.5YR 4/4) loam; friable; a transition layer consisting of an interfingering of A₂ and B₂ horizons.

B₂₁ 15 to 30 inches, dark-brown (7.5YR 4/4) clay loam; friable; slightly plastic when wet, hard when dry; moderate fine and medium blocky structure; fine pinholes numerous; some wormholes, root casts, and dead roots.

- B₂₂ 30 to 38 inches, strong-brown (7.5YR 5/8) loam or fine sandy loam; friable; weak subangular blocky structure; a few pinholes.
- C 38 to 60 inches, yellow (10YR 7/6 to 10YR 8/6) loamy fine sand.

The A and B horizons are strongly acid, and the C horizon is medium to slightly acid. In the complex mapped in the county, the areas of Matapeake fine sandy loam differ from the areas of Matapeake very fine sandy loam in having a higher percentage of fine sand and a lower percentage of silt throughout the profile.

Another member of the Gray-Brown Podzolic soils, the Sassafras soil, is well drained to somewhat excessively drained. It differs from Matapeake very fine sandy loam mainly in the coarser texture of its A and B horizons. It has developed on low ridges with convex slopes of about 1 to 3 percent.

Mattapex, Woodstown, and Nixonton soils show zonal profile development, but not so well as the Matapeake and Sassafras soils. They occupy less well drained areas than the Matapeake and Sassafras soils, and mottles appear in the lower part of the B horizons. The Mattapex soils are similar in texture to the Matapeake soils but differ mainly in degree of drainage. The Woodstown soil differs from the Sassafras mainly in being moderately well drained. The Nixonton soil is moderately well drained and has formed from dominantly very fine sand and silt marine sediments.

The profile of Woodstown fine sandy loam is representative of the profile development of the moderately well drained Gray-Brown Podzolic soils. A profile in a thinly forested area on a gentle slope bordering a natural drainage outlet about 1.4 miles northeast of Corinth Church is as follows:

- A₀ ½ to 0 inch, partly decomposed forest litter.
- A₁ 0 to 1 inch, black (10YR 2/1) intermingled with white (10YR 8/1) fine sandy loam; loose; well matted with fine roots.
- A₂ 1 to 8 inches, grayish-brown (10YR 5/2) light fine sandy loam; very friable to loose.
- B₁ 8 to 17 inches, brownish-yellow (10YR 6/6) fine sandy loam with a few pockets of heavy fine sandy loam; very friable; a few fine pinholes, wormholes, and root casts.
- B₂ 17 to 24 inches, reddish-yellow (7.5YR 6/6) to brownish-yellow (10YR 6/6) heavy fine sandy loam or light loam; very friable; weak medium subangular blocky structure; fine pinholes fairly numerous.
- B₃ 24 to 36 inches, yellowish-brown (10YR 5/4) fine sandy loam showing mottles of light gray (10YR 7/1) and yellowish brown (10YR 5/6), and having pockets or lenses of loam; very friable; weak medium subangular blocky structure.
- C 36 to 60 inches, yellow (10YR 7/6) loamy fine sand; water table at about 40 inches when the profile was observed in December 1948.

Low-Humic Gley soils

The Low-Humic Gley soils are an intrazonal group. They are defined as somewhat poorly to poorly drained soils with very thin surface horizons, moderately high in organic matter, over mottled gray and brown gleylike mineral horizons (15). The soil-development process is gleization. In this county soils having the common characteristics of Low-Humic Gley soils are members of the Bertie, Dragston, Barclay, Lenoir, Fallsington, Othello, Elkton, Pasquotank, Bibb, Stono, and Bladen series.

The soils of this group have developed from acid marine sediments under a forest cover of loblolly pines and

hardwoods that include various oaks, sweetgum, blackgum, maple, and beech. They have more or less well-developed characteristics that reflect more strongly the influence of nearly level relief, high water table, and impeded drainage than the effect of climate and vegetation. Their surface soils range in color from light gray to grayish brown. The subsoils range in color from mottled yellow, brown, and gray to dominantly gray, and in texture from fine sandy loam to silty clay loam. The Dragston, Bertie, Lenoir, Barclay, and Stono series of this great soil group grade toward Gray-Brown Podzolic soils.

Bertie very fine sandy loam has the profile development of the somewhat poorly drained Low-Humic Gley soils of the county. A profile of this soil in a forested area one-tenth mile south of Weeksville School has characteristics as follows:

- A₀ 1 to 0 inch, duff.
- A₁ 0 to 1½ inches, variegated very dark gray (10YR 3/1) and gray (10YR 5/1) very fine sandy loam; very friable; weak fine and medium granular structure; well matted with fine roots.
- A₂ 1½ to 12 inches, pale-brown (10YR 6/3) and very pale brown (10YR 7/3) very fine sandy loam; very friable; slightly sticky when wet; very weak medium subangular blocky structure.
- B_{2x} 12 to 30 inches, mottled yellow (10YR 7/6), yellowish-brown (10YR 5/6) and light-gray (2.5Y 7/2) clay loam containing thin lenses of very fine sandy loam; mottles distinct, common, and of coarse to medium size; friable; slightly plastic when wet, hard when dry; weak to moderate medium blocky structure.
- B_{3x} 30 to 38 inches, light-gray (10YR 7/1), heavy loam with yellow (10YR 7/6), and yellowish-brown (10YR 5/6) mottles; friable; weak medium blocky structure.
- G₁ 38 to 54 inches, light-gray (2.5Y 7/2) loamy fine sand mottled with light yellowish brown (10YR 6/4) and strong brown (10YR 5/8); very slightly compact in place.
- DG 54 to 60 inches, mottled light-gray (10YR 7/1), light yellowish-brown (10YR 6/4), and reddish-yellow (7.5YR 6/6) loam interbedded with loamy fine sand.

The profile is strongly acid in the surface soil and subsoil layers and medium acid in the substratum.

The somewhat poorly drained Dragston, Barclay, and Lenoir soils have about the same degree of profile development as the Bertie soils but differ in profile texture. The Dragston soils have fine sandy loam to loam subsoil layers; the Barclay soil has a very fine sandy loam, loam, or silt loam surface soil and subsoil; and the Lenoir soils have clay or silty clay subsoils.

Poorly drained Low-Humic Gley soils with light-colored surface layers are represented by the Fallsington, Othello, Elkton, and Pasquotank series. The subsoil textures range from fine sandy loam or loam in the Fallsington to clay or silty clay in the Elkton soils. All the soils are characterized by a fluctuating but prevailing high ground-water level. The Fallsington and Pasquotank profiles are permeable enough to allow water to percolate freely, but the Elkton and Othello profiles are more slowly permeable and have slower internal drainage. The Othello soils are intermediate in textural profile between Fallsington and Elkton soils. The Pasquotank soils are dominantly very fine sand and silt throughout their profiles and are very friable and permeable. In the Elkton soils the clay or silty clay subsoil layer is probably caused mainly by deposits of fine materials in the original marine sediments rather than by soil-development processes.

Following is a description of a representative profile of Elkton silt loam in a nearly level forested area about 2 miles northeast of Riverside Church:

- A₀ 1 to 0 inch, brown partly decomposed forest litter.
 A₁ 0 to 2 inches, grayish-brown (10YR 5/2) to dark grayish-brown (10YR 4/2) silt loam; very friable; when moist crushes to weak fine and medium granular structure; matted with fine roots; some wormholes.
 A₂ 2 to 14 inches, intermingled gray (10YR 6/1) and light-gray (10YR 7/1) silt loam, finely mottled with olive yellow (2.5Y 6/6); very friable; crushes to weak medium blocky structure; many fine pinholes, fine roots, and some old root casts.
 G₁ 14 to 26 inches, gray (10YR 5/1) clay or silty clay, finely mottled with yellowish brown (10YR 5/8); firm; plastic when wet, very hard when dry; weak coarse and medium blocky structure; contains a few fine roots; fine pinholes fairly numerous.
 G₂ 26 to 48 inches, intermingled gray (10YR 5/1) and light-gray (10YR 7/1) clay or silty clay, finely mottled with yellowish brown (10YR 5/8) and containing thin lenses or pockets of silt loam or very fine sandy loam; firm; plastic when wet, hard to very hard when dry; weak coarse blocky structure; many fine pinholes.
 G₃ 48 to 54 inches, white (2.5Y 8/0) interbedded light clay loam and fine sandy loam, mottled with yellowish brown (10YR 5/8); mottles distinct, coarse, and fairly common; very slightly compact but friable.
 D 54 to 60 inches, pale-yellow (5Y 7/3) loamy fine sand.

The Bibb series in this county consists of recent alluvial materials. The soils composing this series are variable in texture. They have a gray or dark-gray surface layer and a gray or light-gray subsurface layer mottled with yellow and brown.

The organic-matter content ranges from about 1 to 2½ percent in the lighter colored Low-Humic Gley soils and from 4 to 8 percent in the darker colored soils. Stono and Bladen are the darker colored soils and may be considered intermediate between Low-Humic Gley and Humic Gley soils. The Stono soils are somewhat poorly drained. They are similar to Dragston soils in all characteristics except their darker colored surface soil. The Bladen soils are similar to the Elkton except for their darker colored surface soil and higher organic-matter content.

Humic Gley soils

Humic-Gley soils, an intrazonal group, are defined as poorly drained to very poorly drained hydromorphic soils with dark-colored organic-mineral horizons of moderate thickness underlain by mineral gley horizons (15). Gleying is the soil-development process involved in their formation. The Humic Gley soils in this county are in the Bayboro, Weeksville, Pocomoke, and Portsmouth series. These soils have developed from acid marine sediments in areas where the ground-water level was fluctuating but relatively high and the runoff was very low. The forest cover was principally loblolly pine, water-tolerant oaks, sweetgum, red maple, blackgum, and yellow-poplar.

The Humic Gley soils have dark-gray, very dark gray, or black surface soils. Their subsoils are dominantly gray and range from silt loam to silty clay or clay. In forested areas the approximate organic-matter content is as follows: Bayboro soils, 8 to 15 percent; Weeksville soil, 5 to 8 percent; Pocomoke soils, 5 to 10 percent; and the Portsmouth soil, 8 to 10 percent.

Following is a profile description of Bayboro loam in a nearly level forested area about 0.4 mile east of Blackhead signpost:

- A₀ 1 to 0 inch, partly decomposed forest litter.
 A₁ 0 to 10 inches, black (10YR 2/1) loam; very friable; upper few inches moderate fine and medium granular, the rest weak fine and medium granular structure; roots numerous and evenly distributed.
 A₃₁ 10 to 14 inches, dark grayish-brown (10YR 4/2) to very dark grayish brown (10YR 3/2) silt loam or loam; very friable; crushes to weak medium granular structure at field capacity; roots and fine pinholes fairly numerous.
 A₃₂ 14 to 18 inches, grayish-brown (10YR 5/2) silt loam or loam with variegations of gray (10YR 5/1) and light gray (10YR 7/1); friable; crushes to weak medium subangular blocky structure; few roots.
 G₁ 18 to 40 inches, gray (10YR 6/1), dark-gray (10YR 4/1), and light-gray (10YR 7/1) clay or silty clay, finely mottled with brown (7.5YR 4/4); firm; plastic when wet and hard when dry; weak medium blocky structure; white film of silty material on some of the breakage faces; remains of dead roots fairly numerous; contains a few root holes and fine pinholes.
 G₂ 40 to 50 inches, light olive-gray (5Y 6/2) silty clay, mottled with dark gray (10YR 4/1) and brown (7.5YR 4/4); the dark-gray color is mainly organic stain on the breakage faces, and the brown occurs as splotches and along root casts; firm; plastic when wet; lenses of coarser material present.
 G₃ 50 to 60 inches, light olive-gray (5Y 6/2) clay loam finely mottled with yellowish red (7.5YR 5/6) and interbedded with very fine sandy loam or silt loam; friable; water table below 60 inches in October 1948 when the profile was examined.

The Weeksville soil has a very dark gray or very dark brown surface soil and a mottled gray, light brownish-gray, and white subsoil. The Pocomoke soils have dark-colored surface layers on dominantly gray fine sandy loam to loam subsoil layers, which, in turn, overlie loamy sand at depths of 30 to 40 inches. The Portsmouth soil is intermediate between Bayboro and Pocomoke soils in subsoil texture. Loamy sand is present at depths of 30 to 40 inches, and the soil is classified as a sandy substratum phase.

The Bayboro and Pocomoke series also have mucky loam types. Bayboro mucky loam has a mucky surface layer 6 to 18 inches thick. This layer contains 20 to 50 percent organic matter. It overlies a gray mineral horizon similar to that of Bayboro loam. Except for its high organic-matter content, Pocomoke mucky loam has characteristics similar to those of Pocomoke fine sandy loam. In forested areas organic matter makes up 20 to 45 percent of the surface soil.

Regosols

Regosols are an azonal group of soils consisting of deep unconsolidated rock (soft mineral deposits) in which few or no clearly expressed soil characteristics have developed. They are mainly confined to recent sand dunes and to loess and glacial drift of steeply sloping lands (14). In this county the Regosols are derived from deposits of loose Coastal Plain sandy material and are loamy fine sand types of the Galestown and Klej series. The Galestown soil occurs on low ridges or gentle slopes that border drainageways, and the Klej soil is on less well drained positions on flats and very gentle ridges.

The following description of Galestown loamy fine sand in a forested area about 1 mile southeast of Pitts Chapel School shows the Regosol profile development in well-drained areas.

- A₀ ½ to 0 inch, partly decomposed forest litter.
 A₁₁ 0 to 2 inches, dark grayish-brown (10YR 4/2) loamy fine sand; loose.
 A₁₂ 2 to 6 inches, brown (10YR 5/3) loamy fine sand; loose.
 C₁ 6 to 32 inches, light yellowish-brown (10YR 6/4) loamy fine sand; loose.

- C₂ 32 to 44 inches, yellow (2.5Y 8/6) loamy fine sand or fine sand with a few faint medium mottles in lower part; loose.
- C₃ 44 to 60 inches, mottled pale-yellow (2.5Y 7/4), light-gray (10YR 7/1), and brownish-yellow (10YR 6/6) loamy fine sand, loose.

Miscellaneous land types

The miscellaneous land types are not commonly identified with great soil groups. These land types are Mucky peat, Swamp, Borrow pits, and Made land and dumps. Two of these—Borrow pits and Made land and dumps—are the result of activities by man and therefore do not belong in the taxonomic soil classification. The other two, Mucky peat and Swamp, comprise soils that would be classified into series in the taxonomic classification, provided they were examined in greater detail than was practicable in the survey. Mucky peat is an organic soil.

Mucky peat consists of plant remains in various stages of decomposition. It has developed under a swamp or marsh type of vegetation. In this county Mucky peat has developed under a forest of southern white-cedar, cypress, swamp blackgum, red maple, and bays, and an undergrowth of shrubs and grasses. Its depth ranges from about 2 to more than 5 feet. Determinations on a number of surface soil samples indicate that the organic-matter content is about 90 percent in most places. The underlying material is variable.

The following is a profile description of Mucky peat 48 inches deep, underlain by medium-textured material. The soil is in the Dismal Swamp section of the county and has a fairly dense growth of small cane (*Arundinaria*), red maple, swamp blackgum sprouts, swampbay, and a scattering of pond pine.

1. 0 to 18 inches, very dark grayish-brown (10YR 3/2) partly to well-decomposed plant remains; well matted with roots, twigs, and underground woody shoots; material open, loose, and spongy; a thin layer of pine needles and reed leaves on the surface.
 2. 18 to 48 inches, black (10YR 2/1) fairly well decomposed plant remains; many woody fragments and remains of sedges; soft and smooth; many stumps, roots, and small tree trunks.
 3. 48 to 54 inches, dark grayish-brown (10YR 4/2) fine sandy loam; very friable; brown color caused by organic stains from layer above.
- G 54 to 60 inches, gray (10YR 6/1) or light-gray (10YR 7/1) loam or sandy clay loam; friable.

Field tests indicate that Mucky peat is very strongly acid. In places the underlying material is medium to slightly acid.

Swamp occupies areas only slightly above sea level along sluggish streams. It is very poorly drained. Its organic-matter content ranges from very low to very high. The surface soil and subsoil vary considerably in most places. In areas where there is some soil development, the surface soil is gray to very dark gray fine sandy loam to silty clay loam, and the subsoil is light-gray to gray loamy to clayey material. The substratum is variable.

Forests and Other Natural Vegetation

Pasquotank County has a wide variety of trees, shrubs, and other plants. Plant species are associated to some extent with drainage conditions.

The county lies in the southeastern pine forest division of the Eastern Forest region of the United States (9). It

is in the northern extension of the Southern Pine region of the southeastern United States (17). Originally the area was heavily forested, probably with the same species that exist today but in different proportions. Except in the Dismal Swamp and other very wet areas, loblolly pine was the most important forest species; hardwoods were of secondary importance (5). Subsequent cutting and burning, however, have altered the forest cover. Practically all forests have been cut over at least once, and some areas, mainly in the Dismal Swamp section, have been severely burned. A considerable acreage that was cleared and under cultivation at one time has been allowed to revert to forest within the past 20 to 50 years. The present forests are principally of the loblolly pine-hardwood type; some are southern white-cedar and southern cypress-swamp blackgum types.

Lumbering has been important since the first settlement, when juniper, or southern white-cedar, shingles were exported (3). Small to fairly large forested areas occur today on lands not well suited to agricultural use throughout the southern half of the county. In the northern part, which includes the Dismal Swamp section, probably 80 to 85 percent is in forest or in recently burned or cutover areas.

A direct correlation exists between soil suitability for agriculture and the percentage of the soils under cultivation or in pasture. The best suited soils are mostly under cultivation or in pasture, and the least suited ones are mostly in forest. Nearly all the formerly cultivated areas that have reverted to forest in recent years or that are now idle consist largely of Elkton, Othello, and Bladen soils. Soils of the Elkton, Lenoir, Othello, Bladen, Bayboro, Pocomoke, Galestown, and Klej series have 50 percent or more of their acreage in forest. The Mattapex, Bertie, and Fallsington soils are 25 to 50 percent in forest. The Nixonton, Barclay, Pasquotank, Weeksville, Dragston, Stono, Woodstown, Sassafras, and Matapeake series are largely under cultivation. All areas of Mucky peat, except those that have been recently burned, have some type of forest cover. Much of this cover, however, is a brushy growth consisting mainly of cane or reeds with a scattering of pond pine. Nearly all areas of Swamp and Bibb soils are in forest, but marshgrass covers very small areas along Big Flatty Creek and other small creeks in the southern part of the county.

The forests, as they relate to soils, may be classified in three broad groups: (1) Upland forests on well-drained to poorly drained mineral soils; (2) forests on Mucky peat in the Dismal Swamp and along the Pasquotank River; and (3) forests on the very poorly drained or ponded areas classified as Swamp, but composed mainly of mineral soil and occurring along natural drainageways and in other low wet places.

The upland forest on well-drained to poorly drained mineral soils is of the loblolly pine-mixed hardwood type. It makes up much of the forested area of the county. Cutting and burning have tended to decrease the proportion of loblolly pine in most areas. Loblolly pine, however, is still the dominant species in many upland forests. It occurs in almost pure, even-aged stands on well-drained to poorly drained abandoned fields.

In many areas repeated cuttings of all the merchantable pine have increased the proportion of hardwoods. In small areas all the pines large enough to produce seed were

cut, and fires then followed. Consequently, hardwoods in the form of sprout growth have taken over.

The chief associates of loblolly pine on the well-drained and moderately well drained soils are white, southern red, and post oaks, sweetgum, birch, and hickory. The chief associates on the somewhat poorly drained and poorly drained soils are water, willow, swamp white, and swamp chestnut oaks, sweetgum, blackgum, yellow-poplar, redbay, white ash, elm, and, on the wetter sites, a few pond pines.

In forests on Mucky peat in the Dismal Swamp and along the Pasquotank River north of Elizabeth City, lumbering and fires have greatly modified the stands in places. At one time southern white-cedar was much more common and covered much wider areas than it does today. These areas contained some of the best second-growth stands of this species to be found anywhere (6). Southern cypress was probably never important but was formerly more plentiful. Other species of the original forest probably included red maple, swamp blackgum, sweetbay, yellow-poplar, ash, and pond pine.

With the probable exception of areas along the Pasquotank River and in the extreme northern part of the county, Mucky peat has been burned over one or more times. Nearly half of its total area has been severely burned since about 1930. These severely burned areas have a thick growth of large and small canes, red maple and swamp blackgum sprouts, various shrubs, and a scattering of pond pine. Most areas have enough pine for seed trees and produce seedlings. Other vegetation consists of sweet pepperbush, gallberry, greenbrier, bamboo vine, royalfern, sphagnum moss, and a small stand of panicgrass in open places.

Areas of Mucky peat that have not been severely burned support a hardwood growth, mainly swamp blackgum, red maple, yellow-poplar, swampbay, and ash, and a scattering of young southern white-cedar in places. Southern white-cedar is confined almost exclusively to the extreme northern part of the county and along the Pasquotank River. This species was observed only on Mucky peat areas that are about 5 feet or more in depth. Fires following clean cutting that left heavy slash on the ground have contributed to the general decline in the stands and in the range of the southern white-cedar. The principal smaller vegetation on areas not severely burned consists of gallberry, large gallberry, sweet pepperbush, greenbrier, bamboo vine, rattan or supplejack, swamp huckleberry, highbush blackberry, large and small canes, royal and cinnamonferns, and fetter bush (*Leucothoë axillaris*).

Recently burned areas of Mucky peat have no tree growth; the vegetation is mainly small cane, gallberry, swamp huckleberry, and royalfern, and black willow, red maple, and blackgum sprouts. There are a few pine seedlings and some sphagnum moss, panicgrass, and cattails, and woolgrass and other sedges.

On the very poorly drained mineral soils classified as Swamp that occur mainly in narrow strips along the natural drainageways, southern cypress, swamp blackgum, yellow-poplar, red maple, and ash are the dominant species. Cypress is probably the most valuable tree in this association, and in some forests it forms almost pure even-aged stands. The forest undergrowth consists of black alder, greenbrier, rattan or supplejack, sweet pepperbush, and wild grape.

On ditchbanks that are allowed to grow up in vegetation, and in hedgerows, there usually is a dense growth of blackberry, Japanese honeysuckle, poison-ivy, small cane, sumac, willow sprouts, sassafras, goldenrod, dog-fennel, water bush, greenbrier, broomsedge, Indiangrass, and sweetgum sprouts.

Shrubby thickets have a dense growth of blackberry, wild plum, wild grape, Carolina-jessamine or yellow jasmine, trumpet creeper, crossvine, greenbrier, highbush blackberry, and poison-ivy.

The following are pests in cultivated fields and pastures: Goosegrass, crabgrass, cocklebur, ragweed, horsenettle, goldenrod, Canada thistle, curly dock or curled dock, lambsquarters, jimsonweed, dandelion, broad-leaved plantain, sheep sorrel, morning-glory, peppergrass, wild carrot, pigweed, and winterweed.

The most common pasture grasses and legumes are Dallisgrass, carpetgrass, bermudagrass, white or white Dutch clover, and lespedeza.

According to the census, 26,035 acres was in farm forests or farm woodlots in 1950. Forest practices recommended by the county agricultural agent, the North Carolina Agricultural Extension Service, and the United States Forest Service are being followed on some farms and to a limited extent on commercial holdings.

Except in small areas of grass marsh, all the soils of the county, if properly managed and protected, are suitable for the production of some type of forest. No areas are too sandy or droughty for loblolly pine, and there are no areas of soils shallow over bedrock or formed of dense clay. All the mineral soils except the very poorly drained soil classified as Swamp are suitable for the production of good loblolly pine lumber, piling, and poles. Furthermore, they grow these products in a shorter time than some soils farther inland in the Coastal Plain and in the Piedmont Plateau. The looser, more sandy soils, such as Galestown, Woodstown, Sassafras, and Klej, are probably more suitable for forest management than the firm or clayey soils, such as Elkton, Bladen, and Bayboro, because their undergrowth is not so dense. However, loblolly pine grows rapidly on the fine-textured poorly drained soils despite competition with heavy undergrowth. If fires are controlled, water-loving hardwoods do well on the soils high in organic matter. Under proper management the wet areas of these soils are suited also to the production of southern white-cedar and pond pine. The areas of Swamp are too wet for crops and pasture and probably can be used best for the production of cypress and swamp hardwoods.

Forest Use and Management

At present merchantable timber in the county consists of scattered areas of loblolly pine, some oak and gum, and cypress in the very wet or ponded areas. About seven mills using lumber and wood operate in Elizabeth City, and there are several small mills in other parts of the county. These mills use timber from Pasquotank County and from the surrounding counties. Practically no timber is cut in the Dismal Swamp section of the county. Loblolly pine is cut for lumber and piling, and cypress, gum, and oaks for lumber and other wood products. Although pulpwood markets are within reasonable distances, no pulpwood is cut.

Pasquotank County has had organized fire protection since 1947.⁶ The fire-protection program, administered by the North Carolina Forest Service under the direction of a district forester and several assistants, has apparently been effective in preventing extensive fires in the county.

The forested areas are used to some extent for grazing and for hunting and fishing. Studies of the North Carolina Agricultural Experiment Station and the United States Forest Service in other counties of the lower Coastal Plain of North Carolina indicate that in this county some of the forested areas that support a good growth of switch cane or reed (*Arundinaria*) could be used to advantage for grazing.

Results of forest-grazing studies show that grazing pine forest land that has suitable forage and is not subject to erosion is a sound forest management practice. The following is an excerpt from an article, Common Reed Seen as Profitable Forest Forage,⁷ by E. H. Hostetler, North Carolina State College of Agriculture and Engineering and W. O. Shepherd, Southeastern Forest Experiment Station, Asheville, N. C.

Studies in pond pine forests indicate that grazing encourages the establishment and growth of pine seedlings. The cows remove part of the tall grass and other herbage which otherwise tends to crowd out the young seedlings.

Grazing also helps reduce fire hazards in two ways. The cows consume herbaceous material which would accumulate as fuel, and they knock down and trample the loose surface litter, bringing it in contact with the soil and hastening its decay.

Switch cane or reed range offers the best possibilities for profitable forest grazing. In fact it compares favorably with any native range in the United States.

Studies in Washington County, N. C., show that cattle production can be very profitable on good range of this type. With no supplemental feed except minerals, calves weighed 350 to 400 pounds at weaning age, and approximately 90 percent of the cows produced calves.

Scientific and Common Names of the Plant Species

The scientific names and common names of the principal natural vegetation species and some other species found in the county are given in the following list:

TREES	
Scientific names	Common names
<i>Acer rubrum</i>	Red maple.
<i>Aralia spinosa</i>	Devils-walkingstick.
<i>Carya tomentosa</i>	Mockernut hickory.
<i>C. pallida</i>	Pignut hickory.
<i>Chamaecyparis thyoides</i>	Atlantic white-cedar (southern white-cedar), juniper.
<i>Cornus florida</i>	Flowering dogwood.
<i>Diospyros virginiana</i>	Persimmon.
<i>Fagus grandifolia</i>	Beech.
<i>Fraxinus americana</i>	White ash.
<i>F. caroliniana</i>	Carolina ash, water ash.
<i>Ilex opaca</i>	Holly.
<i>Juniperus virginiana</i>	Eastern redcedar.
<i>Liquidambar styraciflua</i>	Red gum, sweetgum.
<i>Lariodendron tulipifera</i>	Yellow-poplar.
<i>Magnolia grandiflora</i>	Magnolia.
<i>M. virginiana</i>	Sweetbay.
<i>Nyssa sylvatica</i>	Blackgum.
<i>N. sylvatica</i> var. <i>biflora</i>	Swamp blackgum.
<i>Persea borbonia</i>	Redbay.

⁶ Information furnished by the personnel of the North Carolina Forest Service in Elizabeth City, N. C.

⁷ Published in the annual farm edition of the News and Observer, Raleigh, N. C., Feb. 21, 1949.

TREES—Continued

Scientific names	Common names
<i>P. pubescens</i>	Swampbay.
<i>Pinus rigida</i> var. <i>serotina</i>	Pond pine.
<i>P. taeda</i>	Loblolly pine.
<i>Quercus alba</i>	White oak.
<i>Q. bicolor</i>	Swamp white oak.
<i>Q. falcata</i>	Southern red oak.
<i>Q. laurifolia</i>	Laurel oak.
<i>Q. Michauxii</i>	Swamp chestnut oak.
<i>Q. nigra</i>	Water oak.
<i>Q. phellos</i>	Willow oak.
<i>Q. stellata</i>	Post oak.
<i>Q. velutina</i>	Black oak.
<i>Q. virginiana</i>	Live oak.
<i>Salix nigra</i>	Black willow.
<i>Sassafras albidum</i>	Sassafras.
<i>Taxodium distichum</i>	Cypress.
<i>Ulmus americana</i>	Elm.

SHRUBS

<i>Alnus serrulata</i>	Black alder.
<i>Baccharis halimifolia</i>	Water bush.
<i>Berchemia scandens</i>	Rattan, supplejack.
<i>Bignonia caprollata</i>	Crossvine.
<i>Campsis radicans</i>	Trumpet creeper.
<i>Clethra alnifolia</i>	Sweet pepperbush.
<i>Gelsemium sempervirens</i>	Carolina-jessamine, yellow jasmine.
<i>Ilex coriacea</i>	Large gallberry.
<i>I. glabra</i>	Gallberry.
<i>Leucothoe axillaris</i>	Fetter bush.
<i>Lonicera japonica</i>	Japanese honeysuckle.
<i>Myrica carolinensis</i>	Waxmyrtle.
<i>Prunus augustifolia</i>	Chickasaw plum.
<i>Rhus glabra</i>	Sumac.
<i>R. radicans</i>	Poison-ivy.
<i>Rosa carolina</i>	Wild rose.
<i>Rubus</i> sp.....	Blackberry.
<i>R. villosus</i>	Highbush blackberry.
<i>Sambucus canadensis</i>	Elder.
<i>Smilax glauca</i>	Greenbrier.
<i>S. laurifolia</i>	Bamboo vine.
<i>Vaccinium corymbosum</i>	Swamp huckleberry.
<i>Vitis riparia</i>	Wild grape.
<i>V. vulpina</i>	Wild grape, muscadine.

HERBS AND GRASSES

<i>Achillea millefolium</i>	Yarrow.
<i>Amaranthus retroflexus</i>	Pigweed.
<i>Ambrosia artemisiifolia</i>	Ragweed.
<i>Andropogon scoparius</i> ; <i>A. virginicus</i>	Broomsedge.
<i>Anthemis cotula</i>	Dogfennel.
<i>Arundinaria gigantea</i>	Large cane or reed.
<i>A. tecta</i>	Small cane or reed.
<i>Axonopus affinis</i>	Carpetgrass.
<i>Chenopodium album</i>	Lambsquarters.
<i>Cirsium arvense</i>	Canada thistle.
<i>Cynodon dactylon</i>	Bermudagrass.
<i>Dactylis glomerata</i>	Orchardgrass.
<i>Datura stramonium</i>	Jimsonweed.
<i>Daucus carota</i>	Wild carrot.
<i>Digitaria sanguinalis</i>	Crabgrass.
<i>Eleusine indica</i>	Goosegrass, yardgrass.
<i>Ipomoea purpurea</i>	Morning-glory.
<i>Lepidium virginicum</i>	Peppergrass.
<i>Lespedeza</i> spp.....	Lespedeza.
<i>Osmunda cinnamomea</i>	Cinnamon fern.
<i>O. regalis</i>	Royalfern.
<i>Panicum</i> spp.....	Panicgrass.
<i>Paspalum dilatatum</i>	Dallisgrass.
<i>Plantago lanceolata</i>	Buckhorn plantain.
<i>P. major</i>	Broad-leaved plantain.
<i>Poa pratensis</i>	Kentucky bluegrass.
<i>Polytrichum commune</i>	Hairy-cap moss.
<i>Ranunculus bulbosus</i>	Buttercup.
<i>Rumex acetosella</i>	Sheep sorrel.

HERBS AND GRASSES—Continued

Scientific names	Common names
<i>R. crispus</i>	Curly dock, curled dock.
<i>Scirpus rubricosus</i>	Woolgrass.
<i>Solanum carolinense</i>	Horsenettle.
<i>Solidago</i> spp.....	Goldenrod.
<i>Sorghastrum nutans</i>	Indiangrass.
<i>Sphagnum</i> spp.....	Sphagnum moss.
<i>Stellaria media</i>	Winterweed.
<i>Taraxacum officinale</i>	Dandelion.
<i>Trifolium repens</i>	White clover, white Dutch clover.
<i>Typha latifolia</i>	Cattail.
<i>Xanthium</i> sp.....	Cocklebur.

Agriculture

Agricultural History

The early agriculture of the county had to be largely on a subsistence basis. Corn, wheat, oats, and potatoes were grown for home use, and livestock was raised. Because of the lack of transportation facilities and the time needed to clear the land, agriculture developed slowly. Corn has always been a leading crop. Cotton was introduced early but was relatively inextensive until after the Civil War. Its acreage has declined rapidly since 1939. Cabbage is a relatively new crop. Potatoes have been a leading crop since about 1910.

Agriculture now consists mainly of the production of subsistence and cash crops and the raising of some livestock. Corn and soybeans are the main staple crops, and potatoes, cabbage, sweet corn, and snap beans are the main truck crops. Less important crops are cotton, sweetpotatoes, peanuts, small grains, collards, turnips, kale, strawberries, and tree fruits. Truck crops are grown largely in the east-central and southern parts of the county. Their most intensive production is around Elizabeth City and Weeksville. Dairying is relatively unimportant except in the vicinity of Elizabeth City. On many farms hogs and chickens are an important source of income. Some beef cattle are raised.

Crops

Corn and soybeans are the most extensively grown crops. From 1929 to 1949, the corn acreage remained fairly constant but the soybean acreage nearly doubled. Next to corn and soybeans, potatoes are the most important crop, but their 1949 acreage is somewhat less than that of 1929. Cotton was a fairly important crop in 1929 but in 1949 it was relatively unimportant, as also was annual legume hay. The area in cabbage increased from 61 acres in 1929 to 2,528 acres in 1949, but even with this increase the acreage is relatively small for a crop so important in the economy of the county. Green peas occupied about 822 acres in 1939, but in 1949 none of the crop was planted for sale. Peanuts, sweetpotatoes, and small grains have never been large crops in the county. The acreages of the principal crops and the number of bearing fruit and nut trees and grapevines for 1929, 1939, and 1949 are shown in table 9.

TABLE 9.—Acreage of principal crops and number of bearing fruit and nut trees and grapevines in Pasquotank County, N. C., in stated years

Crop	1929	1939	1949
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
Corn harvested for grain.....	17, 264	21, 154	20, 051
Oats threshed or combined.....	10	122	239
Soybeans ¹	11, 514	15, 878	17, 473
Peanuts ²	694	419	93
All hay.....	2, 498	2, 673	677
Annual legumes saved for hay.....	2, 143	2, 062	86
Timothy and clover alone or mixed.....	17	12	11
Alfalfa.....	60	50	8
Small grains cut for hay.....	108	115	24
Lespedeza.....	(³)	397	458
Other hay cut.....	170	37	90
Corn cut for silage.....	99	202	246
Corn hogged, grazed, or cut for fodder.....	806	502	346
Potatoes.....	3, 582	3, 701	2, 766
Sweetpotatoes.....	211	126	71
Beans (snap, string, or wax) ⁴	208	583	210
Cabbage ⁴	61	646	2, 528
Corn, sweet ⁴	28	285	375
Peas (green) ⁴	1, 079	822	0
Cotton.....	6, 815	620	788
	<i>Number</i>	<i>Number</i>	<i>Number</i>
Apple trees.....	2, 918	1, 489	805
Fig trees.....	446	409	363
Peach trees.....	2, 226	987	1, 551
Pear trees.....	990	640	204
Plum and prune trees.....	277	74	149
Cherry trees.....	16	30	24
Pecan trees.....	2, 274	4, 308	3, 843
Grapevines.....	430	447	360

¹ For 1929, includes soybeans grown for all purposes; for 1939 and 1949, includes only soybeans harvested for beans.

² For 1929 and 1949, includes peanuts grown for all purposes; for 1939, includes only peanuts harvested for nuts.

³ Not reported.

⁴ For 1929 and 1939, includes only vegetables harvested for sale; for 1949, includes vegetables harvested for home use or for sale.

Corn

Corn, the most extensive crop in the county, is grown on practically all the cultivated soils. Yields vary widely because of differences in soil, in weather, and in fertilization and other management practices. The average corn yield has increased considerably in recent years, and in 1949 it was 32.7 bushels an acre. This increase is attributable in part to better fertilization and other management practices and in part to the use of hybrid seed corn. In some of the past few years, average yields have been considerably higher than averages based on census data for 1944 and 1949. Yields are higher because interest in greater corn production has increased in the country and throughout the State. An estimated 60 percent of the corn produced in the county is sold for cash. A small part is hogged down in the field, and most of the rest is fed on the farm to livestock, including poultry. A small part is used for silage on the larger dairy farms near Elizabeth City.

Soybeans

Like corn, soybeans are widely distributed and are grown on practically all the soil types used for cultivated crops. They are important in the economy of the county and are the principal cash crop on most farms located entirely on soils of the Bayboro and the Elkton-Bladen soil associations and on some farms on the Bertie-Othello and Othello-Bertie-Dragston soil associations. Yields vary from about 5 to 40 bushels an acre, the yield depending largely on the soil type, the weather, and the fertilization and other management. In 1949, a very favorable year, the average yield was more than 17 bushels an acre. There has been much interest in proper fertilizing and liming and other good management for the crop since 1944, and the high average yields of 1949 undoubtedly have resulted from improved methods. A small acreage of soybeans is interplanted with corn, but both crops usually are hogged down. Soybeans are sold in the fall after they are harvested, or they are stored for sale during winter or in spring.

Potatoes

The acreage in potatoes is only about one-sixth of that in soybeans but potatoes are important in the general economy of the county and are the main cash crop on some farms. Their acreage has remained fairly constant since 1929. Because potatoes are more exacting than corn or soybeans in soil requirements, they are grown mainly in east-central and southern parts of the county, where the soil is most favorable. Yields depend largely on soil type, management, and weather; they range from 75 to 400 bushels an acre. The average potato yield was 203 bushels an acre in 1949. Little of the potato crop is consumed locally; most of it is shipped to eastern and northeastern markets.

Cabbage

Cabbage ranks with potatoes in importance, and in 1949 the acreage of both crops was about the same. Cabbage is grown mainly on soils of the Pasquotank-Barclay-Weeksville soil association and is an important source of cash income on some farms. Acre yields range from about 4 to 16 or more tons and depend on the soil, management, cabbage variety, and the weather. Most of the crop is shipped to eastern and northeastern markets. Harvesting may be done during almost any month but is more commonly done from March to November.

Minor crops

Oats, the only small grain of any importance, are grown on a very small acreage. A few acres of wheat, rye, and barley are used for temporary grazing and as winter cover crops. Small areas of vetch, Austrian winter peas, and crimson clover are grown as green-manure crops. Lespedeza is the chief crop grown for hay and is also used for temporary grazing and seed production.

Cotton was fairly important at one time, but its production has greatly declined. It is grown in small widely scattered areas, mainly on Elkton, Bladen, and Lenoir

soils. Peanuts occupy a small acreage, chiefly on sandy soils of the Othello-Bertie-Dragston soil association. Sweetpotatoes are produced mainly for home use, but some are sold at local markets. Some snap beans and sweet corn are grown as truck crops, mostly around Elizabeth City and Weeksville. The beans are planted chiefly in fall, and the sweet corn in spring.

Nearly all farms have a few apple, peach, and pear trees and some have a few pecan trees, fig trees, and grapevines. The fruit trees are given little or no care. Only one commercial apple orchard and two young peach orchards were observed during the survey. There are several pecan orchards in the county, but according to census data, yields are low.

Pasture

In 1949 there were about 3,471 acres of pasture. Pasture occurs throughout the county on practically all soils used for cultivated crops. About 45 percent of the pasture, however, is on the Elkton-Bladen soil association. The soils of this association are not widely used for crops because they are difficult to drain adequately. About 15 percent of the pasture acreage is on soils of the Bayboro series, and about 10 percent on the Othello soils. The rest is on various other soils. Pasture on the most desirable soils, such as the Barclay, Pasquotank, Dragston, and Stono, is restricted mainly to small areas adjoining the farm woodlot. Soils of the Elkton, Othello, and Bladen series are difficult to manage and not very well suited to cultivated crops, but they are good to excellent for pasture when limed, fertilized, and seeded to adapted mixtures. An estimated 500 acres of pasture have been improved.

The seed mixtures recommended for pasture by the North Carolina Agricultural Extension Service and the county agricultural agent and commonly used are Ladino clover and orchardgrass, or Ladino clover and either Kentucky 31 or Alta fescue. The largest improved pasture in the county is located on a combination dairy and beef cattle farm. The soils of this pasture are Bayboro loam and Bayboro loam, thick surface phase. All improved pasture in the county has a high carrying capacity and furnishes grazing from about March 1 to November 1.

Carpetgrass, bermudagrass, goosegrass, Dallisgrass, and whiteclover are the principal plants in the unimproved pastures. Weeds such as dogfennel, ragweed, Canada thistle, curly dock, dandelion, goldenrod, plantain, and horsenettle are common in most of the native pastures. These weeds and sprouts of blackberry, wax-myrtle, water bush, willow, and sweetgum tend to crowd out the desirable grasses. There is a trend in the county to improve pastures and to increase their number.

Livestock and Livestock Products

Hogs and cattle are the principal livestock on the farms of the county. Practically every farm has a small flock of chickens for egg production. Some broilers are raised. Sheep and goats are relatively unimportant. The numbers of livestock and beehives on the farms of the county in 1930, 1940, and 1950 are given in table 10.

TABLE 10.—Number of livestock and beehives on farms in Pasquotank County, N. C., in stated years

Livestock	1930	1940	1950
	<i>Number</i>	<i>Number</i>	<i>Number</i>
Cattle and calves.....	3, 348	¹ 3, 216	3, 752
Horses and colts.....	1, 017	¹ 629	474
Mules and mule colts.....	1, 534	¹ 1, 301	455
Hogs and pigs.....	12, 778	² 5, 714	10, 550
Sheep and lambs.....	2, 953	³ 1, 463	1, 311
Chickens.....	¹ 50, 141	² 38, 958	² 38, 457
Beehives.....	204	137	493

¹ Over 3 months old.² Over 4 months old.³ Over 6 months old.

In 1949, the amount of livestock products and number of livestock sold alive or butchered together totaled a fairly large source of cash income. Whole milk sold amounted to 340,125 gallons; cream (butterfat), 7,683 pounds; and eggs, 132,511 dozens. Wool shorn totaled 4,704 pounds. Chickens sold totaled 20,001. Cattle and calves sold alive numbered 1,705, and butchered, 42. Hogs and pigs sold alive numbered 9,509, and butchered, 1,801. There were 619 sheep and lambs sold alive.

Practically all the milk and milk products produced in the county are sold locally. Two large dairies near Elizabeth City and a number of small ones elsewhere in the county supply milk to Elizabeth City. Most well-established farms have one or two milk cows. The dairy cattle are mostly good grades of Holstein-Friesian, Guernsey, and Jersey, but some are purebred. Holstein-Friesians are most common on the large dairy farms, and Jerseys predominate on farms that have cows for home supply of milk. The large dairies keep purebred sires. Most of the beef cattle come from grade cows and purebred Hereford or Aberdeen-Angus sires. There are several purebred Hereford herds, and one or two purebred Aberdeen-Angus herds.

Duroc-Jersey and Poland China are the most common breeds of hogs in the county. There are several herds of purebred Duroc-Jersey, and one or two of Chester White and Hampshire. Most of the grade herds have purebred sires.

New Hampshire Red is the commonest breed of chicken, but there are some flocks of Barred Plymouth Rock, White Leghorn, and Rhode Island Red. The sheep are mostly grade Hampshire. There is one small purebred Hampshire flock.

All the feed for workstock, beef cattle, and hogs is produced on the farm except the protein or protein-mineral supplement for hogs and the protein supplement for the beef cattle finished off in the county. A few beef cattle are fattened for market in the feed lot; but, except for hay or other roughage during winter, the main feed for most beef cattle is pasture. Most poultry feed except corn is purchased. Pasture ensilage and some hay are produced for dairy cattle, but most of the protein concentrates, such as cottonseed meal and soybean meal, are purchased. In 1949 the number of farms reporting purchase of feed was 593, or 75.5 percent of all farms in the county.

Land Use

The number and average size of farms and the farm acreage for the years 1930, 1940, and 1950 are shown in table 11.

TABLE 11.—Number and average size of farms and the farm acreage in Pasquotank County, N. C., in stated years

Year	Total farms	Approximate area of county	Area not in farms	Area in farms	Part of county in farms	Average size of farms
	<i>Number</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Percent</i>	<i>Acres</i>
1930.....	1, 170	142, 720	59, 717	83, 003	58. 2	70. 9
1940.....	844	¹ 146, 560	65, 448	81, 112	55. 3	96. 1
1950.....	785	146, 560	66, 307	80, 253	54. 8	102. 2

¹ Change in acreage of county results from remeasurement in 1940.

The percentage of land in farms has remained fairly constant since 1929, but the acreage of cropland decreased slightly during the period 1939 to 1949. Observations indicate that some areas of less desirable soils, such as Elkton, Othello, Bladen, and Bayboro, were allowed to revert to forest from 1919 to 1949. During this period areas of more suitable soils probably were brought into cultivation to make up for the areas that were allowed to return to forest. From 1939 to 1943 about 1,000 acres of cropland, consisting mainly of Elkton and Othello soils, were incorporated in government military reservations.

The use of the land in farms in 1929, 1939, and 1949 is shown in table 12.

TABLE 12.—Acreages in farms, by use, in Pasquotank County, N. C., in stated years

Use	1929	1939	1949
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
Cropland (total).....	50, 999	50, 506	47, 359
Harvested.....	43, 075	44, 709	43, 903
Used only for pasture.....	4, 410	3, 383	1, 910
Not harvested or pastured (includes crop failure, idle, and fallow).....	3, 514	2, 414	1, 546
Woodland (total).....	29, 388	27, 558	26, 035
Pastured.....	4, 780	(¹)	3, 560
Not pastured.....	24, 608	(¹)	22, 475
Other land pastured.....	820	(¹)	1, 561
All other land (house lots, barnyards, feed lots, roads, wasteland, etc.).....	1, 796	3, 048	5, 298

¹ Data not available.

Types and Sizes of Farms

Field-crop and general farms are the principal types in the county. The number and types of farms in Pasquotank County in 1950 were as follows:

Type of farm:	Number of farms
Field crop other than vegetable.....	243
Cash grain.....	182
Cotton.....	14
Other field crop.....	47

Type of farm—Continued	Number of farms
Vegetable.....	19
Dairy.....	6
Poultry.....	5
Livestock other than dairy and poultry.....	47
General.....	230
Primarily crop.....	182
Primarily livestock.....	5
Crop and livestock.....	43
Miscellaneous and unclassified.....	235

In 1950 the 785 farms in the county ranged in size from less than 10 to more than 1,000 acres. Of this total number, 89 farms had less than 10 acres; 234, from 10 to 49; 206, from 50 to 99; 139, from 100 to 179; 66, from 180 to 259; 38, from 260 to 499; and 10, from 500 to 999. Three farms were 1,000 acres or more in size.

Farm Tenure and Labor

In 1949, owners operated 567 farms or 72.2 percent of all the farms; tenants, 216 farms or 27.5 percent; and managers, 2 farms or 0.2 percent. There were 15 cash tenants, 18 share-cash tenants, 155 share tenants and croppers, and 28 others. No definite relation exists between the tenancy and the soils or soil associations.

In the week preceding the 1950 census enumeration, the number of workers on 558 farms, including family members and hired help, totaled 1,333. On 158 farms, 522 hired workers were reported.

The labor supply is usually adequate except during potato harvest. In recent years transient labor, mainly from Florida, has been available during the rush season of potato harvesting.

Farm Power and Mechanical Equipment

Work animals supply some of the farm power, but the number of work animals has declined sharply in recent years. In 1950 there were 543 fewer horses and colts and 1,079 fewer mules and mule colts than in 1930. Many farms have a pair of horses or mules for part of the cultivation and for odd jobs, such as plowing out field drains, dusting, and spraying. Except on small subsistence farms, most of the land preparation, cultivation, and harvesting, however, is done with tractors (see fig. 7). Nearly all the feed for workstock is produced on the farm, but only a few replacements for work animals are raised on the farm.

Pasquotank County has a much greater proportion of tractors, in relation to its size and to the number of farms, than any other county in the State. Practically all the tractors are the 2-row type. In 1950 the number of tractors on the 403 farms reporting was 561. On the 398 farms reporting tractors, 536 were wheel tractors other than garden, 16 were garden tractors, and 9 were crawler tractors. On farms not having tractors, considerable soil preparation is done by hired tractors and labor.

Other mechanical equipment on farms in 1950 included the following: Grain combines, 153 on the 147 farms reporting; cornpickers, 148 on the 147 farms reporting; pick-up hay balers, 11 on the 11 farms reporting; upright silos, 14 on the 11 farms reporting; motortrucks, 236 on the 218 farms reporting; and automobiles, 517 on the 428

farms reporting. It is estimated that 75 to 80 percent of the corn is harvested with mechanical pickers, and 80 percent of the soybeans and oats with combines.

In 1950, 117 farms reported having no tractor, horses, or mules; 107 farms, no tractor and only 1 horse or mule; 134 farms, no tractor and 2 or more horses, mules, or both; 342 farms, a tractor and horses, mules, or both; and 85 farms, a tractor and no horses or mules.

General Character of the Area

Location and Extent

Pasquotank County is in northeastern North Carolina (fig. 10). It comprises an area of 229 square miles or 146,560 acres. Elizabeth City, the county seat, is 140 miles northeast of Raleigh, the State capital, and 40 miles south of Norfolk, Va. The county is bounded on the south by the Albemarle Sound. The Pasquotank River forms the eastern and most of the northern boundary, and the Little River forms the southern part of the western boundary. Camden County adjoins on the remainder of

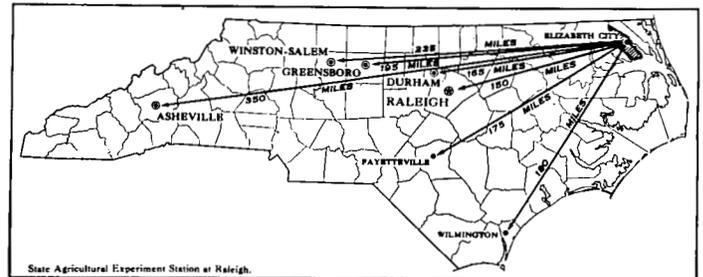


Figure 10.—Location of Pasquotank County in North Carolina.

the northern boundary, and Gates and Perquimans Counties on the western boundary.

Physiography, Relief, and Drainage

Pasquotank County lies wholly within the Coastal Plain province (4). It is in the Albemarle region of the Lower Coastal Plain of northeastern North Carolina and occupies a nearly level plain known as the Pamlico terrace. Most of the area appears level or nearly level to the naked eye, and probably less than one-tenth of 1 percent has slopes greater than 2 percent. The most conspicuous topographic features are (1) several low, short sandy ridges west and northwest of Elizabeth City and in the vicinity of Morgans Corner and (2) the steep 10- to 12-foot escarpment in places along the Pasquotank River Valley between Elizabeth City and Jackson Corner.

Elevation above sea level varies from a few feet near Elizabeth City to a high of about 18 feet near Lynchs Corner in the northern part of the county. The approximate elevations in feet at several points in the county are: Elizabeth City, 8; United States Naval Air Facility, 5.5; Nixonton, 8; Okisko, 10; Morgans Corner, 13; and Lynchs Corner, 18.⁸

Natural drainage is through the Pasquotank and Little Rivers, Knobbs, New Begun, and Symonds Creeks, and

⁸ Data from United States Army Engineers' quadrangles.

a number of short creeks and swamps. However, the drainage system is not well developed, and large areas of the county have no natural drainage outlets. The smaller creeks and swamps have no definite channels in most places, and drainage is sluggish. Although the Pasquotank and Little Rivers originate in the Dismal Swamp section of the county, this swampy area is very poorly drained. Except during very dry periods, water covers or is within a few inches of the surface. Practically all the cultivated land in the county has been provided with some artificial drainage by open-ditch systems made up of large lead ditches or canals and smaller feeder ditches.

Water Supply

The water supply for Elizabeth City comes from a series of shallow wells located several miles to the northwest in the southern end of the Dismal Swamp section of the county. Rural homes obtain water mainly from shallow wells, most of which have electric or hand pumps. Water in the county is generally hard and not the best in other qualities. Shallow wells, creeks, swamps, and canals supply water for livestock.

Climate

The climate of Pasquotank County is oceanic because of the proximity of the Atlantic Ocean and the Albemarle Sound (see table 13). Summers are long and temperate, with very few unusually warm days. Winters are relatively mild and have only a few days below freezing. The average frost-free season of 208 days extends from April 7 to November 1. Hardy vegetables, such as turnips, spinach, kale, collards, and cabbage, withstand the winter temperatures. Rainfall is adequate and generally fairly well distributed throughout the year. Average precipitation for the warm season (April to September, inclusive) is 27.5 inches. Short periods of drought (20 to 30 days) and periods of excessive rainfall (10 to 30 days) during the planting and growing season are not uncommon. Periods of excessive rainfall, however, are usually more damaging to crops than periods of drought, because they sometimes delay planting, cultivating, and harvesting or injure growing crops. Destructive wind, hail, and ice storms are uncommon, as the area is far enough south to escape the severe winters of the northern United States and far enough north to escape the tropical storms of the Gulf States.

TABLE 13.—Normal monthly, seasonal, and annual temperature and precipitation at Elizabeth City, Pasquotank County, N. C.

[Elevation, 8 feet]

Month	Temperature ¹			Precipitation ²			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1912)	Wettest year (1948)	Average snowfall
	° F.	° F.	° F.	Inches	Inches	Inches	Inches
December.....	44.8	80	9	3.90	3.25	5.61	1.5
January.....	45.0	80	-2	3.60	4.30	4.64	1.5
February.....	44.2	82	5	3.60	3.60	6.75	1.1
Winter.....	44.7	82	-2	11.10	11.15	17.00	4.1
March.....	51.2	92	15	3.70	4.10	3.63	1.4
April.....	59.0	95	22	3.50	2.80	3.25	(³)
May.....	67.4	101	30	3.90	4.65	3.15	(³)
Spring.....	59.2	101	15	11.10	11.55	10.03	1.4
June.....	75.0	104	45	5.00	4.00	2.92	0
July.....	78.9	107	50	6.10	1.85	11.80	0
August.....	78.1	104	50	5.50	1.60	2.64	0
Summer.....	77.3	107	45	16.60	7.45	17.36	0
September.....	73.2	99	39	3.50	4.45	6.13	0
October.....	63.1	95	24	2.60	.70	3.16	0
November.....	53.1	87	17	2.60	2.15	9.73	.1
Fall.....	63.1	99	17	8.70	7.30	19.02	.1
Year.....	61.1	107	-2	47.50	37.45	63.41	5.6

¹ Average temperature based on a 42-year record, through 1954; highest temperature based on a 37-year record, through 1952; lowest temperature based on a 39-year record through 1952.

² Average precipitation based on a 42-year record, 1912-54; wettest and driest years based on a 41-year record, in the period 1912-54; snowfall based on a 39-year record, through 1952.

³ Trace.

Climatic conditions are favorable for general farming, growing truck crops, dairying, and livestock raising.

in textile industries that manufacture woolens, worsteds, hosiery, and cotton goods.

Early History

As early as 1666 Bermudians established themselves on the Pasquotank River, where they engaged in shipbuilding. In the early 1800's Elizabeth City and Nixonton had a flourishing trade with the West Indies, exchanging shingles and naval stores for molasses, rum, sugar, and tropical fruits (3).

The first Quaker Meeting House in North Carolina was established at the village of Symonds Creek in 1706. Here, also, a marker indicates the site of the first school in North Carolina, established in 1705 by Charles Griffin (3).

The Dismal Swamp Canal, which connects the Albemarle Sound with the Chesapeake Bay region, was completed in 1836, and in 1881 the Norfolk Southern Railway entered the area. These transportation links stimulated agricultural and industrial development. Before 1881 communication with the outside world was mainly by boat (7). The counties north of the Albemarle Sound were long referred to as "lost provinces" because of difficult communication with the rest of the State (3).

Organization and Population

In 1672 Pasquotank County was constituted a precinct in the County of Albemarle, which included a large area in the northeastern part of the State. Pasquotank County was established in 1739 and at that time included what is now Camden County. Camden County was formed from part of Pasquotank County in 1777 (3).

Nixonton, originally called Old Town, was the seat of Pasquotank County until about 1800, when the county seat was moved to Elizabeth City. Elizabeth City was incorporated as Reading in 1793. Later it was called Elizabethtown and the name was changed to Elizabeth City in 1801.

The 1950 census lists the total population of the county as 24,347; 47.9 percent of this was classed as rural. Elizabeth City (pop. 12,685) is the only incorporated city or town in the county. Small villages or trading centers and concentration points for farm produce are Weeksville, Nixonton, Symonds Creek, Okisko, and Morgans Corner. Farm population is densest in the vicinity of Weeksville and Symonds Creek. A fairly large area in the northern and northwestern parts of the county, occupied by an arm of the Dismal Swamp, is uninhabited.

Industries ⁹

The most important industries in the area are lumbering and the manufacture of forest products and textiles. Less important are shipbuilding, ironworks, candy and peanut butter manufacturing, and fishing. Approximately 1,000 people are employed in Elizabeth City in the manufacture of lumber, veneer, barrels, and boxes, and in printing. In addition, the rural sections of the county have several sawmills. About 625 people are employed

⁹ Most of the information in this section was furnished by the Elizabeth City Chamber of Commerce.

Transportation and Markets

The Norfolk Southern Railway passes through the center of the county in a northeast-southwest direction. It connects the county with points to the south and west and with Norfolk, Va., and with other markets to the north. At present, this railway handles only freight and express. Hard-surfaced roads, including two main highways, reach all important points in the county. The graded roads are well maintained and are generally passable the year around. The Pasquotank River and the Dismal Swamp Canal are a part of the Inland Waterway and connect the area with the Chesapeake Bay region. The canal is used mainly for pleasure craft. Some freight, including lumber and oil, is shipped by boat over the Pasquotank River.

Elizabeth City is the only market for agricultural products in the area. Weeksville is an important concentration and shipping point. Most of the agricultural products go to northern markets, including Washington, Baltimore, Philadelphia, New York, and Boston. Some cabbage is shipped to Raleigh, Durham, and other cities in North Carolina. Snap beans and much of the cabbage raised in the county are hauled by truck. The other important products—corn, soybeans, and potatoes—are shipped both by truck and by rail. Practically all the milk, butter, eggs, and poultry produced in the county are used locally. Hogs and cattle not consumed locally are sold at auction at the local stockyards and then shipped mainly to nearby points in Virginia. Lumber and wood products are shipped to outside markets.

Although not a resort, Elizabeth City is convenient to the duck-hunting country in Currituck County and the sport-fishing waters and resort spots of the northern Carolina coast. Elizabeth City is a popular stop on the Coastal Highway, or United States Highway No. 17, and the Inland Waterway (10).

Community Facilities

Schools and churches are accessible to all residents in the county. Most children in the rural areas are transported to and from school by bus. A State Teachers College for Negroes is located in Elizabeth City. Rural mail delivery service reaches all sections. One county library is located in Elizabeth City, and bookmobile service is available to rural residents.

The 1950 census reported 138 farms had telephones; 558 farms, electricity; and 308 farms, running water.

Soil Survey Methods and Definitions

The scientist who makes a soil survey examines soils in the field, classifies the soils in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

Field study.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern, but are located according to

the lay of the land. Usually they are not more than a quarter of a mile apart, and sometimes they are much closer. In most soils such a boring or hole reveals several distinct layers, called horizons, which collectively are known as the soil profile. Each layer is studied to see how it differs from others in the profile and to learn the things about the soil that influence its capacity to support plant growth.

Color is usually related to the amount of organic matter. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration. Uniformly yellow, red, or brown lower layers generally indicate good drainage and aeration.

Texture, or the content of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers, and is later checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer, and whether it is easy or difficult to cultivate.

Structure, which is the way the individual soil particles are arranged in larger grains and the amount of pore space between grains, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

Other characteristics observed in the course of the field study and considered in classifying the soil include the following: The depth of the soil over bedrock or compact layers; the steepness and pattern of slopes; the degree of erosion; the nature of the parent material from which the soil has developed; and the acidity or alkalinity of the soil as measured by chemical tests.

Classification.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified into phases, types, and series. The soil type is the basic classification unit. A soil type may consist of several phases. Types that resemble one another in most of their characteristics are grouped into soil series.

The soil type (or the soil phase if the soil type is subdivided) is the unit of mapping in soil surveys. It is the unit or the kind of soil that is most nearly uniform and has the narrowest range of characteristics. For this reason land use and soil management practices can be more definitely specified for it than for broader groups of soils that contain more variation.

Soil type.—Soils similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

Soil phase.—Because of differences other than those of kind, thickness, and arrangement of layers, some soil types are separated into two or more phases. For example, if the depth to sand in a soil type ranges from 3 feet to 4 or 5 feet, the type may be mapped in two phases—a normal phase in which sand generally occurs at a depth of 36 to 40 inches, and a deep phase in which sand occurs at 48 to 60 inches. Similarly, if the surface soil, or A horizon, has a wide range in depth, the type may be divided into a normal phase and a thick surface phase.

Soil series.—Two or more soil types that differ in surface texture but are otherwise similar in kind, thick-

ness, and arrangement of soil layers are normally designated as a soil series. In a given area, however, it frequently happens that a soil series is represented by only one soil type.

The name of a place where a soil series was first found usually is chosen for the name of the series. Thus, Pasquotank is the name of a deep, smooth, friable, poorly drained series in Pasquotank County. Two types of the series have been found—Pasquotank silt loam and Pasquotank very fine sandy loam. Neither of these types is divided into phases, but types of other series are. For example, Othello very fine sandy loam is divided into the normal phase and the deep phase.

Miscellaneous land types.—These land types are not classified into series but are identified by descriptive names, such as Mucky peat, Swamp, Borrow pits, and Made land and dumps.

Glossary

Acidity. The degree of acidity of the soil mass expressed in pH values or in words as follows:

	pH		pH
Extremely acid.....	below 4.5	Slightly acid.....	6.1-6.5
Very strongly acid.....	4.5-5.0	Neutral.....	6.6-7.3
Strongly acid.....	5.1-5.5	Mildly alkaline.....	7.4-8.0
Medium acid.....	5.6-6.0		

Clay. The small mineral soil grains, less than 0.002 mm. (0.00079 in.) in diameter. (Formerly included the grains less than 0.005 mm. in diameter.)

Consistence. A soil term expressing degree of cohesion and resistance to forces tending to deform or rupture the aggregates. The relative mutual attraction of the particles in the whole mass, or their resistance to separation. Terms used in the report to describe consistence are *compact*, *firm*, *friable*, *hard*, *loose*, *plastic*, *slightly plastic*, and *very friable*.

Compact. Dense and firm but without any cementation. The term denotes a combination of firm consistence and close packing or arrangement of soil particles.

Firm. Soil material crushes under moderate pressure between thumb and forefinger but resistance is distinctly noticeable.

Friable. Soil material crushes easily under gentle to moderate pressure between thumb and forefinger and coheres when pressed together.

Hard. Moderately resistant to pressure; soil material can be broken in the hands without difficulty but is barely breakable between thumb and forefinger.

Loose. Noncoherent.

Plastic. Forms wirelike shape when rolled between hands; moderate pressure required for deformation of the soil mass.

Slightly plastic. Forms wirelike shape when rolled between hands; soil mass easily deformable.

Very friable. Soil material crushes under very gentle pressure but coheres when pressed together.

Crumb (*See also* Structure). Generally soft, small, porous aggregates, tending toward a spherical shape, as in the A₁ horizon of many soils. This variety is closely related to granular structure.

Family, soil. A taxonomic group of soils having similar profiles and composed of one or more distinct soil series. It is a category in soil classification between series and great soil groups.

Fertility, soil. The inherent quality of a soil, as measured by the quantity of compounds provided for proper or balanced growth.

Genesis (*See also* Horizon). Mode of origin of the soil, referring particularly to the processes responsible for the development of the solum (horizons A and B) from the unconsolidated parent material.

Granular (*See also* Structure). Roughly spherical aggregates that may be either hard or soft, usually more a firm than a crumb structure and without the distinct faces of blocky structure.

Great soil group (soil classification). A broad group of soils having common internal soil characteristics.

Green-manure crop. Any crop grown and plowed under for the purpose of improving the soil, especially by the addition of organic matter.

Horizon, soil. Layer or part of the soil profile approximately parallel to the land surface that has more or less well-defined characteristics.

Horizon A. The upper horizon of the soil mass from which material has been removed by percolating waters; the eluviated part of the solum; the surface soil. It is generally subdivided in two or more subhorizons, of which A_0 is not a part of the mineral soil but the accumulation of organic debris on the surface. Other subhorizons are designated as A_1 , A_2 , and so on.

Horizon B. The horizon of deposition, to which materials have been added by percolating waters; the illuviated part of the solum; the subsoil. This horizon may also be divided into several subhorizons, depending on the color, structure, consistence, or character of the material deposited. These layers are designated as B_1 , B_2 , B_3 , and so on.

Horizon C. The horizon of partly weathered material underlying the B horizon; the substratum; usually the parent material.

Internal drainage. Refers to the movement of water through the soil profile. This rate is affected by the texture of the surface soil and subsoil, and by the height of the ground water table; either permanent or perched. Relative terms for expressing internal drainage are the following: *Very rapid, rapid, medium, slow, very slow, and none.*

Leaching, soil. Removal of materials in solution.

Morphology. The physical constitution of the soil expressed in the kinds of horizons, their thickness and arrangement in the profile, and the texture, structure, consistence, porosity, and color of each horizon.

Mottles, soil. Contrasting color patches that vary in number and size. Descriptive terms are as follows: Contrast—*faint, distinct, and prominent*; abundance—*few, common, and many*; and size—*fine, medium, and coarse*. The size measurements are the following: Fine, commonly less than 5 mm. [about 0.2 in.] in diameter along the greatest dimension; medium, commonly ranging between 5 and 15 mm. [about 0.2 to 0.6 in.] along the greatest dimension; and coarse, commonly more than 15 mm. [about 0.9 in.] along the greatest dimension (11).

Natural drainage. Refers to those conditions which existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be due to other causes, such as sudden deepening of channels or sudden blocking of drainage outlets. The following relative terms are used to express natural drainage: *Excessively drained, somewhat excessively drained, well drained, moderately well drained, imperfectly or somewhat poorly drained, poorly drained, and very poorly drained.*

Normal soil. A soil having a profile in equilibrium with two principal forces of the environment—native vegetation and climate—usually developed on the gently undulating (but not strictly level) upland, with good drainage, from any parent material, not of extreme texture or chemical composition, that has been in place long enough for biological forces to exert their full effect.

Nutrients, plant. The elements taken in by the plant, essential to its growth, and used by it in the elaboration of its food and tissue. These include nitrogen, phosphorus, calcium, potassium, magnesium, sulphur, iron, manganese, copper, boron, zinc, and perhaps others obtained from the soil; and carbon, hydrogen, and oxygen, obtained largely from the air and water.

Parent material (See also Horizon C, Profile, and Substratum). The unconsolidated mass from which the soil profile develops.

Permeable. Easily penetrated, as by water.

Phase, soil. A subdivision of the soil type covering variations within the type that are not sufficient to justify the establishment of a new type, yet are worthy of recognition; a mapping unit. The variations may be in such external characteristics as relief, stoniness, erosion, or depth. (Example: Othello very fine sandy loam, deep phase.)

Productivity, soil. The capability of a soil to produce a specified plant (or plants) under a given system of management.

Profile, soil. A vertical section of the soil from the surface into the parent material.

Reaction. See Acidity.

Relief. The elevations or inequalities of the land surface, the slope gradient, and the pattern of these.

Runoff. This term refers to the amount of water removed by flow over the surface of the soil. The amount and rapidity of runoff are affected by factors such as texture, structure, and porosity of the surface soil, the vegetative covering, the prevailing climate, and the slope. Relative degree of runoff is expressed in six classes as follows: *Very rapid, rapid, medium, slow, very slow, and ponded.*

Sand. Small rock or mineral fragments with diameters ranging between 0.05 mm. (0.002 in.) and 1.0 mm. (0.039 in.). The term "sand" is also applied to soils containing 90 percent or more of sand.

Series, soil. A group of soils having the same profile characteristics (the same general range in color, structure, consistence, and sequence of horizons), the same general conditions of relief and drainage, and usually a common or similar origin and mode of formation. A group of soil types closely similar in all respects except the texture of the surface soil.

Silt. Small mineral soil grains ranging from 0.05 mm. (0.002 in.) to 0.002 mm. (0.000079 in.) in diameter.

Soil. An organized natural body occurring on the surface of the earth, characterized by conformable layers that result from modification of parent material by physical, chemical, and biological forces through various periods of time.

Soil texture classes. Classes of soil based on the relative proportion of soil separates. The principal classes, in increasing order of the content of the finer separates are as follows: *Sand, loamy sand, sandy loam, loam, silt loam, clay loam, and clay.*

Soil separates. The individual size groups of soil particles, as sand, silt, and clay.

Structure, soil. The morphological aggregates in which the individual soil particles are arranged. Term may refer to their natural arrangement in the soil when in place and undisturbed or to the soil at any degree of disturbance. Soil structure is classified according to grade, class, and type.

Grade. Degree of distinctness of aggregation; expresses the differential between cohesion within aggregates and adhesion between aggregates. Terms: *Structureless* (single grain or massive), *weak, moderate, and strong.*

Class. Size of soil aggregates. Terms: *Very fine or very thin, fine or thin, medium, coarse or thick, and very coarse or very thick.*

Type. Shapes for soil aggregates. Terms: *Platy, prismatic, columnar, blocky, or angular blocky, subangular blocky, granular* (nonporous), and *crumb* (very porous). (Example of soil-structure grade, class, and type: Moderate coarse blocky.)

Subsoil. Technically, the B horizon; roughly, that part of the profile below plow depth.

Substratum (See also Horizon C and Parent Material). Material underlying the subsoil.

Surface soil. Technically, the A horizon; commonly, the part of the upper profile usually stirred by plowing.

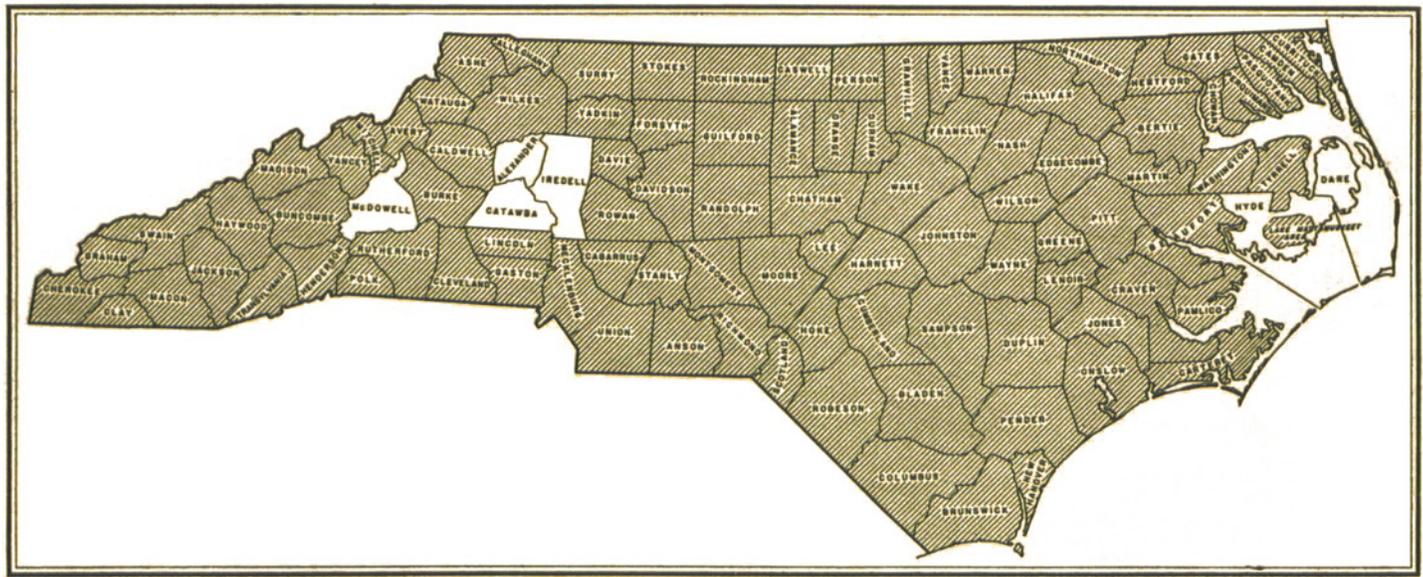
Texture. The relative proportions of the various size groups of individual soil grains in a mass of soil. The various soil separates are the size groups, as sand, silt, and clay. A coarse-textured soil is one high in sand; a fine-textured soil has a large proportion of clay.

Type, soil. A group of soils having genetic horizons similar as to differentiating characteristics, including texture and arrangement in soil profile, and developed from a particular type of parent material.

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Areas surveyed in North Carolina shown by shading.

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