United States Department of Agriculture

Soil Conservation Service

in cooperation with North Carolina State University

Soil Survey Investigations Report No. 40

Water-Table Levels in Some North Carolina Soils

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by

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Abstract

This r port provides weekly and biweekly water-table data for an average year's rainfall at 53 soil sites in the Coastal Plain of North Carolina. In addition, it lists the dominant overstory and understory vegetation on the forested sites. The mean monthly water-table levels presented for each site are for the amount of rainfall expected to be exceeded only 1 year in 20 and for the amount that is exceeded or equaled in 19 years in 20.

The water-table data are for Paleudults, Hapludults, Paleaquults, Umbraquults, and Haplaquods, common soils in the Coastal Plain. Morphology and yearly water-table level are closely related in such soils as Umbraquults and Paleudults, which have a yellowish red B horizon. Aeric and Typic Paleaquults and Aquic and Typic Paleudults, which have a mottled B horizon, however, do not always have highly contrasting water-table levels. The difference in the water-table level of Typic Paleaquults in a swale and that of Typic Paleudults in an adjacent swale may be 20 cm or less throughout most of the year.

The morphological differences between these soils result primarily from short-term reducing conditions in the Aquults that generally are absent or less intense in the adjacent Udults. Although the morphology of an Aquult may imply that it will have a periodic high water table and some short-term reducing conditions, the absolute water level or the length of saturation at or above a certain depth cannot be accurately predicted. If only the depth and duration of saturation were used in classifying soils, Typic and Aeric Paleaquults and Aquic and Typic Paleudults would often be placed in the same class. Morphologically, this makes little sense, but it separates soils on the divide centers that have a high water table from those near the valley slopes that have a deeper water table. Because it would group soils by landscape units instead of by morphological units, this method could be useful for some engineering purposes. In this type of classification, the landscape and the geologic control of the water table would override the morphological classification. A soil series would commonly be placed in more than one group, depending on the local factors affecting its water-table level.

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March 1987

Introduction

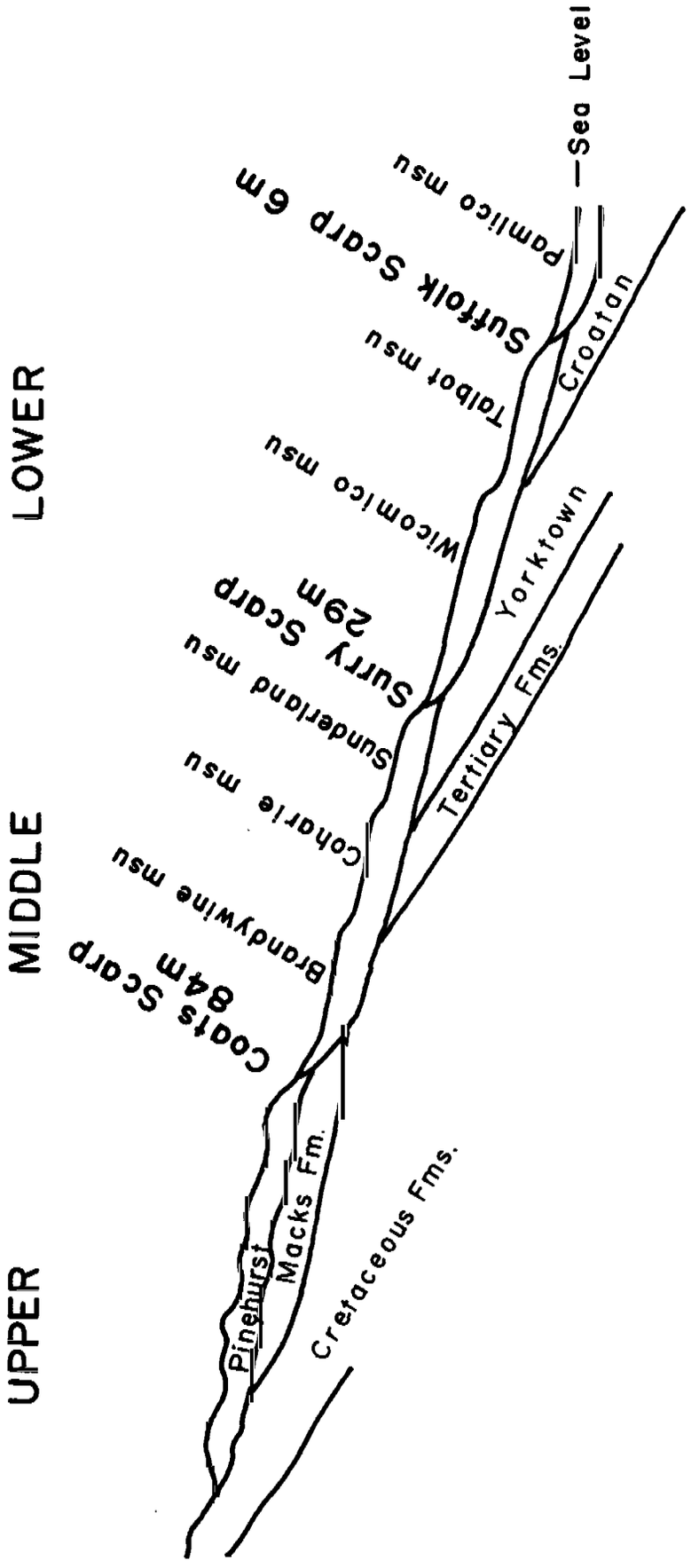
This report provides water-table data and pedon descriptions for 53 sites in the Coastal Plain of North Carolina from 1962 to 1969 and from 1970 to 1972 (fig. 1).

Data are not reported for all sites studied because there is much duplication, and the study was d signed to analyze local changes in water level on a Coastal Plain landscape rather than to study water l vel by taxonomic units.

Raw data are not provided in this report because the water table at any time is controlled by such factors as antecedent water level, rainfall, vapotranspiration, and loss of water through aquifer leakage. The yearly water level at a site varies greatly, and it is difficult to relate raw data to a meaningful average without statistics. Thus, all data are generalized to a standard rainfall patt rn and amount. Details of this generalization were given by Nelson et al. (1973).

Av rages, how ver, are of little use unless something is known about the variation. The variation that can occur in water levels is represented by th average monthly water levels for each site computed for an average year. Actual water-table levels can be expected to be less than the computed av rage 5 years in 10. Average monthly high and low levels expected to be exceeded 1 year in 20 are also given. These estimates are derived from probabilities of monthly rainfall computed by Strommen and Horsfield (1969).

Figure 1.--Generalized stratigraphic and geomorphic relationships in the Coastal Plain of North Carolina. msu = morphostratigraphic unit. fm = formation.



Procedures

Materials used for the well casings were clay sewer pipe open at the bottom and sealed along the sides with concrete; thin-wall galvanized electrical metallic tubing (EMT) with an inside diameter (ID) of 2.54 cm; and 2.54- or 5.08-cm ID semirigid plastic pipe. Most wells were cased either with 2.54-cm ID EMT or plastic pipe perforated in the low r 15 to 30 cm, and all were capped at the top to prevent entry of surface water.

Details of installing the casing are given in the Handbook of Soil Survey Investigation Field Procedures (Soil Survey Staff, n.d.). On most sites there were two to four cased wells opening at various levels to permit checking for possible perching of water. Data were collected from more than one well if perching was evident (see water-table data for sites 5-1, 5-2, and 5-3 in the appendix. At most sites there was little, if any, difference in the water levels of the wells, so data were collect d from the deepest cased well.

Usually, the wells were installed in a sequence across a local landscape with a wide range of soil moisture for the specific geomorphic surface. Most sites were in timbered areas where modification of surface drainage was minimal. There are few areas in the middle Coastal Plain of North Carolina, however, where surface drainage has not been improved to some extent by road or drainage ditches. Two sequences of wells were established in New Hanover County to study the effect of ditching on the water level in soils with a spodic horizon.

Water levels were measured at uneven intervals, but a 2-week interval was the standard. If possible, water levels were measured weekly during spring drawdown and during the fall or early winter rise of the water tables. All measurements were made by the float and tape method described in Soil Survey Staff (n.d.). At all sites, the mineral surface of the soil was the zero elevation. At all sites in the middle and upper Coastal Plain, local rainfall was measured by gages (Gamble and Daniels, 1967). The only relative humidity data available--variables X15, X16, and X17--were collected in Raleigh, North Carolina, these were omitted for New Hanover County because the county (120 miles southeast of Raleigh) is only 13 m or less above sea level, whereas Raleigh's elevation is 135 m or more.

The format used in generalizing raw water-table data follows:

Predictor variable	No.
January	X1
February	X2
March	X3
April	X4
May	X5
June	X6
July	X7
August	X8
September	X9
October	X10
November	X11
December	--1/
Rainfall since last reading	X13
30-day antecedent rainfall	X14
Average relative humidity--	
1 a.m.	X15
7 a.m.	X16
7 p.m.	X17
No. of days between readings	X18
Raw data by well casing	X19 to X-n

All regressions of the measured soil-water level on these variables at each site, except for a few shallow wells that were dry most of the time, were statistically significant at or below the 5-percent level. Statistical significance implies a real relationship between the water-table level and the set of predictor variables. The coefficient of determination (r^2), another measure of adequacy of the model and its usefulness as a prediction equation, was greater than 0.73 (Nelson et al., 1973). The regression equations that were statistically significant were used to generate the water-table level for each site by using the distribution and amount of rainfall closest to the average monthly rainfall. A synthetic average year's rainfall and distribution were selected from records of the National Weather Service, U.S. Department of Commerce, for the airport at Wilmington, North Carolina, and for Dunn, North Carolina.

1/ Not included in equations.

The Wilmington data were used for all sites in New Hanover County, and th Dunn data were used for all other sites. The amount and distribution of rainfall for each month of the synthetic year were chosen by selecting the month that came closest to the long-time station averag . Months that had hurricanes or other irregular storms were eliminated, even though their total rainfall was close to the station average.

All water levels predicted from the regression equations by using data for the synthetic average year were smoothed by a moving average of three points. Equal weight was given to each point. This method helped eliminate some minor fluctuations in the data and gave a more reasonable estimate of water levels.

Factors Affecting Soil Water Levels

Such factors as cumulative rainfall, evapotranspiration rate, permeability of beds or horizons, ant cedent water l vel, and aquifer leakage rate help determine the free water level in a soil. The regression model uses these onsite factors in predicting water levels. Other hydrologic factors, controlled in part by the local geology and geomorphology, also influence the water level in soils.

Figure 2 shows a generalized model of what happens to the rainfall received by a soil on a nearly level Coastal Plain surface. Most of this rainfall is lost by evapotranspiration (Van Bavel and Verlinden, 1956), but 25 to 38 cm (10 to 15 in) per year remains. This 25 to 38 cm of rainfall can go three places. It can leave the area as surface runoff or overland flow, but surface runoff is much less than was originally thought, even in the rolling Coastal Plain areas (Daniels et al., 1971b) or in the forested mountains (Nutter, 1973; Hewlett, 1961). Runoff probably is slight on a nearly level Coastal Plain surface under forest vegetation. The surface gradient is only 0.2 to 0.4 m/km, and considerable time would be needed for overland flow to move 2 km or more to an outlet near the valley side (Daniels et al., 1971a). A second place for the excess rainfall is surface storage in depressions. Open-pan evaporation data from the National Weather Service indicat that in much of the Coastal Plain, normal rainfall exceeds the water evaporated from a large body of water.2/

Without runoff or loss of water through an aquifer, a lake could be maintained by rainfall alone, as indicated by the nearly continuous water in some Carolina bays in the lower Coastal Plain. Lakes are not common in the Coastal Plain, but in certain areas the accumulation of blanket organic deposits depends on the retention of this excess water.

Most of the excess rainfall is likely to flow into the aquifer systems. The amount of water ntering an aquifer is a function of the stratigraphy of the area, which closely controls the saturated moisture regime of the soils studied.

Figure 3 shows a generalized model of the changes in the zones of saturation and aeration in relation to the topography in the middle Coastal Plain.

2/ Harvey, A.V. 1972. Personal conversation. North Carolina Stat Climatologist, Raleigh, N.C.

This model was generaliz d from publish d work by Daniels et al. (1971a). Characteristically, the middle Coastal Plain surficial sediments ar fine textured near the surfac and grad to loamy sand or sand near the base (fig. 3; Gamble and Daniels, 1974). The surficial sediments overlie clayey to loamy, less permeable formations. The zone of aeration is thicker and the water table is deeper n ar the dissected edge of the surface. The water table fluctuates most about 0.3 km inland from the dissected edge of the nearly level surface. The water table fluctuates less in the divide center than in any other place.

No sediment is impermeable, and if a hydraulic gradient exists, a small amount of water moves vertically from the saturated zone into the underlying formation (fig. 2). In the middle Coastal Plain, however, stream dissection has truncated the surficial formations and exposed their coarse basal beds. Water is free to move through the sandy basal sediments of the surficial formations to an outlet on the valley sides. The streamlines in the surficial sediments should be similar to thos of water flowing to a tile line above an impermeable layer (Edwards, 1956), or the streamlines should slope down toward the less permeable layer and then move above this layer to the outlet.

The model shown in figure 3 is a leaky aquifer system in which water moves through all parts of th surficial sediment. In this model, soil horizons such as plinthite do not perch water. These conditions of free drainage allow maximum vertical fluctuation of the water table because the water is relatively free to move through the basal sandy beds. The depth to the water table and the amount of fluctuation at any one site, however, are primarily a function of distance from the outlet (Daniels et al., 1971a). The soil profile on the divide has little influence. Only the upp r part of the aquifer system and the outlet of the aquifer control the shape and the slope of th water table. The model shown in figur 3 does not apply if the underlying formations have permeable beds or carbonate rocks with solution cavities that contact the basal sands of th surficial formations.

In gen ral, figure 3 does not apply to the lower Coastal Plain where land surfaces are below about 14 m (45 ft). The lower Coastal Plain surficial sediments rang from coarse textured to fine textur d, but in places individual beds are thin and discontinuous, resulting in abrupt vertical and horizontal changes in permeability. The rate at which water moves depends in part on the geometry or shape of the restricting beds and in part on the permeability of the bed in which the water is moving. The underlying formations have horizontally discontinuous beds of organic materials, clay, silt, and sands (Daniels et al., 1972) that vary widely in permeability, which add to the complexity of water movement.

Below a surface altitude of about 12 m, the base of the surficial sediments commonly is near or below sea level. The outlets on the valley sides of shallowly incised stream channels are above the base of the surficial sediments and not at the base as shown in figure 3, except near the estuaries. The relief from upland to stream level is much less than in the middle Coastal Plain, and the hydraulic gradient is proportionally smaller. So, the water table is closer to the surface, and its total fluctuation is less. Figure 4 represents the zones of saturation and aeration across much of the lower Coastal Plain landscape.

Conditions similar to those shown in figure 4 are responsible for large areas of organic soils, such as those in the Hoffman Forest and the Croatan National Forest in North Carolina. Limited dissection, a nearly flat topography, and a center position in a broad interstream divide characterize these pocosins (swamps on a hill). All pocosins studied in North Carolina have a restrictive layer within 5 to 10 m of the surface. In Hoffman Forest, the surficial Wicomico is thin and fine textured and is underlain by pre-Miocene formations, the major restrictive layer. The pre-Miocene formations are within 4 m of the surface and are 5 to 30 m thick. They are dense, tough, calcareous loam with an extremely low hydraulic conductivity (0.5 to 0.07 cm/day). The excess rainfall has little chance of leaving the area other than as overland flow. So, organic deposits have accumulated in all areas not drained by the shallowly incised streams. Water-table studies indicate that the zone of saturation in the thicker organic soils stays above the mineral sediments all year.3/ This is to be expected

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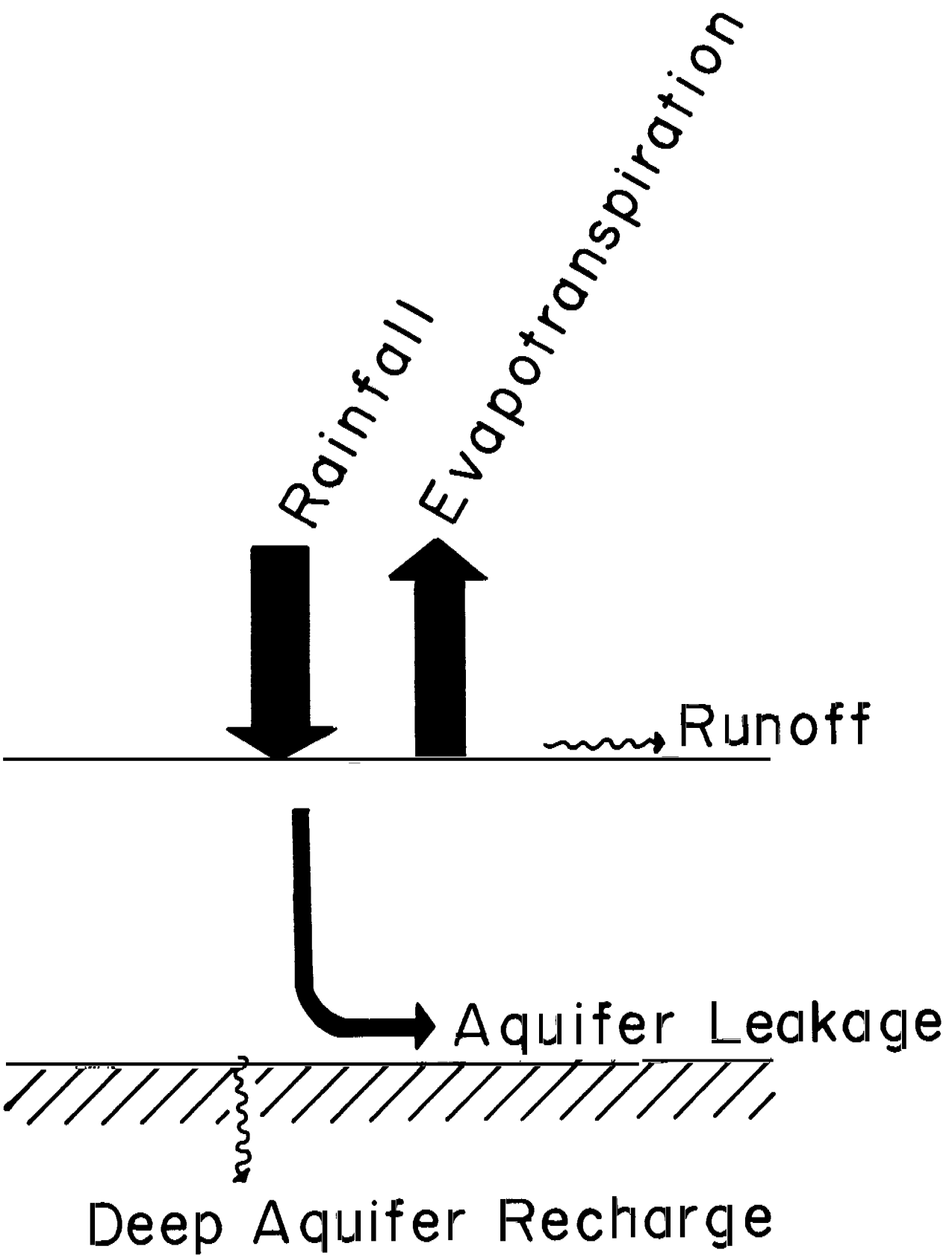
3/ Gallop, L.E. 1955. some interrelationships of drainage, water table, and soil on the Hoffman Forest in eastern North Carolina. Unpublished master's thesis, N.C. State Univ., Raleigh, N.C.

Figure 2.--Disposition of rainfall on a nearly level Coastal Plain surface.



Figur 3.--Water-table fluctuation and s diment color in the dissected middle Coastal Plain. Water moves freely throughout the sediment above th l ss permeable formations.

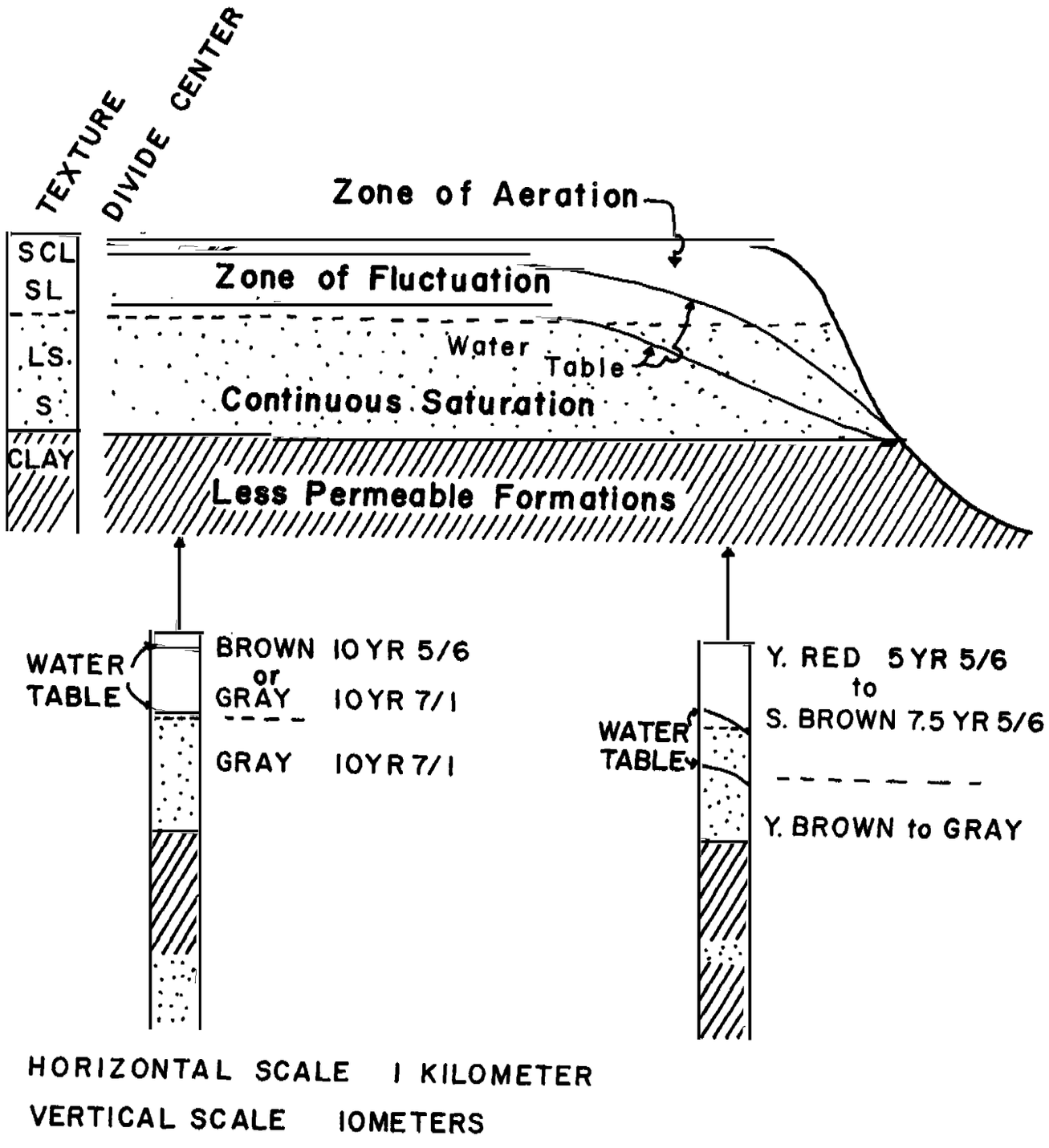
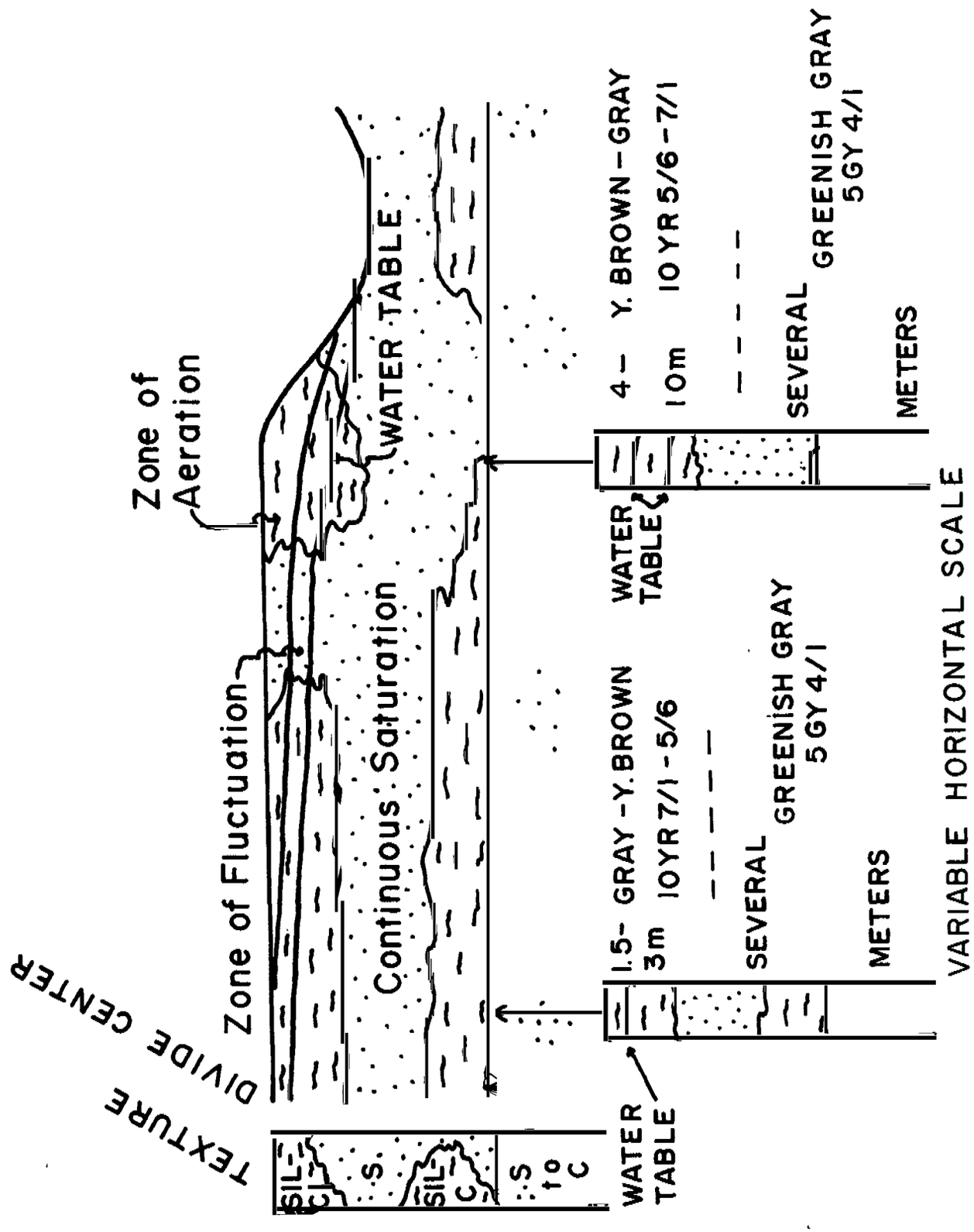


Figure 4.--Water-table fluctuation and sediment color in the slightly dissected lower Coastal Plain. Water movement in the silty to clayey beds is slow, and water fluctuation near the surface may be largely caused by evapotranspiration rath r than movement under a hydraulic head.



because the sediments under the organic soils are greenish gray (5GY 4/1) or a similar color, suggesting that ferrous iron is present (Daniels et al., 1961) and little drying or aeration has occurred.

In summary, the water-table elevation at a site is a function of the stratigraphy and the geomorphology of the area. The characteristics of the sediments, the amount of dissection, and the location of the site in relation to the aquifer outlet basically control the water-table level. Fluctuation of the water table is controlled by such factors as rainfall, antecedent water level, and evapotranspiration rate. The soils usually have little influence on the water-table level. Where soil horizons perch water, the underlying water table and the zone of saturation are also controlled primarily by the stratigraphy and the geomorphology of the area.

Interpretation of Water-Table Data

The preceding discussion of factors affecting water-table levels shows in a broad way how the saturated regime in the soils studied is controlled mainly by factors outside the solum. Yet, the characteristics of a soil result from the interaction of these and other factors.

Each site discussed in the appendix is grouped by geomorphic surface and Coastal Plain subdivision (fig. 1). Where possible, a cross section showing the stratigraphy of the area and the local landscape position is given. Detailed drill traverses are not available for each site, but all areas except New Hanover County have been investigated in enough detail to permit the major sediment characteristics to be outlined.

Upper Coastal Plain Sites

Sit s 1 through 4 are in the upper Coastal Plain (fig. 5). The Macks Formation is mottled brown and gray fine loam that restricts water movement. The Pinehurst Formation is clayey to medium textured at the top and grades downward to coarse loamy sand to sand (Daniels et al., 1966b). Sites 1, 2, and 3 are on the Plain View surface and have a thick horizon of discontinuous phase plinthite below a depth of 1 m (see pedon descriptions in the appendix). Site 4 is on a younger erosional surface that truncates the Pinehurst Formation and the Macks Formation (Gamble et al., 1970). Site 1 is less than 50 m from a similar surface (rising from a streamhead) that truncates the Pinehurst Formation.

The deep water table fluctuates through about 3 m of the basal sandy Pinehurst Formation above the Macks Formation (fig. 5). The water table moves seasonally, depending on the balance between rainfall and evapotranspiration. The response lag of the deep water table to rainfall is caused by the plinthite and iron-rich mottled zone, the B3 horizon, in the upper 2 to 4 m of the solum. Water perches above the plinthite horizon about 8 to 12 percent of the time, and in the reticulately mottled zone 17 to 28 percent of the time (table 1). These zones are saturated continuously for 1 to 12 weeks. These observations are not reflected in the water-table data in the appendix because the regression equations used to predict water levels above 1.3 to 3 m were not significant. The equations are thus of little value, and wells in these zones are dry most of the time. The response to rainfall also varies. In summer when the soils are dry, 7 to 8 cm of rainfall may not be enough to perch water above the plinthite, but at other times 2 cm of rainfall can cause the deep water table to rise significantly.

The water table perched above the plinthite and mottled zones falls slowly during periods of low rainfall and no vegetation growth. Apparently, the perched water moves slowly to the deeper zone of saturation, possibly as unsaturated flow, and the plinthite and lower mottled horizons are aquitards rather than aquicludes. The deep water table seldom if ever rises high enough to give a continuous zone of saturation from 1 m below the surface to the base of the Pinehurst Formation (fig. 5).

Middle Coastal Plain Sites

Four areas were studied in the middle Coastal Plain, one each on the Brandywine and Coharie surfaces and two on th Sunderland surface (fig. 1). The emphasis of this study was on landscape r lationships rather than on soil series. The Brandywine and Coharie morphostratigraphic units (msu's; Frye and Willman, 1962; figs. 5, 6, and 7) ar fine textured at the top and grade downward to a coarser textured unit (Daniels and Gamble, 1974; Daniels et al., 1972; Gamble and Daniels, 1974). In Wilson County the Sunderland msu has beds of sandy loam intercalated with finer textured material (fig. 7), but the lower one-third to one-half of the unit is coarse-textured sands. At the Lenoir County sites (fig. 8) the Sunderland msu consists of medium sand to medium loamy sand from the surface to the base. Under sites 24, 25, and 26, the Bh horizon is continuous down to about 1 m above the base of the Sunderland msu.

The Brandywine and Coharie msu's overlie the clayey Black Creek Formation, whereas the Sunderland msu overlies either saprolite or th Yorktown Formation. The Black Creek and the Yorktown Formations and the saprolite serve as aquitards or aquicludes. The stream systems truncat the Brandywine, Coharie, and Sunderland msu's and cut into the underlying formations, making each msu a leaky aquifer system with outlets above the stream level. The flow of water should be toward the base of the msu and to the outlets through the basal sandy layers above the less permeable aquitards (fig. 3). This is lateral movement of the ground water, but the movement is in the basal sand of the msu, well below the soil profile.

Brandywine Surface

Sites 5 through 8 (fig. 5) are in a wooded ar a that has a suite of soils common to the Brandywine surface. A Plinthic Paleudult is in the high areas, and a Typic Paleaquult is in th low areas. The plinthite and the underlying reticulately mottled horizon are not so strongly developed at site 5 as they are at the upper Coastal Plain sites 1, 2, and 3 (see pedon descriptions in the appendix), but they still perch water. The deeper water table in the area fluctuates through 3 m (fig. 5), but it is not uncommon for th water to be within 1 m of the surface, even in the

Paleudults. Water stands above the surface periodically in the Aquults, but the total water-table fluctuation is similar to that in the better drained adjacent soils. Fluctuation of the water table is caused by a combination of precipitation, evapotranspiration, and aquifer leakage.

The relief at sites 5 to 8 is 1.2 m, a little above average for many areas of the Brandywine surface (Daniels et al., 1970). During wet periods, such as in winter, the elevation of the water table in deep wells at site 8 is only 6 to 10 cm below the elevation of the water table in the deep well at site 5, about 90 m away. Sites 6 and 7 show a similar relationship, and their water table is almost a level line on the local landscape. This relationship suggests that the water level of adjacent sites might be predictable with some degree of accuracy if the elevation of the water table is known at one point.

The plinthite horizon under site 5 perches water for several weeks during the year (see appendix). The regression model used could not accurately predict perching above the plinthite horizons at sites 1, 2, and 3 in the upper Coastal Plain, although it did a reasonable job at sites 5-1 and 5-2. (Prob. $> F = 0.0071$ to 0.0001; $r^2 = 0.467$ and 0.822. See water-table data for site 5 in the appendix.) The low r^2 value for site 5-1 suggests that the model may not always be accurate, a conclusion supported by the raw data. Between February 1966 and May 1969, site 5-1 was saturated 21 percent of the time, and site 5-2 was saturated 41 percent of the time. Therefore, the model probably predicts too high a water table and an excessive period of saturation for site 5-1. The synthetic water level at site 5-2 probably is close to actual field conditions ($r^2 = 0.822$) and clearly shows how the plinthite and associated horizons modify the saturated regime of the soil.

Coharie Surface

Data from the Newton Grove area were used in plotting the curves showing the high and low levels of the water table in relation to the dissected edge of the surface (fig. 6). The computer model used in generalizing the water levels (Nelson et al., 1973) was originally tested in this area. Oxygen data published on Aquults and Udults (Daniels et al., 1973) were collected in the area between sites 16 and 17 (fig. 6).

The water level of soils in the Newton Grove area is closely correlated with the distance from the dissected edge of the nearly level Coharie surface (Daniels et al., 1971a). Actually, the water level however, is a function of the distance from the outlet of the ground water. Because the exact outlet for the ground water at each point on the Coastal Plain is difficult to determine, the

Table 1.--Results of measurements showing water perched above plinthite and reticulately mottled horizons at sites 1, 2, and 3.

[119 measurements were made from September 1965 to March 1970]

Measurement	Site 1 Horizon		Site 2 Horizon		Site 3 Horizon	
	Plinthite	Mottled	Plinthite	Mottled	Plinthite	Mottled
Percentage of time						
Dry.....	88	83	92	72	89	76
Saturated.....	12	17	8	28	11	24
Total number of weeks saturated	19	29	10	48	16	39
Number of periods saturated	6	7	5	9	8	10
Range in saturated period (weeks)	1-6	1-7	1-6	1-12	1-4	1-12

correlation with distance from the dissected edg of the surface must be used.

Site 9, a Udult, is about 40 cm high r than site 10, an Aquult (fig. 7). These sites are only 33 m apart, and their water-table levels usually are close to the same absolute altitude. the water table for both soils fluctuates about 3 m, as would be expected because of their nearness to the edge of the surface (fig. 6). Although site 10 is an Aquult, its average water table is lower than that at Udult sites 16, 17, and 18. Also, the water-table fluctuation at site 10 is greater than at sites 16 and 17 and reflects the relative nearness of site 10 to an outlet of the underlying leaky aquifer.

By definition, Aquults have an aquic moisture regime (Soil Survey Staff, 1975) and must have reducing conditions. How, then, can Aquult site 10 maintain its morphology and have a lower yearly water table than Udult sites 16, 17, and 18, which are closer to the divide center? The question can be partly explained in two ways. (1) Saturation by water does not always mean reducing conditions. Aquults near the divide center at Newton Grove may be saturated to or near the surface for several months without developing reducing conditions (Daniels et al., 1973; fig. 5) If there is not enough energy available for microbial activity to reduce the oxygen content of the water to nearly zero. Although some Udults may have a high water table, their Al horizon is not saturated, and reducing conditions develop only in the deeper layers. Thus, the saturated upper part of the B horizon of the Udult is still oxidizing, and the iron remains in the horizon. (2) The Aquults usually occupy slightly low areas and the Udults slightly high areas. Any runoff would move to the Aquults, and short periods of saturation could be recorded only if the water level were monitored continuously. For this study, water levels were measured at irregular intervals, and therefore short periods of saturation were not identified.

Udults of the Coharie surface have incipient plinthite (see pedon descriptions for sites 16, 17, and 18 in the appendix). The water table in these soils is relatively high, but it fluctuates 1 m or more. Other Udults, close to the dissected edge of the Coharie surface, that have a deep water table have little or no plinthite, and the matrix colors are uniformly red or brown. These relationships suggest that plinthite forms in soils having a moderately high, fluctuating wat r table. The water-table level at sites 16, 17, and 18 is similar to that at site 5-2 (see app ndix). The water table at site 5-2 is perch d abov the deep r water table part of th year, as it is at sites 1, 2, and 3 (table 1), which shows that the plinthite and associated horizons hav modified the saturated regime of these soils. This observation suggests that when plinthite becomes strong enough to restrict water movement, it tends to retain the saturated regime that may have triggered its formation. The saturated regime of the upper part of the solum of soils with restrictive horizons then becomes a function of soil characteristics under a given pattern of rainfall. In adjacent soils without restrictive horizons, however, the local stratigraphy and geomorphology control the saturated regimes.

Sunderland Surface

Two areas of the Sunderland surface were studied. The one in Wilson County (fig. 7) is in mixed pine and hardwoods. The soils are medium-textured Udults and Aquults. The Aquults have a fragipan horizon. Two small ditches provide surface drainage, but at site 23 water stands above the surface for several weeks each year. Site 21 is a Udult, and there is little evidence of water perching in or above its B horizon.

At sites 22 (series not designated) and 23, the Aquults, water perches above the Bx horizon early in winter (see appendix). By late winter or early spring, the deep and perched zones of free water saturation probably are continuous across the Bx horizon because the water level was at about the same elevation in the wells at both sites. Th Bx horizon apparently requires several weeks of perching before it becomes saturated.

Soils on the Sunderland surface in Lenoir County (fig. 8) are under mixed pine and hardwoods. The sediments are 10-m-thick loamy sands to sands, and most divide areas have accumulations of organic matter (Bh horizon) below a depth of 1 or 2 m. Sites 24, 25, and 26, Haplohumods and Haplaquods, are in the center of the interstream divide about 0.5 km from the edge of the surface. Local r lief is about 0.6 m (fig. 8). The Bh horizon und r site 24 can be traced under sites 25 and 26. The lower boundary of the Bh horizon at these sites is about 1 m above the base of the Sunderland msu,

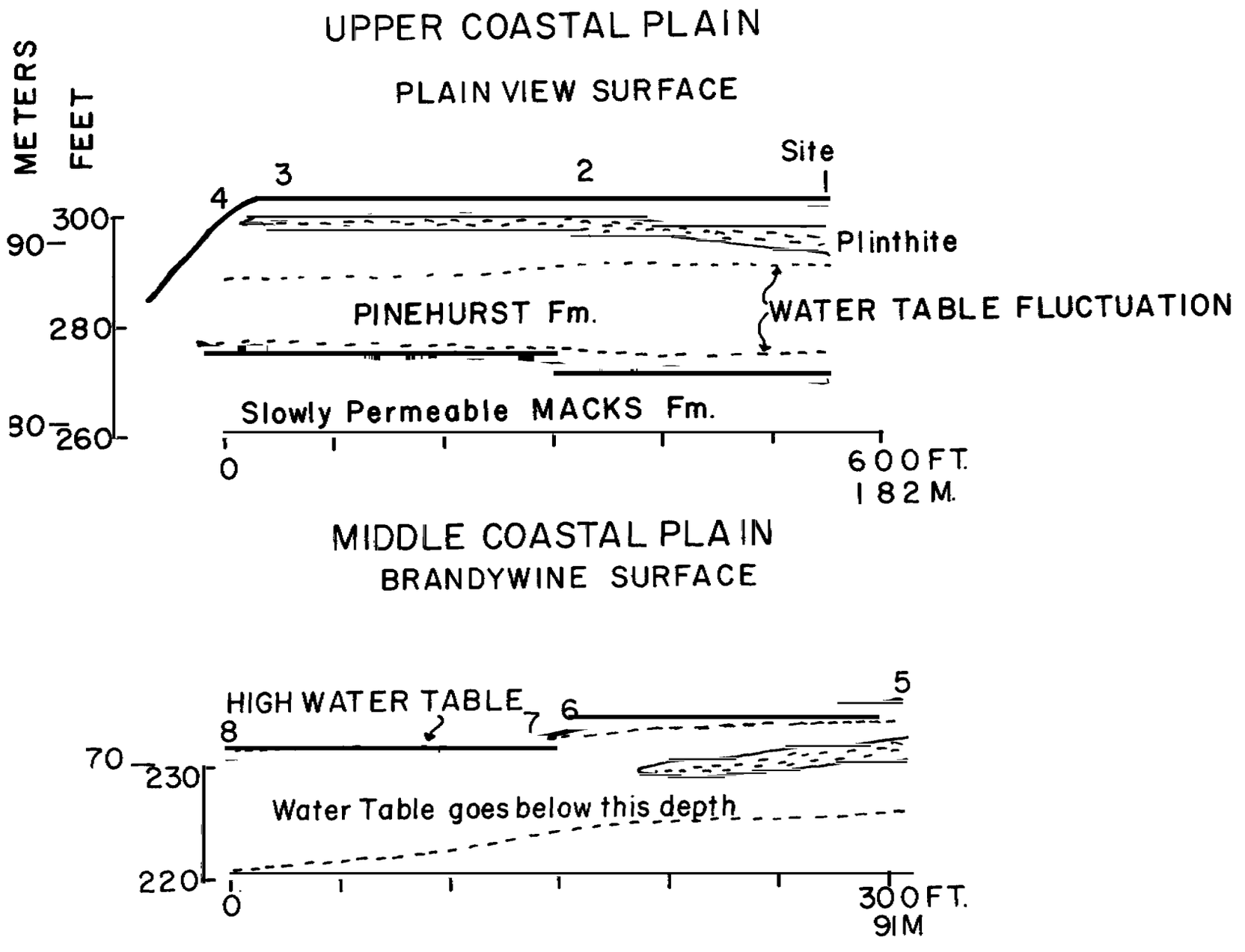


Figure 5.--Topography and water-table fluctuation of soils on the Plain View and Brandywin geomorphic surfaces. fm = formation.

about 9 to 10 m below the surface. Sites 27 through 30 (fig. 8), Haplohumods, are on a spur ridge at the edge of the surface. The Bh horizon is continuous under these sites, but it is much thinner than that under sites 24 through 26 (fig. 8). Vegetation at sites 27 through 30 is more Xeric than that at sites 24, 25, and 26 (see listing of vegetation in the appendix) and may have some influence on the thickness and character of the Bh horizon. The total water-table fluctuation under sites 24, 25, and 26 is much greater than that under site 27 (see appendix). This difference is to be expected because sites 27 through 30 are close to the aquifer outlets.

Lower Coastal Plain Sites

Wicomico surface

The Wicomico surface studied in Wilson County (fig. 9) is on a terrace of Contentnea Creek near Stantonsburg, North Carolina (Daniels et al., 1966a). Sites 31 to 34 are in mixed pines and hardwoods, and surface drainage is minimal. At site 34 water stands above the surfac for several weeks each year. The sites are more or less along the axis of the divide about 0.8 km from th dissected edge of the surface. The underlying sediments range from sands to clay.

Site 34 is fine textured, and water movement through the upper 1 m of the solum is restrict d. This restriction results in perching, but usually the difference in the water levels of the two cased wells is minor. Water stands above the surface of the other Aquults on the Wicomico surface at sites 32 and 33 for short periods each year. The Udults at site 31 may have water in the upp r 20 cm for short periods, but they ar in a slightly convex high area where water does not stand above the surface. The total fluctuation of the water table is about 2 m, considerably less than that in areas of the Brandywine and Coharie surfaces (see sites 5 through 20 in the appendix). Sites 31 to 34 are in the center of the divide, where water-table fluctuation is minimal, ven though the base of the surficial formation is truncated by the valley slopes (fig. 3).

Talbot and Pamlico Surfaces

The Talbot geomorphic surface (14 to 8 m) and the Pamlico geomorphic surface (6 to 0 m) were studied in New Hanover County. Dissection is limited to areas adjacent to streams, and broad, flat areas are common. The model shown in figure 4 has general application in this area. The Talbot and Pamlico msu's generally are loamy sand to sand, although a few clay beds are in the section. In places gley colors (5GY or greener) start at 1.6 to 5 m under broad divides. The Talbot and Pamlico msu's in this area overlie the Eocene Castle Hayne Formation and the Small sequenc (Daniels et al., 1972). The upper part of the Castle Hayne Formation is soft sticky clay to silty clay that overlies soft to very hard limestone.

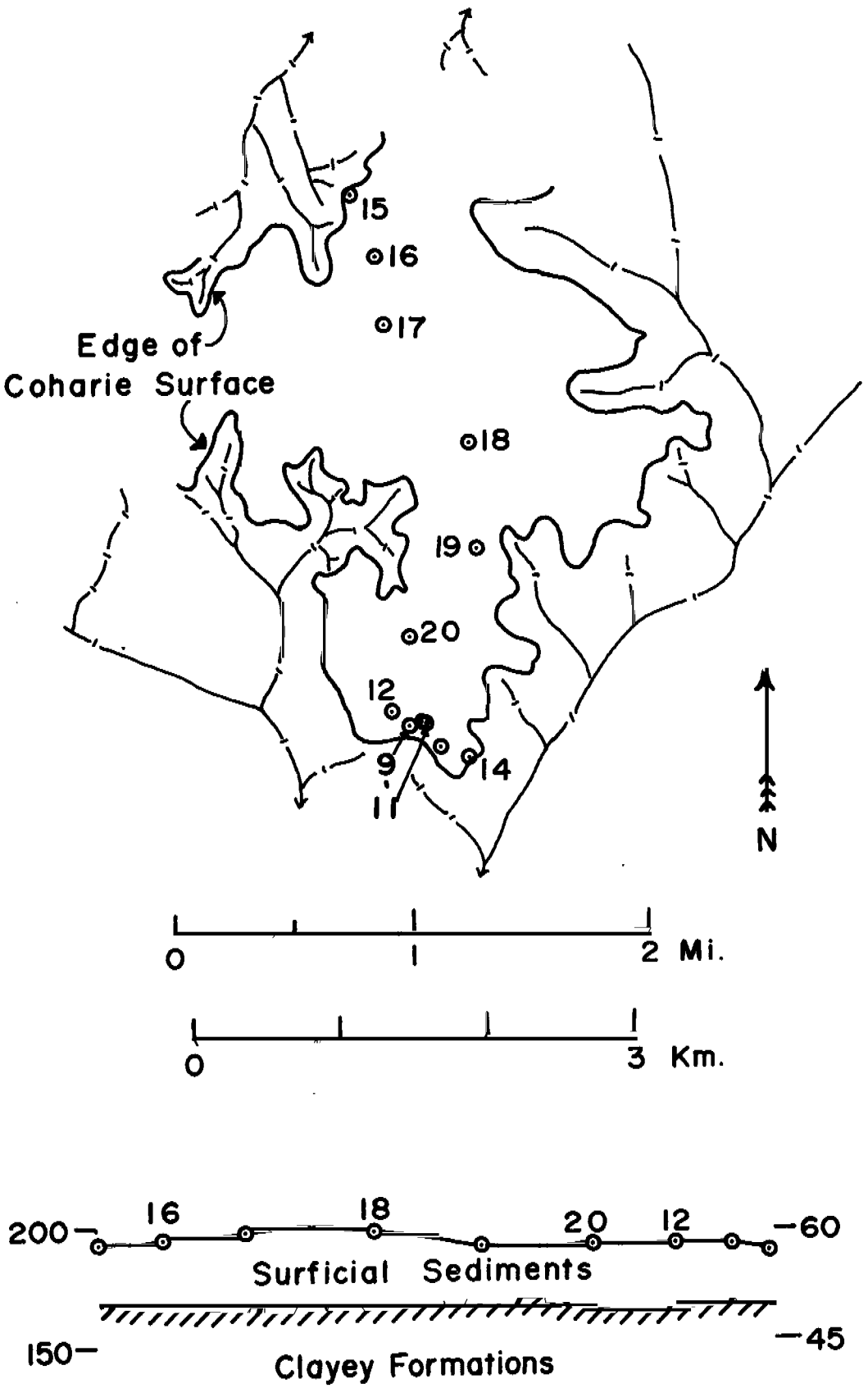
The soils studied at all sites except 44 and 45 are sandy and have a Bh horizon within 2 m of the surface. Modification of surface drainage at the sites is slight to severe, depending upon the distance of the sites from the drainage ditch (fig. 9). Modification, however, has little effect on the water-table level of these sandy soils except at the drainage ditch. For example, sites close to the drainage ditch (fig. 9) have deeper water tables during the dry part of the year than sites farther away from the ditch (see water-table data for sites 35 through 37 and 41 through 43 in the appendix). The greatest effect of the ditch on the soils 8 to 10 m from the ditch is the removal of surface water and the lowering of the water table. The effect of the ditch on the water level of the soils 20 m from the ditch is slight. There is little evidence of perching in these soils, and apparently the combination of a Bh horizon and fine sand greatly restricts horizontal water movement.

Mean Monthly Water-Table Levels

The weekly and twice-monthly water-table levels shown in the appendix are computed for an average year's rainfall recorded at the Coastal Plain weather stations at Dunn and Wilmington, N.C. This approach is useful, but it does not show the extremes that can occur in water tables during dry and wet years. To show the extremes that can occur weekly or biweekly requires that an average rainfall pattern be assumed for wet and dry years or months. The volume of data in the appendix tables would thus be increased 200 percent, and the data would, therefore, be difficult to assimilate. A method that reduces the data volume by 50 to 75 percent gives the mean monthly water table and the variation that can be expected 1 year in 20 according to the probability of rainfall in each area. Strommen and Horsfield (1969) computed tables for monthly rainfall by climatic division in North Carolina. In January, for example, the mean rainfall for the Central Coastal Division is 8.94 cm. In 1 year out of 20 (0.05 probability), 3.94 cm or less rainfall will be received, and in 19 years out of 20 (0.95 probability), 15.60 cm or less will be received. Thus, in this climatic division, in 1 year out of 20, less than 3.94 cm or more than 15.60 cm rainfall can be expected in January. Table 2 shows the expected rainfall at the 0.95 and 0.05 probability levels and the monthly rainfall in the synthetic average year for Dunn and Wilmington.

Table 3 has three monthly water-table levels. The depth of the water table will be less than the 0.95 value 19 years in 20. The mean is from the synthetic average year and should be close to the long-time average monthly water-table depth. The 0.05 value represents the dry periods, and deeper water tables are to be expected only 1 year in 20. The table data were derived by using a $\underline{b}$ value for the 30-day antecedent rainfall (X14: see "Procedures" for the format used in generalizing raw data for water tables). This value closely approximates the reaction of the water table to 1 cm of rainfall during the preceding month. For example, site 44 (Baymeade soil series) has a $\underline{b}$ value of -4.83. The difference between the amount of rainfall at the 0.95 probability and that of the synthetic average year for January at the Wilmington station (table 2) is 7.52 cm. The $\underline{b}$ value -4.83 multiplied by the difference is -36 cm, and this value subtracted from the mean value

Figure 6.--Location of well sites on the Coharie surface n ar Newton Grove, North Carolina.



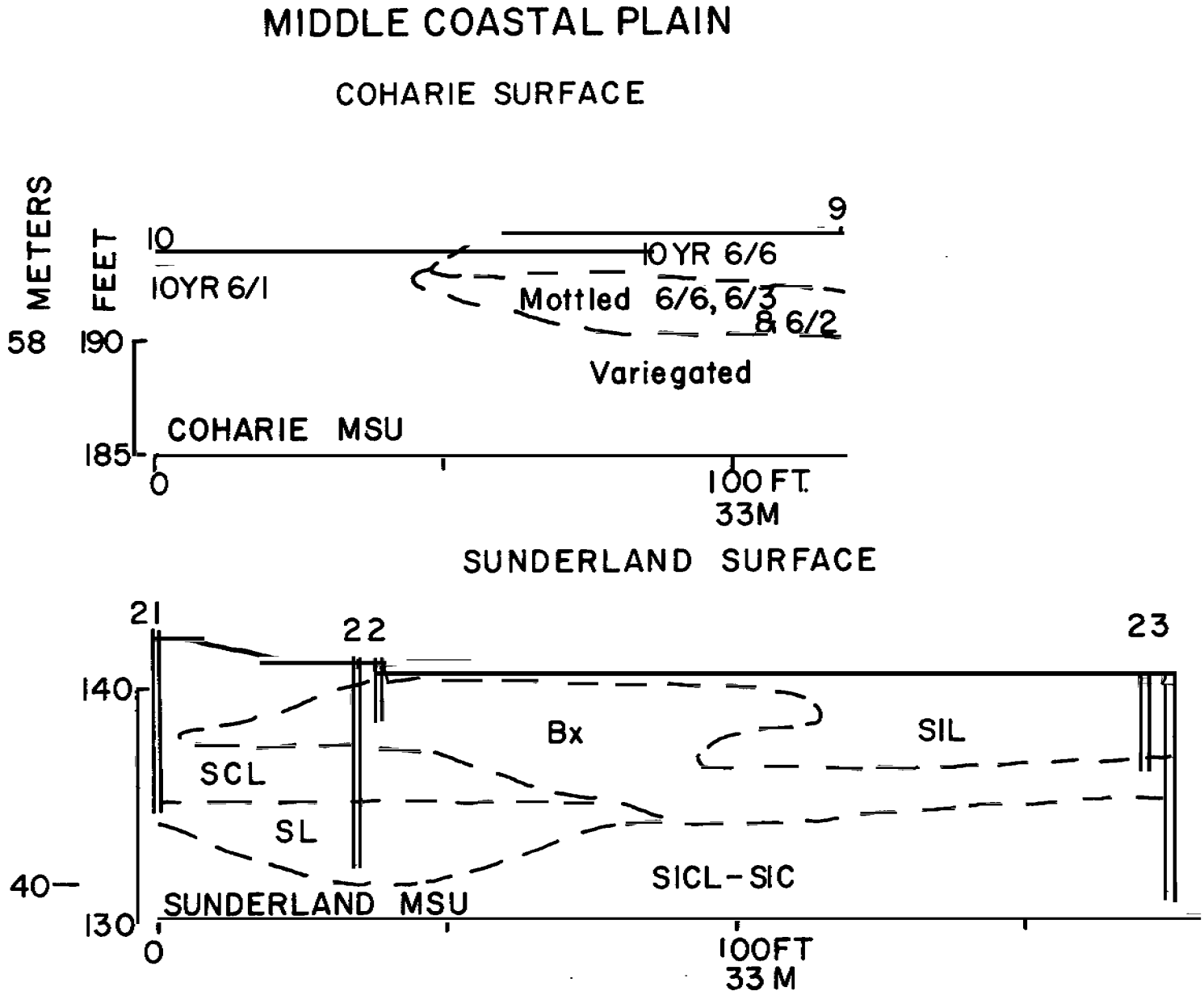
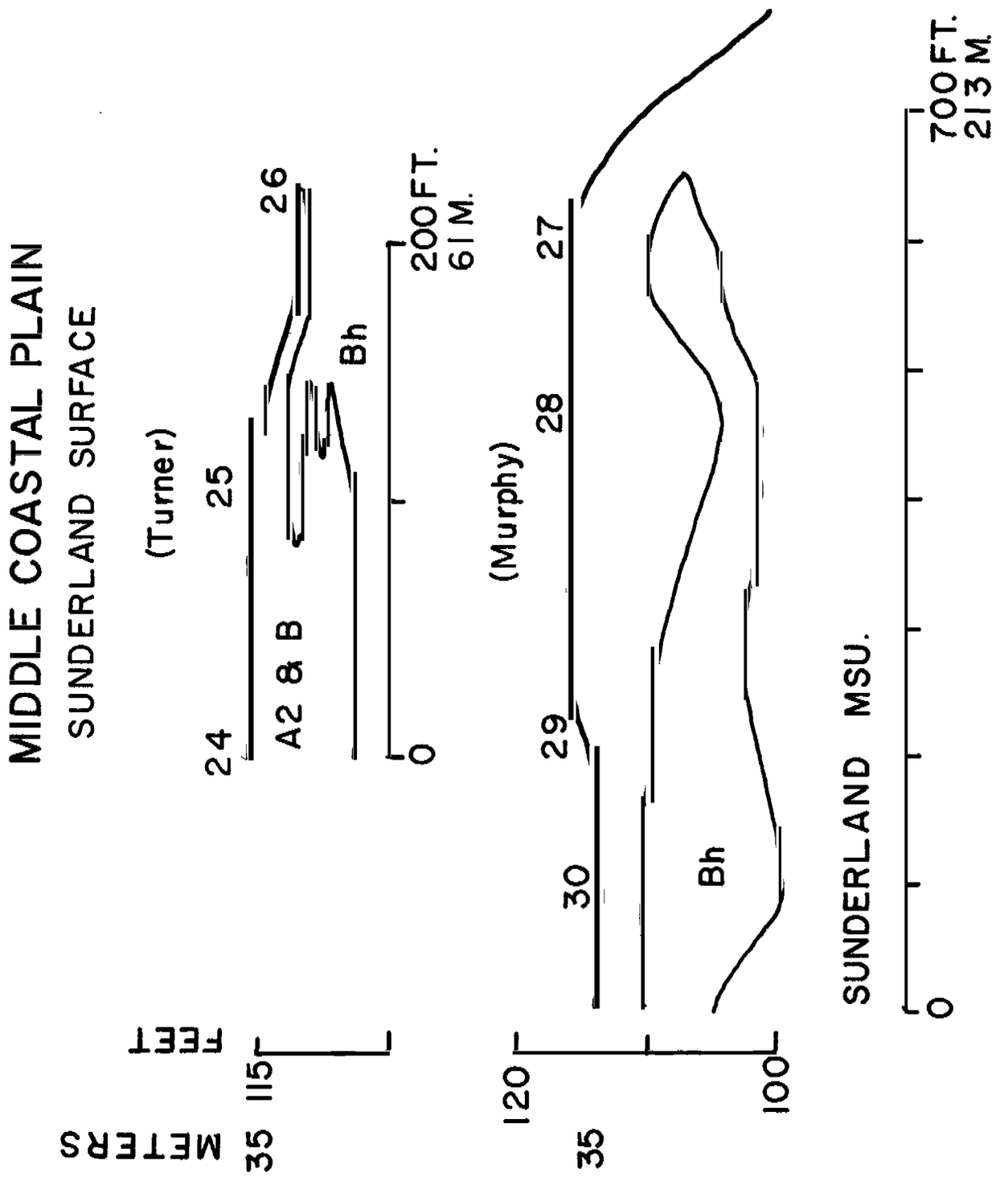


Figure 7.--Topography and subsurface characteristics of sites 9 and 10 on th Coharie surface near Newton Grove, North Carolina, and of sites 21, 22, and 23 on the Sunderland surface near Wilson, North Carolina.

Figure 8.--Topographic relationships of sites 24 through 30 and distribution of the Bh horizon under these sites on the Sunderland surface near Pink Hill, North Carolina. All sediments are loamy sand and are part of the Sunderland morphostratigraphic unit.



of 129 cm gives the 0.95 predicted water-table depth of 93 cm. The same computation is made for the 0.05 probability, but the value is added to the mean water-table depth because this is a decrease in rainfall, and the water table should become deeper. Some of the b values are positive (table 3), and so an increase in the depth of the water table is expected with an increase in the monthly rainfall. This is not the normal, expected water-table reaction, and therefore only th mean monthly values are shown.

Table 2.--Monthly rainfall computed for synthetic average year at Dunn and Wilmington, North Carolina.*

Month	Rainfall at Dunn			Rainfall at Wilmington		
	0.95 Probability	Average Year	0.05 Probability	0.95 Probability	Average Year	0.05 Probability
	cm			cm		
January	15.60	5.79	3.94	14.63	7.11	3.33
February	17.78	11.33	3.66	18.01	8.38	3.07
March	14.96	8.33	5.18	17.35	10.46	4.32
April	15.14	8.20	3.71	15.52	6.78	3.07
May	16.20	10.00	4.27	16.54	9.40	3.66
June	22.25	10.51	5.03	21.71	11.07	5.28
July	31.37	14.33	7.54	30.30	18.92	7.98
August	25.96	15.65	7.24	23.47	17.88	7.98
September	26.92	12.12	4.14	26.26	15.47	3.94
October	18.82	5.10	1.24	18.31	8.00	0.89
November	18.31	7.29	2.26	17.07	8.36	1.70
December	16.76	8.89	2.90	16.13	8.73	2.46

* In 19 years out of 20, rainfall will be less than the amount shown for the 0.95 probability, and in 1 year out of 20, less than the amount shown for the 0.05 probability. (From Stromen and Horsfield, 1969.)

Table 3.--Mean water-table depths and predicted water-table depths computed from 0.95 and 0.05 probabilities of rainfall 1/2/

[A plus sign (+) indicates that the water table is above the mineral surface; a single dash indicates that the water table is below the base of the well.]

Soil series	Baymeade						Byars						Faceville		
Site no.	44			45			11-1			11-2			14		
Well depth (cm)	249			242			91			183			609		
b value	4.83			-4.57			-1.52			-1.27			-6.10		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	93	129	147	123	157	174	37	52	55	131	143	153	383	443	454
February	84	130	156	112	161	185	21	31	43	126	134	136	300	339	386
March	88	121	150	124	155	183	17	27	32	67	75	79	274	314	333
April	101	143	161	133	173	190	15	25	32	38	47	50	358	400	427
May	151	175	203	170	203	229	8	17	26	25	33	34	425	463	498
June	153	194	222	160	209	---	40	58	66	50	65	73	385	457	491
July	128	183	236	146	198	243	61	86	99	77	99	114	369	473	514
August	179	206	254	182	208	---	---	---	---	123	136	138	392	455	506
September	82	134	190	95	144	197	---	---	---	129	128	157	307	397	446
October	140	190	224	138	185	217	23	44	50	---	---	---	440	524	548
November	89	181	213	119	206	240	---	---	---	88	102	110	398	465	496
December	136	172	202	145	179	207	---	---	---	102	112	114	270	318	354

Soil series	Goldsboro																	
Site No.	6			9			12			20			21			31		
Well Depth(cm)	246			238			609			609			234			290		
b value	6.86			-0.76			-10.16			-10.92			-11.68			-16.00		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm			cm		
January	47	107	120	158	165	166	72	172	191	84	51	211	+	104	125	+	89	119
February	6	50	103	121	126	132	61	126	204	+	35	118	+	30	120	+	22	144
March	+	58	80	93	98	100	31	98	120	+	71	105	+	28	65	+	42	92
April	34	82	113	117	122	125	52	122	168	4	80	129	+	57	109	+	65	137
May	50	92	131	132	137	146	79	142	200	40	108	172	0	72	139	+	82	174
June	25	105	143	155	164	168	80	199	254	7	135	195	+	67	131	+	59	147
July	27	144	190	242	255	260	171	344	415	+	148	222	+	83	162	+	57	166
August	102	172	230	---	---	---	189	293	378	35	147	239	+	80	178	+	50	184
September	---	---	---	---	---	---	169	319	238	13	174	261	11	183	276	+	30	158
October	+	58	84	102	112	115	113	252	291	10	160	202	+	24	69	+	116	178
November	---	---	---	---	---	---	206	318	369	103	223	278	---	---	---	+	127	207
December	---	---	---	---	---	---	205	285	346	144	230	295	---	---	---	---	---	---

See footnotes at end of table.

Table 3.--Mean water-table depths and predicted water-table depths computed from 0.95 and 0.05 probabilities of rainfall--continued

Soil series	Leon														
Site no.	25			38			48			52			39		
Well depth (cm)	144			122			117			127			147		
b value	+0.76			-4.32			- 5.08			-0.25			-6.10		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	--	10	--	86	118	--	2	40	59	18	20	21	39	85	108
February	--	6	--	73	115	--	+	48	75	25	27	28	25	84	116
March	--	15	--	68	98	111	6	41	72	25	27	29	30	72	109
April	--	44	--	71	109	--	10	54	72	27	28	29	12	65	88
May	--	39	--	76	107	--	29	65	94	39	41	42	61	105	140
June	--	0	--	67	113	--	6	60	89	60	63	64	48	113	--
July	--	0	--	63	112	--	9	67	--	51	54	57	23	92	--
August	--	0	--	85	109	--	40	68	--	84	85	87	48	82	142
September	--	0	--	24	71	105	+	36	94	65	68	71	+	40	110
October	--	42	--	65	109	--	19	71	107	89	92	94	21	84	127
November	--	44	--	--	--	--	+	66	100	90	95	97	+	101	147
December	--	5	--	77	109	--	36	74	106	92	94	96	57	102	140

Soil series	Leon--continued												Lynchburg		
Site no.	49			50			40			47			7		
Well depth (cm)	152			127			147			152			246		
b value	-4.32			-4.06			- 5.39			-3.30			-9.14		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	60	92	108	56	86	101	16	58	79	56	81	93	78	168	185
February	67	107	130	54	93	115	6	60	90	52	83	108	+	48	118
March	50	80	106	38	66	91	11	49	85	47	70	90	+	52	81
April	57	95	111	47	82	97	19	67	88	58	87	99	16	79	120
May	81	112	137	64	95	118	51	91	123	83	107	126	20	87	139
June	75	121	146	64	107	--	38	97	129	89	124	143	2	109	159
July	50	99	146	36	82	126	9	73	134	71	109	145	+	143	205
August	84	108	150	75	98	--	65	96	--	83	101	134	96	190	267
September	60	107	--	36	80	127	+	27	91	44	80	118	--	--	--
October	73	117	148	72	114	--	32	90	129	68	102	125	+	57	92
November	43	125	154	44	124	--	+	82	119	66	129	151	--	--	--
December	85	117	144	87	117	--	43	84	119	98	122	142	--	--	--

See footnotes at end of table.

Table 3.--Mean water-table depths and predicted water-table depths computed from 0.95 and 0.05 probabilities of rainfall--continued

Soil series	Lynchburg--continued						Lynn Haven			Murville					
Site no.	19			32			51			26			35		
Well depth (cm)	609			229			117			178			147		
b value	-7.11			-15.24			-2.29			+1.78			-6.86		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	+	25	38	+	72	100	+	12	20	--	+	--	+	+	24
February	+	14	68	+	4	122	+	10	22	--	+	--	+	+	35
March	+	40	62	+	17	65	+	8	22	--	+	--	+	3	45
April	19	68	100	+	27	96	+	16	24	--	24	--	+	19	44
May	48	92	133	+	54	142	19	35	48	--	16	--	+	38	77
June	13	96	135	+	32	116	33	57	70	--	+	--	+	67	107
July	+	108	156	+	39	144	22	48	73	--	+	--	+	44	119
August	17	90	150	+	29	159	48	61	84	--	+	--	+	39	107
September	11	116	173	+	10	133	+	21	47	--	+	--	+	2	81
October	26	124	151	+	45	105	46	70	86	--	6	--	+	48	97
November	68	146	182	35	145	223	35	79	94	--	16	--	+	34	80
December	62	122	164	67	188	--	56	73	87	--	42	--	+	14	57

Soil series	Murville--Continued														
Site no.	36			37			53			41			42		
Well depth (cm)	147			147			91			147			147		
b value	-5.33			-4.06			- 1.78			-3.05			-4.06		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	+	+	19	+	+	13	+	4	11	+	10	22	+	2	17
February	+	+	27	+	+	18	+	4	13	+	12	28	+	0	22
March	+	+	31	+	+	24	+	4	15	+	11	30	+	2	27
April	+	3	23	+	1	16	+	9	16	+	21	32	+	12	27
May	+	19	49	+	16	39	13	25	35	18	40	56	+	28	51
June	+	55	85	+	41	65	15	34	44	27	59	77	5	47	71
July	+	35	93	+	23	67	8	28	47	12	47	80	+	38	82
August	5	35	88	6	28	68	35	45	63	36	53	83	18	41	81
September	+	1	62	+	1	48	+	5	25	+	20	55	+	6	53
October	+	40	78	+	29	57	26	55	57	36	67	89	22	64	93
November	+	12	47	+	6	31	18	52	64	+	32	52	+	21	48
December	+	1	34	+	0	25	34	47	58	+	12	31	+	14	39

See footnotes at end of table.

Table 3.--Mean water-table depths and predicted water-table depths computed from 0.95 and 0.05 probabilities of rainfall--continued

Soil series	Murville--continued						Norfolk								
Site no.	43			13			15			16			17		
Well depth (cm)	147			609			609			609			609		
b value	-2.03			-3.05			-10.16			-13.2			-8.13		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	+	0	8	461	490	495	2	102	121	4	34	58	+	34	49
February	+	0	11	324	344	367	21	86	164	+	21	122	+	40	102
March	+	0	12	284	304	314	59	126	158	+	54	96	2	56	82
April	+	2	10	358	379	393	68	138	184	+	62	121	4	60	96
May	+	18	30	410	429	446	95	158	216	9	90	166	30	80	126
June	17	38	50	409	445	463	40	159	215	+	105	177	+	91	135
July	+	19	41	414	466	487	+	151	220	+	108	198	+	94	149
August	40	51	71	482	513	539	47	151	236	0	136	247	29	112	180
September	+	5	28	519	564	588	0	150	231	+	152	257	4	124	189
October	38	59	73	394	436	448	65	204	243	+	141	192	+	108	139
November	+	14	28	474	508	523	67	179	230	13	158	224	36	126	167
December	1	16	29	--	--	--	2	81	141	35	138	217	67	131	180

Soil series	Norfolk--Continued						Rains			Rimini					
Site no.	18			8			10			33			46		
Well depth (cm)	609			284			289			210			185		
b value	-6.10			-10.16			+2.54			-14.99			-5.33		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	+	28	39	41	141	160	--	160	--	+	50	88	67	107	127
February	+	24	70	+	31	109	--	101	--	+	+	113	51	102	130
March	7	47	66	+	28	60	--	75	--	+	8	55	56	93	125
April	20	62	89	+	48	94	--	88	--	+	22	89	67	133	153
May	22	70	105	1	64	122	--	107	--	+	41	127	95	133	163
June	25	96	129	+	79	135	--	166	-	+	9	91	85	142	172
July	8	112	153	+	118	187	--	218	--	+	11	113	51	112	170
August	71	134	185	58	162	247	--	259	--	+	17	143	103	132	185
September	145	235	284	--	--	--	--	--	--	+	3	123	32	89	152
October	0	84	107	+	52	91	--	104	--	+	31	89	81	146	184
November	116	183	214	86	198	249	--	230	--	+	131	206	45	146	181
December	308	356	392	--	--	--	--	--	--	73	190	--	93	132	165

See footnotes at end of table.

Table 3.—Mean water-table depths and predicted water-table depths computed from 0.95 and 0.05 probabilities of rainfall--continued

Soil series	Tolsnot						Varina								
Site no.	22-1			22-2			1			2-1			2-2		
Well depth (cm)	81			279			762			260			863		
b value	-4.57			-14.99			-4.34			-3.05			-0.76		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	+	34	42	+	136	163	591	633	641	172	202	208	645	652	653
February	+	12	47	+	74	189	456	484	517	124	144	167	560	565	571
March	+	20	34	+	32	79	424	453	467	169	189	199	508	513	515
April	7	39	59	+	48	115	482	512	531	--	--	--	549	554	557
May	14	42	68	+	54	140	547	574	599	--	--	--	619	624	628
June	+	39	64	+	116	198	645	696	720	--	--	--	585	594	598
July	+	34	65	+	202	--	498	572	601	136	188	208	621	634	639
August	+	32	70	+	143	269	574	619	645	--	--	--	695	703	709
September	+	21	57	+	55	174	--	--	--	--	--	--	--	--	--
October	+	25	43	+	127	185	325	385	407	98	140	152	470	480	483
November	16	66	--	+	164	239	527	575	601	--	--	--	654	662	666
December	57	65	--	+	12	101	--	--	--	--	--	--	--	--	--

Soil series	Varina--continued						Not Designated								
Site no.	3			4			23-1			23-2			24		
Well depth (cm)	883			701			107			290			162		
b value	+0.25			+4.57			-12.93			-7.87			-0.51		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	--	714	--	--	474	--	+	22	46	+	22	36	11	16	17
February	--	626	--	--	389	--	+	2	101	126	177	237	5	8	12
March	--	582	--	--	390	--	+	4	44	22	74	99	16	19	21
April	--	609	--	--	412	--	+	13	71	+	50	85	50	53	55
May	--	661	--	--	436	--	+	22	96	11	60	105	43	46	49
June	--	652	--	--	440	--	+	23	94	12	104	147	+	0	3
July	--	687	--	--	448	--	+	32	--	59	193	246	+	2	5
August	--	730	--	--	479	--	+	36	--	104	185	251	0	5	9
September	--	824	--	--	571	--	+	67	--	+	89	152	+	0	4
October	--	568	--	--	342	--	+	2	52	15	123	133	37	44	46
November	--	684	--	--	522	--	--	--	--	80	166	206	46	51	53
December	--	--	--	--	--	--	--	--	--	+	12	59	34	38	41

See footnotes at end of table.

Table 3.--Mean water-table depths and predicted water-table depths computed from 0.95 and 0.05 probabilities of rainfall--continued

Soil series	Not designated--continued														
Site no.	27			28			29			30			34-1		
Well depth (cm)	226			193			274			200			91		
b value	-0.76			-1.27			-0.51			0			-6.60		
Month	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05	0.95	Mean	0.05
	cm			cm			cm			cm			cm		
January	107	114	115	96	108	110	43	48	49	--	12	--	+	12	24
February	103	108	114	91	100	110	21	24	28	--	2	--	+	+	47
March	149	154	156	131	139	143	41	44	46	--	12	--	+	0	21
April	160	165	168	142	151	157	71	75	77	--	40	--	+	8	38
May	141	146	150	134	142	149	64	67	70	--	39	--	+	17	55
June	136	145	149	130	145	152	20	26	28	--	--	--	+	+	35
July	116	139	144	116	138	146	23	32	35	--	4	--	+	+	44
August	104	112	118	113	126	137	37	42	46	--	8	--	+	+	55
September	124	135	141	136	155	165	75	83	87	--	32	--	+	+	49
October	164	174	177	130	147	152	67	74	76	--	36	--	+	12	37
November	172	180	184	168	182	188	102	108	110	--	66	--	3	75	--
December	196	202	208	235	244	252	201	205	208	--	145	--	--	--	--

Soil series	Not designated--continued		
Site no.	34-2		
Well depth (cm)	234		
b value	-9.40		
Month	0.95	Mean	0.05
	cm		
January	+	51	68
February	+	9	81
March	+	6	36
April	+	10	52
May	+	26	80
June	+	17	69
July	+	43	68
August	+	17	96
September	+	15	90
October	+	30	66
November	18	121	168
December	--	--	--

1/ Mean is the monthly depth of the water table computed from the value of the synthetic average year.

2/ Water tables can be expected to be higher than the predicted value for the 0.95 probability and lower than the predicted value for the 0.05 probability 1 year in 20.

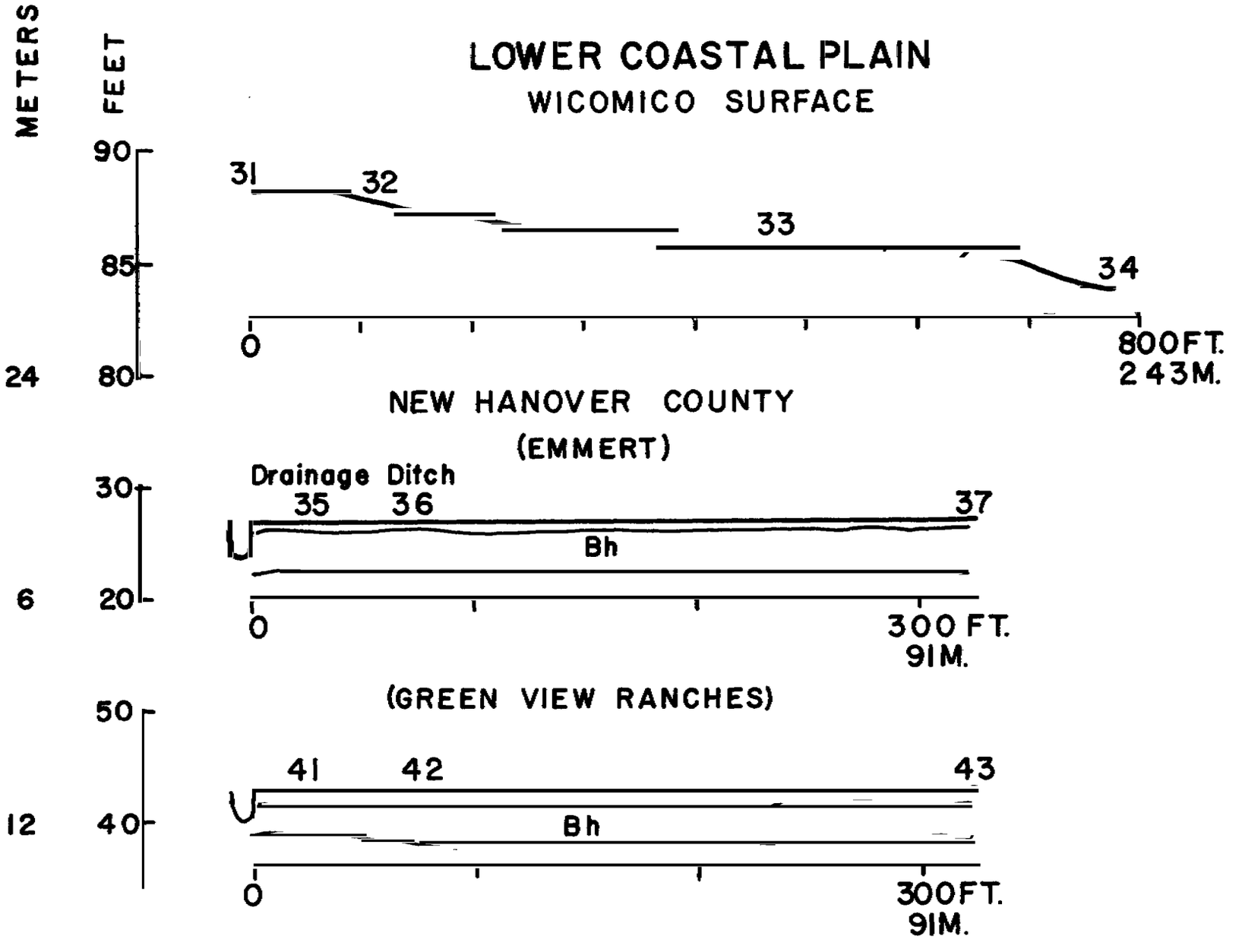


Figure 9.--Topographic relationships of Wicomico surface sit s in the lower Coastal Plain.

Relationship Between Soil Morphology and Water Levels

Soil scientists use many landscape and vegetative clues to help them locate the boundary between various soil units. The boundary between a well-drained or moderately well-drained unit and a poorly drained one may be near a topographic break or a change in vegetation related to changing moisture conditions. The only criterion, however, is the morphology or the horizon sequence and color of the soil.

Several authors have shown that a general relationship exists between soil morphology and water-table levels (Lyford, 1964; Fanning and Reybold, 1968; Thorp and Gamble, 1972; Fritton and Olson, 1972; Boersma et al., 1972; Simonson and Boersma, 1972; Fanning et al., 1972). Water levels have a general seasonal variation. They are high late in fall, during the winter, and early in spring. They drop when the plant transpiration pump starts in spring and reach their lowest level late in summer and early in fall. The amount of time during the year that water levels remain above a specified depth (e.g., 30 cm) is correlated with the natural drainage class (Thorp and Gamble, 1972). Poorly drained soils usually are saturated above a specified level much longer than adjacent better drained soils.

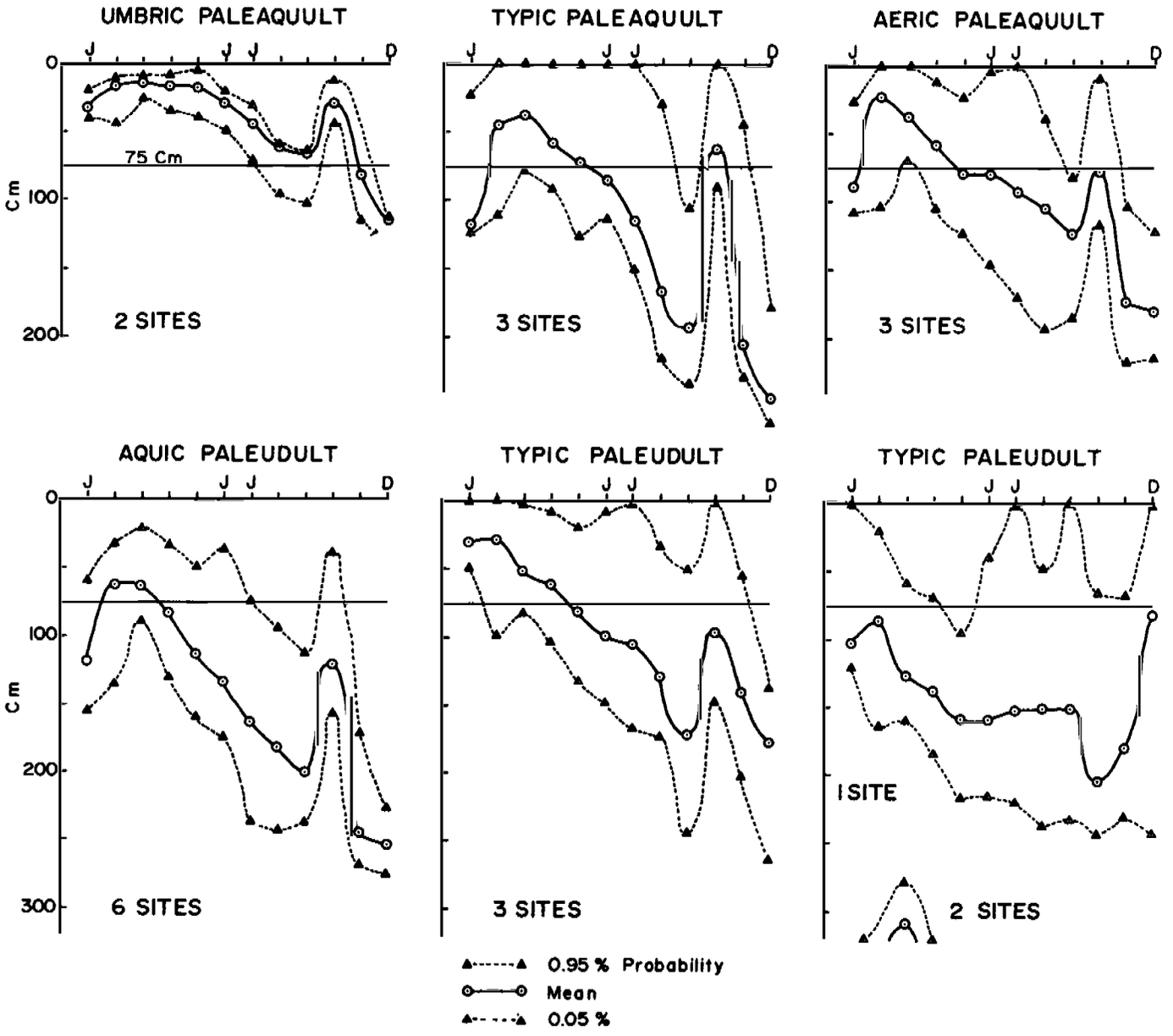
Other authors have shown that morphological features commonly are correlated with these longer periods of saturation. Depth to mottling increases as drainage improves and the period of saturation decreases. Hue and chroma are related to the length of saturation; poorly drained soils usually have the highest value and the lowest chroma. Hue may shift from 10YR in well-drained soils to 2.5Y and 5Y in adjacent poorly drained soils. These color changes are related to the free iron content, which commonly is lowest in the most poorly drained member of a drainage sequence.

Data in the appendix show that the average water table is deeper in some Aquults than in some Udults (see water-table data for sites 10, 16, 17, and 18). At most sites, however, soils with morpohology interpreted as reflecting wetness have a higher average water table than the associated better drained soils. Figure 10 shows, by subgroup, the mean monthly water-table depths at sites and the water-table depths computed from the 0.95 and 0.05 rainfall probabilities. The Umbric Paleaquults hav the highest mean monthly water table, and only rarely does the water l vel fall below 75 cm, even in very dry periods. There is little difference in the mean water-table depths of the Typic and Aeric Paleaquults, although Typic Paleaquults are saturated above 75 cm 5 months a year and Aeric Paleaquults, only 3 months. During wet periods, Typic Paleaquults are also saturated to or above the surface more months than Aeric Paleaquults (fig. 10, 0.95 probability). Th adjacent Aquic Paleudults have a mean water level above 75 cm for only about 2 months a y ar.

Typic Paleudults have the greatest range in water levels (fig. 10). The three soils with pale brown (10YR 6/3) mottles (fig. 10, lower c nter) in the upper 75 cm have a higher mean water lev l than Aquic Paleudults and are similar to Aeric Paleaquults. These three soils are in th cent r of the divide on slight rises on the Coastal Plain surface, where the water table fluctuates less than it does near the dissected edg of the surface. Water never stands on the surfac of these soils, but after heavy rains it can be near the surface. These soils are mottled within 75 cm of the surface, but the mottles are pale brown (10YR 6/3 and 7/3), so they are not gley mottles (Soil Survey Staff, 1975), and the soils are in the Typic subgroup rather than the Aquic subgroup. On the same landscape the soil with 10YR 7/3 mottles (fig. 10, lower right) is saturated above 75 cm l year in 20, whereas the adjacent strong brown sites are saturated above 300 cm l year in 20.

Typic Paleudults are on all parts of the interstream divides in the middle Coastal Plain, but when differentiated by color and mottling patt rns in the Bt horizon, each class occupies specific parts of the divide. The Bt horizons are mainly yellowish brown (with or without pal brown mottles), strong brown, or yellowish red. Soils with a mottled yellowish brown Bt horizon are common in the centers of the divides, have a high water table, and have a mean water level similar to that of the adjacent Aeric Paleaquults (fig. 10). The yellowish brown Bt horizon grades laterally toward the valley slopes into strong brown and the strong brown into a yellowish red Bt horizon (Daniels and Gamble, 1967). Paleudults with a yellowish brown to yellowish red Bt horizon form bands on the landscape that parallel the major drainag systems (Daniels and Gamble, 1967). The redder soils, or those closest to the valley slopes, have the deepest water table throughout the year (Daniels and Gamble, 1967; fig. 10) and the greatest depth to pale brown or gray mottles (fig. 11).

Figure 10.--Mean monthly water-table levels of Aquults and Pal udults and mean monthly levels at the 0.95 and 0.05 rainfall probabilities. The Typic Pal udults from the three sites (lower center) all have 10YR 7/3 or 6/3 mottles within 75 cm of the surface; the Typic Paleudults from sites 1 and 2 (lower right) ar associat d on the same landscape, but the one with th highest water table has 10YR 6/3 or 7/3 mottles in the upper 75 cm.



Water-tabl measurements are not available for all the soils in this sequence from mottled yellowish brown to y llowish r d. Data for the unmottled yellowish brown soils are missing, but the sequence can be approximated from the water level of the soils shown in figure 10. The three Paleudult sites that have a high water table represent the Typics that have pale brown (6/3 to 7/3) mottles in the Bt horizon. Site 15 probably represents the unmottled yellowish brown and the wet end of soils with a strong brown Bt horizon, because it is in a transitional area between these soils. The water levels of the strong brown and yellowish red soils are plotted in figure 10. These soils probably are representative of large areas of soils in the middle Coastal Plain that have a strong brown or yellowish red B horizon.

The wide range in the mean water-table levels of the Typic soils raises many questions about the validity of the present criteria (Soil Survey Staff, 1975) for separating these soils. The Udults that have pale brown (10YR 6/3 and 7/3) mottles in the yellowish brown Bt horizon (sites 16, 17, and 18) would be classified in the same family and probably in the same series as those that have a strong brown Bt horizon (sites 13 and 15). Yet there is as much as a 2-m difference in their mean water-table level (fig. 10). The absolute difference in water-table levels probably is less important than the fact that soils with pale brown mottles in the Bt horizon have a mean monthly water level similar to that of the adjacent Aquic Paleudults and Aeric Paleaquults (fig. 10). This similarity is to be expected because of their position on the divides. The pale brown mottles are in the yellowish brown Bt horizon of soils on slight convex rises that may be 0.2 m higher than the adjacent Paleaquults. The pale brown mottles do not meet the criteria for gley mottles (Soil Survey Staff, 1975), but they are only one unit in chroma higher than gley mottles, and in these soils can be used as an indicator of a high water table. The pale brown mottles probably represent very short periods of weak reducing conditions, known to occur below 1 m in these soils (Daniels et al., 1973). The authors of the present report suggest that 6/3 or 7/3 mottles be the criterion for placing soils in the Aquic subgroups of Paleudults and that the Typic subgroups be restricted to unmottled soils or to soils having mottles with chroma of 4 or greater in the upper 75 cm.

Although the mean water-table levels of better drained soils vary greatly, the mean water levels of soils such as the Aquic Paleudults and the Aeric and Typic Paleaquults vary only slightly. Differences in oxidation-reduction regimes ar most likely responsible for the morphological differ nces in these soils (Daniels t al., 1973). Small differences in the water-table elevation and the period of saturation apparently can produce large differences in oxidation-reduction regimes and consequently large differences in the stability of iron in the solum. The total annual time that a Typic Paleaquult has reducing conditions may be relatively small. The time required for thes soils to form may be more than 1 million years, and short yearly periods of reduction can produce the morphologies now seen and mapped. The futility of trying to establish depth-duration limits of water tables to separate these soils of contrasting morphology should be obvious (fig. 10), because saturation by water is only one of the factors to be considered.

In the sandy Spodosols studied in New Hanover County, North Carolina, the relationship between morphology and water-table level is mor clear-cut than it is in the medium-textured soils in other areas. Almost all these soils have a Bh horizon at some depth below the surface, and depth to the top of the Bh horizon is related to the low stand of the water table (fig. 12). Many factors other than the water-table level influence the Bh horizon. As the mean monthly water-table level rises closer to the surface, however, so does the Bh horizon. This is clearly shown in figure 13 by the difference in the mean monthly water-table levels of the Aeric Haplaquods, in which the A2 horizon overlies the Bh horizon, and the Typic Haplaquods, in which the Bh and A1 horizons join. The Arenic Hapludults have a weakly expr ssed discontinuous Bh horizon overlying a Bt horizon, and their water table usually is below 1 m (see appendix).

Most soils discussed in this study do not perch water, and a plot of the yearly fluctuation of the water table shows the yearly changes in the zone of free water (fig. 14(A)). The soils at sites 1, 2, 3, 5, 11, 22, 23, and 34 perch water, and the zones of free water cannot always be interpreted solely from the water-table elevation. Soil morphology must be used to modify the interpretation of the water levels. Plinthite and fragipan horizons perch water, but they are restrictive horizons, not impervious horizons. A plot of the deep well and the well op ning into the lower third of the plinthite horizon of site 5 is shown in figur 14(B). There are few times during the y ar wh n the el vation of the water

tables in the two wells are the same. During the winter wetup period, water perches in and above the plinthite horizon, and an unsaturated zone occurs below. During midwint r, the deep water tabl seems to rise into or abov the plinthit horizon but seldom matches the elevation of the water p rching in or above the plinthite. Thus, there is a continuous, but not necessarily freely interconnected, zone of free water from 40 cm to more than 300 cm (fig. 14(B)). During the summer and fall drawdown, a nonsaturated zone again forms under the plinthite horizon. For short periods in summer th deep water table may rise above that in the plinthit horizon, but the zone of free water is at or only slightly above the base of the plinthit . Apparently, the water in the deeper beds or horizons is under some artesian pressure at this time. The water table is the plane that marks the upper boundary of a zone of free water, and it is the feature measured. The water table, however, can only be used to help interpret the zone or zones of free water if the restrictions in the system are considered.

Summary and Recommendations

The water-table levels of most soils studied on the nearly l v l Coastal Plain surface are controlled primarily by the stratigraphy and geomorphology

of the site. Such soil horizons as plinthite and fragipan can temporarily perch water, but these horizons only retard the movement of water and do not prevent it. Because the water table and the zone of free water are controlled by the local geology of the leaky aquifer system, table depth and duration curves for soils that are side by side are similar, even though their morphology may be highly contrasting.

The morphological differences between the Aquults and the adjacent Udults on the center of the divide probably result from the short periods of reduction in the Aquults. The reducing conditions can last only a few days a year (Daniels et al., 1973). The soils studied, however, are on pre-Pleistocene surfaces, and short-term processes operating intermittently for long periods can result in much movement of iron and subsequent changes in morphology.

Variation in the length of saturation of soils of the same morphology because of the position of the soils on the divide center (table 4) is the major reason that placing soils in wetness classes according to their depth and duration of saturation is incompatible with soil morphology. Any one wetness class for the Coastal Plain area must include many mapping units that are in different suborders of the Ultisols. The wetness classes are concerned much more with the position of the soils on the landscape than with soil series.

According to Soil Taxonomy (Soil Survey Staff, 1975), a gley mottle has a value of 4 or more and a chroma of 2 or less. Gley mottles, as defined, separate soils with wetness problems from better drained soils. The data in this report show that mottles having a chroma of 3 or less in a matrix of stronger chroma are good indicators that a horizon is saturated sometime during the year. Three pedons studied have these mottles (at sites 16, 17, and 18), and their yearly water-table curves are between those of the Aquic Paleudults and the Aeric Paleaquults (fig. 10). Yet, according to the current criteria (Soil Survey Staff, 1975), these soils with pale brown (6/3 or 7/3) mottles are Typic Paleudults. These soils

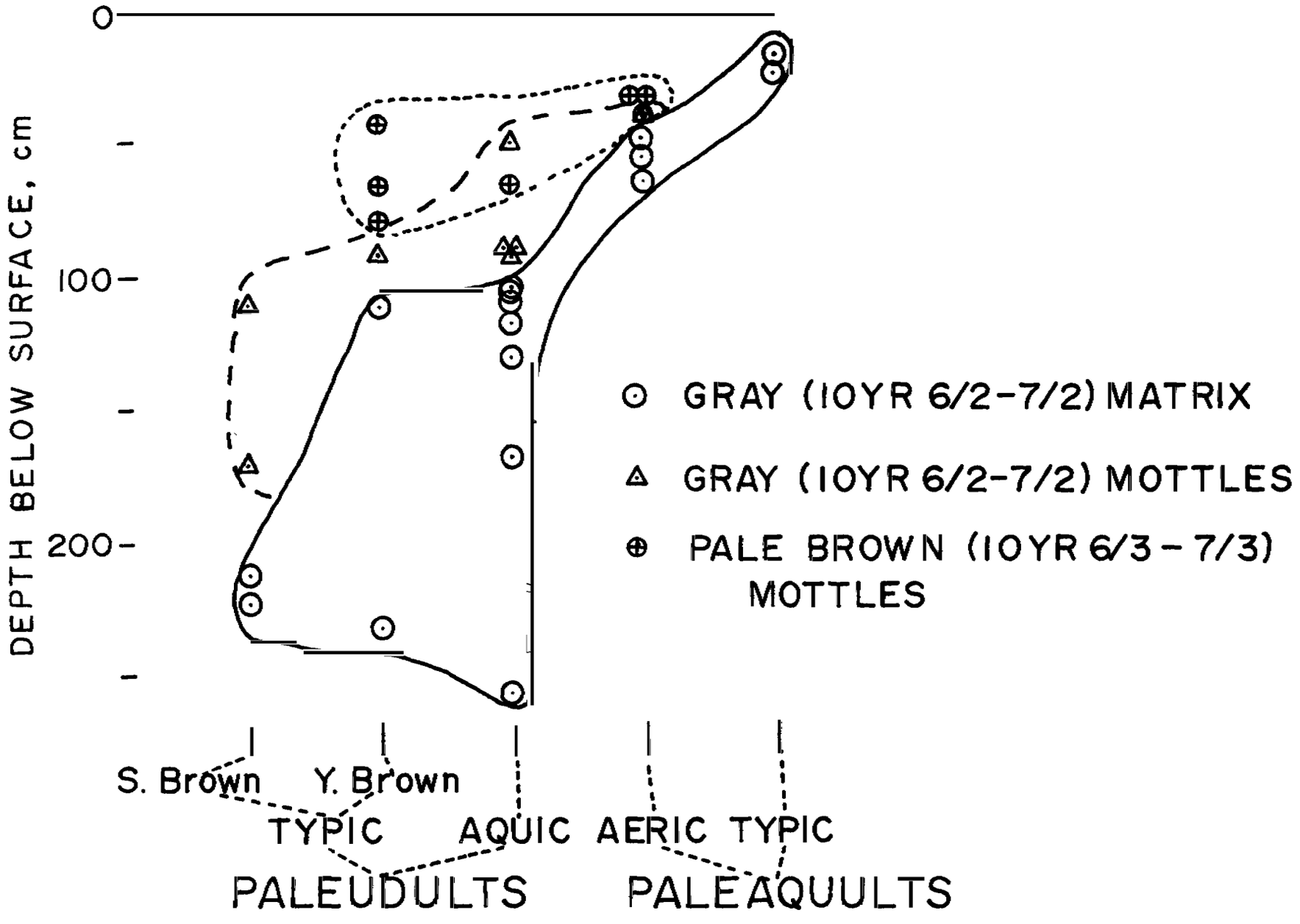


Figure 11.--Depth to gray matrix, gray mottles, and pale brown mottl s in Paleaquults and Paleudults.

Figure 12.--Correlation between the top of the Bh horizon and low stand of the water table for all Spodosol sites.

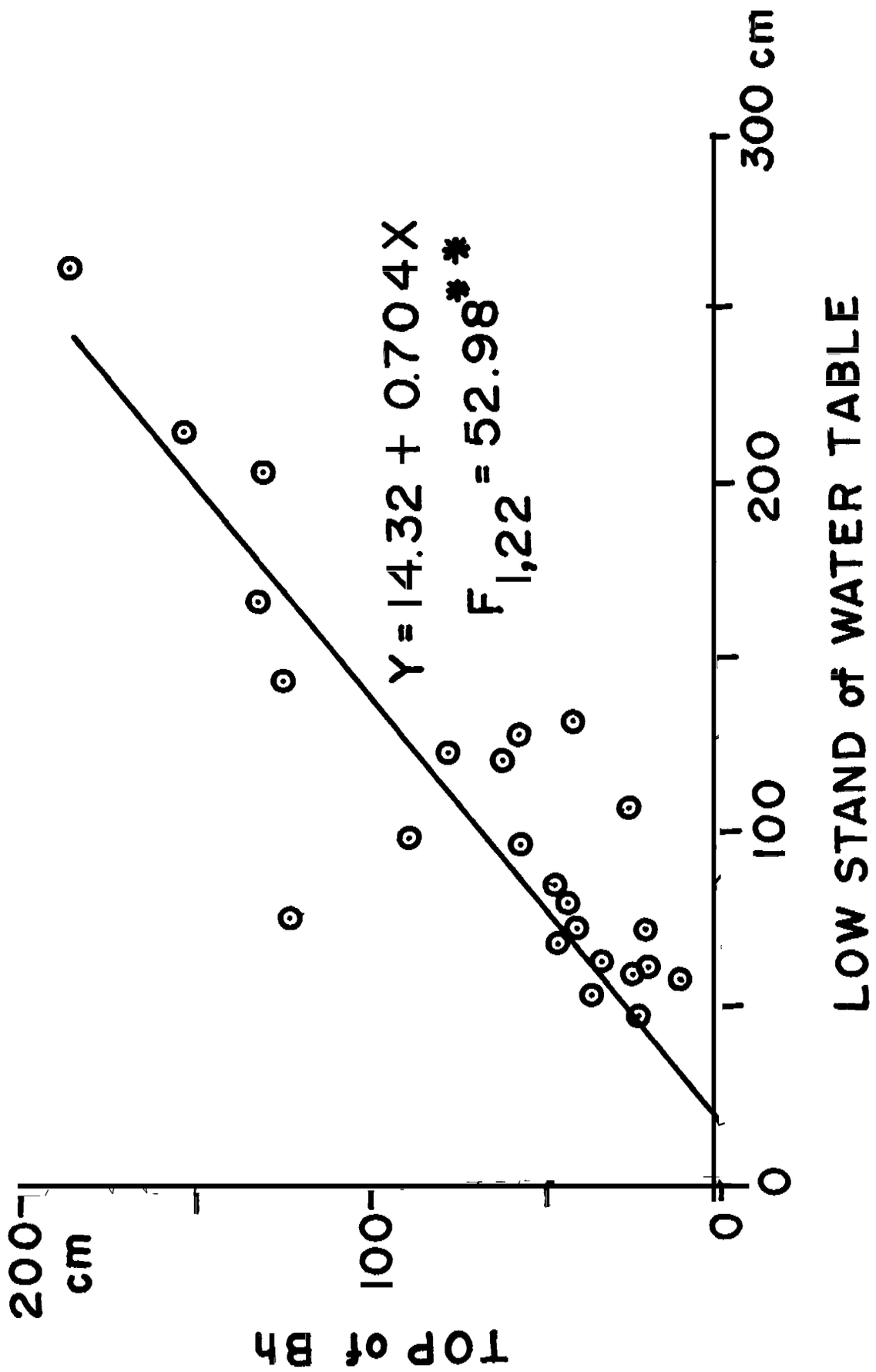


Figure 13.--Mean monthly water-table l vels in Haplaquods and associated soils and mean monthly levels at the 0.95 and 0.05 rainfall probabilities.

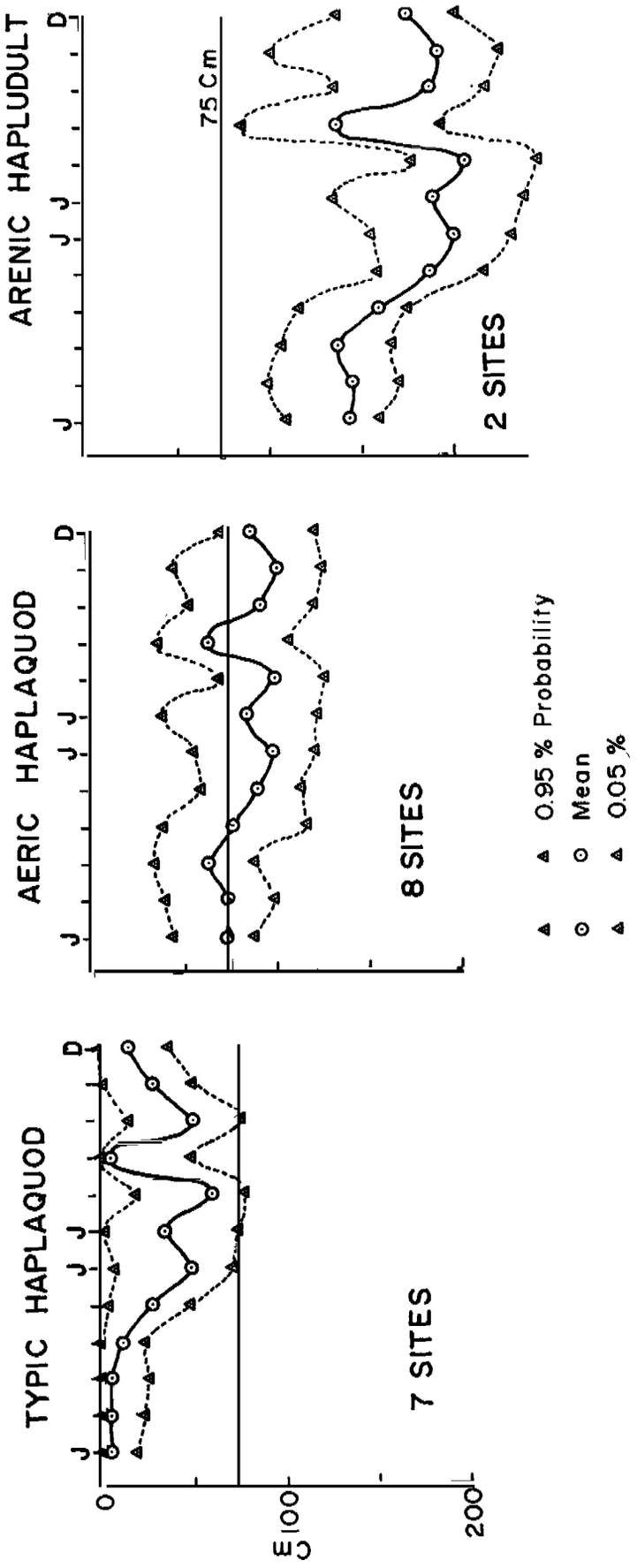


Figure 14.--Yearly distribution of saturated zones at sites 8 (A) and 5 (B).

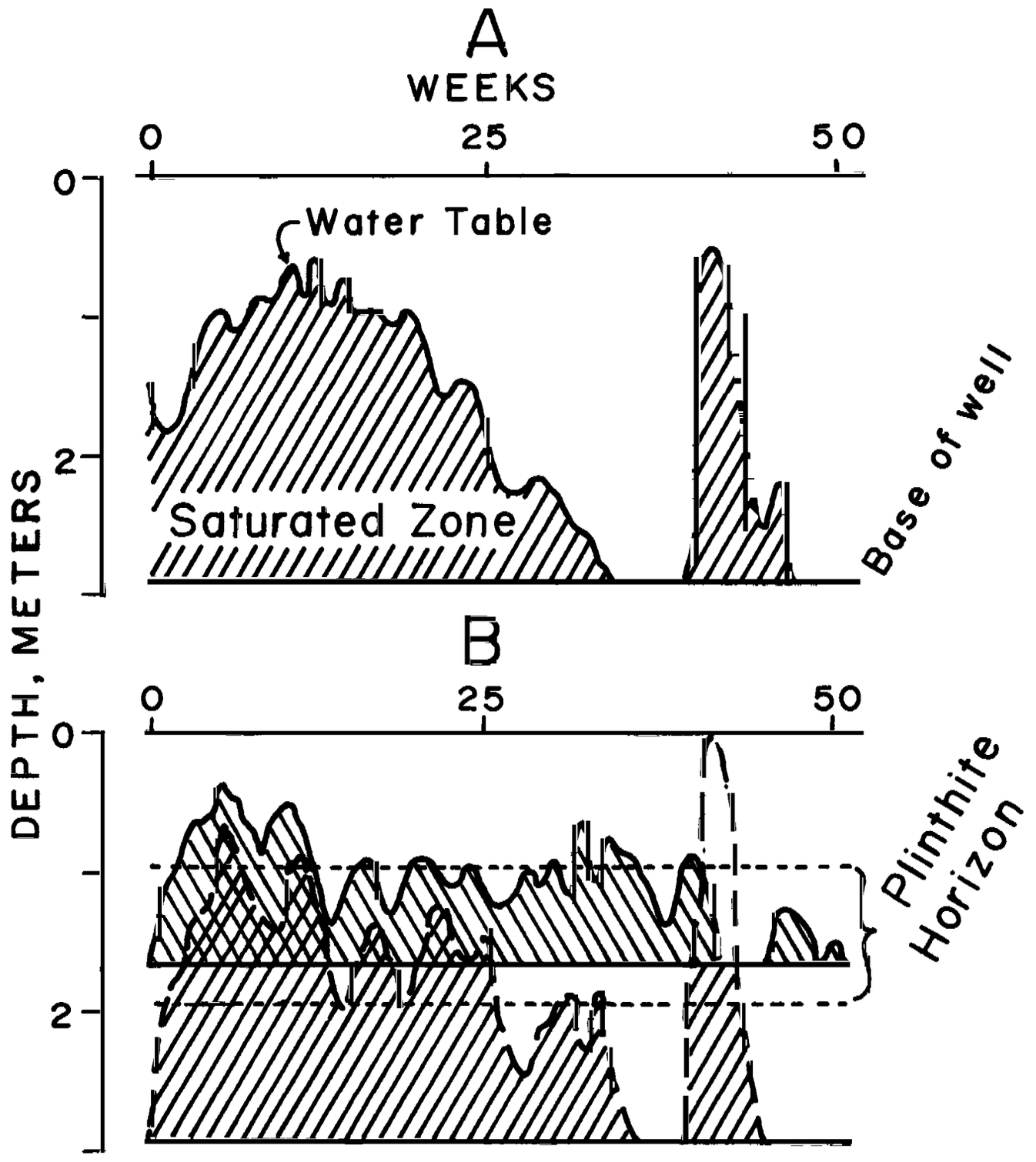


Table 4.--Cumulative percentage of time that adjacent Udults and Aquults are saturated at a given d pth.

[Altitude differences: 61 cm for sites 6 and 8, 30 cm for sites 9 and 10, and 73 cm for sites 31 and 33]

Depth of water table (cm)	Percentage of time saturated					
	Soils on divide center				Soils near valley slope	
	Udult (Site 6)	Aquult (Site 8)	Udult (Site 31)	Aquult (Site 33)	Udult (Site 9)	Aquult (Site 10)
+0	0	4	0	13	0	0
0-20	8	10	8	51	2	0
20-40	12	18	29	72	4	0
40-60	16	35	46	76	4	6
60-100	39	50	71	82	10	27
Greater than 100	100	100	100	100	100	100

are common in nearly level areas of the Coastal Plain in the southeastern United States. Recommendations are that in Paleudults the 7/3, 6/3, or 5/3 mottles in a matrix with stronger chroma be considered gley mottles and that soils having the mottles in the upper 75 cm be placed in Aquic subgroups.

During the past 15 to 20 years, great interest has been shown in measuring the water-table level of soils in the southeastern United States. Water tables and the associated zones of free water are easily measured with simple tools, and the wells can be lined with inexpensive casing. If proper care is taken in installing the cased wells and if the wells are installed above, in, and below restricting horizons, it is easy to determine whether the restrictive layers are perching water. Measurements taken once a week for a year or two can give a good picture of the saturation regime of a soil. There are difficulties, however, in interpreting water-table data. Some of these difficulties are:

1. Weekly measurements do not disclose the saturation that may occur above some soil horizons for short periods; this measurement interval is best suited to more slowly fluctuating water tables. Equipment or casings can be designed to show whether saturation has occurred during the interval between measurements, but the total period of saturation is unknown. Also, the high or low levels are not recorded during the measurement intervals, so the total fluctuation range is unknown.

2. Water-table data are site specific, and unless related to an average or standard rainfall pattern, they are specific only for the rainfall, vegetative, and evapotranspiration conditions prevailing during the measurement period. Comparing data from different years for two or more sites is nearly impossible unless some form of computer generalization is made. So, use of the data by soil scientists in the field is severely limited.

3. Large quantities of data can be collected in a short period, but methods of presenting these data so others can understand them are commonly only partly satisfactory.

4. The water saturation of most soils cannot be precisely defined because antecendent conditions are very important, and there may be considerable overlap in the duration of saturation between soils with contrasting morphologies.

Although the difficulties outlined seemingly constitute a negative approach to defining the saturation regime of soils, they are limitations that must be either overcome or tolerated. It is much better to know what problems to expect than to find out about the problems when it is too late to modify the study. On the more positive side, considerable information on the saturation regime of soils can be obtained during the cours of a standard soil survey. If wells are installed during the first year, then the mapping units can be tested by the use of actual data. The information can also be used in determining the approximate range of water-table fluctuation and the duration of saturation at certain depths. If the water-table data are used as an approximation of the saturation regime of the soils studied and not as an absolute guide, they can be very useful.

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Appendix

This appendix contains water-table data, a list of v getation* identified within a 10-m radius, and pedon descriptions for 53 sites in th Coastal Plain of North Carolina. Data are presented by site.

Water-table data are from computer-generalized predictions of water levels from an average year's precipitation. The rainfall patterns used are given in text tables 1 and 2. If a site has two or more wells, data are provided only for the deep wells and those in which water perches.

Th data are arranged alphabetically by soil series. Colors given are for moist soils. If two or more sites have similar pedon descriptions, a d scription is provided only for one site, and the similarity is noted in a footnote.

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* Vegetation identified by Arlin Weaver, soil scientist, SCS, Whiteville, NC; John E. Wiggins, Jr., staff forester, South Technical Servic Center, Ft. Worth, TX; and Charles Perino, NC Stat University, Raleigh, NC.

Th soil series are listed below by sit .

Site No.	Soil Series	Site No.	Soil Series	Site No.	Soil Series
1	Varina	19	Lynchburg	37	Murville
2	Varina	20	Goldsboro	38	Leon
3	Varina	21	Goldsboro	39	L on
4	Not designated	22	Toisnot	40	Leon
5	Dothan	23	Not designated	41	Murville
6	Goldsboro (taxadjunct)	24	Not designated	42	Murville
7	Lynchburg	25	Leon	43	Murville
8	Rains	26	Murville	44	Baymeade
9	Goldsboro	27	Not designated	45	Baymeade
10	Rains	28	Not designated	46	Rimini
11	Byars	29	Not designated	47	Leon
12	Goldsboro	30	Not designated	48	Leon
13	Norfolk	31	Goldsboro (taxadjunct)	49	Leon
14	Faceville	32	Lynchburg (taxadjunct)	50	Leon
15	Norfolk	33	Rains	51	Lynn Haven
16	Norfolk	34	Not designated	52	Leon
17	Norfolk	35	Murville	53	Murville
18	Norfolk	36	Murville		

Site 44: Baym ade taxadjunct

Water-table data

Well depth--234 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	142	May	18	167	Sept.	36	130
	2	123		19	179		37	124
	3	123		20	175		38	129
	4	127		21	180		39	152
Feb.	5	133	June	22	185	Oct.	40	174
	6	135		23	196		41	196
	7	125		24	197		42	196
	8	125		25	196		43	196
				26	194			
Mar.	9	118	July	27	190	Nov.	44	191
	10	116		28	179		45	188
	11	113		29	173		46	185
	12	123		30	189		47	172
	13	137					48	170
Apr.	14	137	Aug.	31	203	Dec.	49	173
	15	139		32	228		50	172
	16	139		33	230		51	170
	17	157		34	206		52	174
				35	162			

Prob. > F = 0.0005

r^2 = 0.753

Vegetation

(longleaf pine-forest type--No. 70)

Scientific name	Common name
Overstory	
Trees	
Pinus palustris Mill.	longleaf pine*
Understory	
Trees and shrubs	
Myrica cerifera var. *pumila* Michx.	dwarf wax myrtle
Perennial herbs	
Trillisa odoratissima (Walt.) Cass.	vanilla trillisa (deer's tongue) (Carolina vanilla)
Grasses	
Aristida stricta Michx.	pineland threeawn (dominant groundcover)

* Area burned late in spring of 1973.

Pedon Description

Series:	Baymeade taxadjunct
Classification:	Arenic Hapludult, loamy, siliceous, thermic
Location:	1.0 km (0.6 mile) east of NC Highway 132 on Road 1327, New Hanover County, NC
Slope and geomorphic surface:	0-1 percent; lower Coastal Plain
A1 0-5 cm	Dark gray (10YR 4/1) sand; single gain; loose; few medium and fine roots; strongly acid; clear smooth boundary.
A2 5-23 cm	Gray (10YR 6/1) sand; single grain; loose; medium acid; clear wavy boundary.
B1h 23-30cm	Dark brown (7.5YR 4/4) loamy sand; massive; weakly cemented to loose; medium acid; abrupt wavy boundary.
A'21 30-51 cm	Light yellowish brown (10YR 6/4) loamy sand; weak fine granular structure to structureless; very friable to loose; slightly acid; clear smooth boundary.
A'22 51-94 cm	Very pale brown (10YR 7/3, 7/4) loamy sand; single grain; loose; slightly acid; abrupt wavy boundary.
B'2t 94-126 cm	Yellowish brown (10YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable; few medium faint very pale brown mottles; medium acid; clear smooth boundary.
B'3 126-140 cm	Brownish yellow (10YR 6/6), yellow (10YR 7/6), and very pale brown (10YR 7/3) loamy sand; single grain to weak fine granular structure; medium acid; gradual boundary.
C 140-168 cm	White (10YR 8/1) sand; single grain; loose; medium acid; clear smooth boundary.
IIC 168-216 cm	Gray (10YR 6/1) sandy clay loam; massive; friable; medium acid; clear smooth boundary.
IIC 216-254 cm	Whit (10YR 8/1), olive yellow (2.5Y 6/6), and light gray (10YR 7/1) sand; single grain; loos .

Site 45: Baymeade

Water-table data

Well depth--242 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	164	May	18	196	Sept.	36	142
	2	153		19	207		37	138
	3	153		20	205		38	141
	4	157		21	205		39	156
Feb.	5	161	June	22	205	Oct.	40	171
	6	164		23	210		41	186
	7	161		24	210		42	187
	8	158		25	210		43	196
				26	208			
Mar.	9	153	July	27	206	Nov.	44	203
	10	152		28	197		45	211
	11	149		29	191		46	209
	12	156		30	200		47	206
	13	164					48	200
Apr.	14	168	Aug.	31	207	Dec.	49	196
	15	169		32	226		50	194
	16	169		33	229		51	194
	17	186		34	207		52	131
				35	169			

Prob. > F = 0.0012
r^2 = 0.725

Vegetation

Vegetation at site 45 is the same as that at site 44.

Pedon Description

Series:	Baymeade
Classification:	Arenic Hapludult, loamy, siliceous, thermic
Location:	1.0 km (0.6 mile) east of NC Highway 132 on Road 1327, New Hanover County, NC; exact location shown on New Hanover County photo 3GG-40
Slope and geomorphic surface:	0-1 percent; lower Coastal Plain
A1 0-5 cm	Dark gray (10YR 4/1) loamy sand; weak granular to single grain structure; loose; medium acid; clear smooth boundary.
A2 5-20 cm	Gray (10YR 6/1) sand; single grain; loose; medium acid; clear smooth boundary.
B2 20-66 cm	Yellow (10YR 7/6) loamy sand; weak fine granular to single grain structure; common medium and coarse dark brown (10YR 4/3) nodules that are very firm to hard; medium acid; diffuse boundary.
A'3 66-89 cm	Very pale brown (10YR 7/3) loamy sand; weak fine granular structure; very friable to loose; medium acid; gradual smooth boundary.
B21t 89-117 cm	Yellowish brown (10YR 5/8) sandy loam; weak fine subangular blocky structure; medium acid; clear smooth boundary.
B22t 117-147 cm	Brownish yellow (10YR 6/6) and yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few fine faint very pale brown mottles and few fine prominent yellowish red mottles; medium acid; clear smooth boundary.
C1 147-183 cm	Yellowish red (5YR 5/6), brownish yellow (10YR 6/6), and white (10YR 8/1) loamy sand to sand; structureless; loose; medium acid; diffuse boundary.
C2 183-204 cm	Yellow (10YR 7/6) sand; structureless; loose.

Site 11: Byars

Water-table data

Well depth 91 cm at site 11-1; 183 cm at site 11-2

Month	Week	Water-table depth 11-1	Water-table depth 11-2	Month	Week	Water-table depth 11-1	Water-table depth 11-2
		cm				cm	
Jan.	1	38	96	July	27	84	89
	2	66	173		28	86	94
	3	64	170		29	89	104
	4	38	135		30	--	109
Feb.	5	18	102	Aug.	31	--	117
	6	23	137		32	--	122
	7	41	160		33	--	140
	8	41	137		34	--	145
					35	--	155
Mar.	9	33	96				
	10	41	109	Sept.	36	--	145
	11	30	86		37	--	168
	12	28	76		38	--	147
	13	2	10		39	--	132
Apr.	14	18	38	Oct.	40	61	117
	15	18	33		41	8	135
	16	36	71		42	41	--
	17	28	46		43	68	--
May	18	30	36	Nov.	44	--	--
	19	15	13		45	86	117
	20	18	28		46	79	96
	21	36	56		47	--	79
					48	--	114
June	22	51	68				
	23	48	48	Dec.	49	--	132
	24	51	56		50	--	119
	25	58	61		51	--	114
	26	81	91		52	--	81

	11-1	11-2
Prob. > F =	0.0001	0.0001
r^2 =	0.718	0.755

Vegetation

(loblolly pin -hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Acer rubrum L.	red maple
Ilex opaca Ait.	American holly
Liquidambar styraciflua L.	American sweetgum
Magnolia virginiana L.	sweetbay magnolia
Oxydendrum arboreum (L.) DC.	sourwood
Understory	
Trees and shrubs	
Acer rubrum L.	red maple
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)
Myrica cerifera L.	southern waxmyrtle
Oxydendrum arboreum (L.) DC.	sourwood
Quercus nigra L.	water oak
Symplocos tinctoria (L.) L'Hér.	common sweetleaf (horse sugar)
Vaccinium vacillans Torr.	low blueberry
Vines	
Gelsemium sempervirens (L.) Ait. f.	Carolina jessamine (yellow)
Rhus radican L.	poison-ivy
Smilax rotundifolia L.	common greenbrier
Vitis rotundifolia Michx.	muscadine grape

Pedon Description

Series:	Byars
Classification:	Umbric Paleaquult, clayey, kaolinitic, thermic
Location:	Near Newton Grove, NC
Slope and geomorphic surface:	0 percent; middle Coastal Plain, Coharie surface
A11 0-25 cm	Black (N 2/0) sandy loam; weak fine granular structure; cl ar smooth boundary.
A12 25-43 cm	Black (10YR 2/1) sandy loam; weak fine and medium subangular blocky structure; friable; clear smooth boundary.
B21tg 43-91 cm	Gray (10YR 5/1) sandy clay loam to sandy clay; weak medium subangular blocky structure; thin discontinuous dark clay films on ped surfaces; gradual smooth boundary.
B22tg 91-178 cm	Gray (10YR 5/1) sandy clay with common fine and medium y llowish brown (10YR 5/8) mottles; weak fine medium subangular blocky structure; firm; common patchy thick dark clay films on cleavages; gradual smooth boundary.
B3 178-216 cm	Light gray and gray (10YR 7/1 and 5/1) sandy clay; few fine brownish yellow (10YR 6/8) mottles; massive; firm; thick patchy clay films on rare cleavage faces; gradual smooth boundary.
C 216-290+ cm	Light gray (10YR 6/1) sandy clay loam; massive; friable.

Site 5: Dothan

Water-table data

Well depth--89 cm at site 5-1; 152 cm at site 5-2; 292 cm at site 5-3

Month	Week	Water-table depth			Month	Week	Water-table depth		
		5-1	5-2	5-3			5-1	5-2	5-3
		-------cm--------					-------cm--------		
Jan.	1	86	--	264	July	27	66	117	244
	2	61	104	196		28	58	99	208
	3	53	89	173		29	66	109	198
	4	46	61	135		30	53	89	183
F b.	5	61	76	127	Aug.	31	66	114	229
	6	46	38	56		32	51	63	185
	7	48	46	76		33	61	104	239
	8	58	64	112		34	33	74	279
						35	35	107	--
Mar.	9	74	86	150	Sept.	36	13	91	--
	10	58	51	91		37	36	115	--
	11	56	43	89		38	33	140	--
	12	56	61	112		39	43	102	--
	13	74	104	170					
Apr.	14	79	132	196	Oct.	40	64	81	147
	15	68	112	165		41	--	102	0
	16	61	89	135		42	--	--	28
	17	56	89	147		43	--	--	135
May	18	71	124	198	Nov.	44	--	--	246
	19	56	104	165		45	--	--	--
	20	48	86	124		46	66	122	--
	21	53	89	124		47	38	124	--
						48	18	134	--
June	22	66	109	157	Dec.	49	10	--	--
	23	66	109	160		50	5	145	--
	24	58	81	145		51	8	--	--
	25	66	114	193		52	38	--	--
	26	68	122	234					

	5-1	5-2	5-3
Prob. > F =	0.0071	0.0001	0.0001
r^2 =	0.467	0.822	0.824

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Pinus taeda L.	loblolly pine
Quercus falcata Michx.	Southern red oak
Quercus shumardii Buckl.	Shumar oak
Quercus velutina Lam.	black oak
Understory	
Trees and shrubs	
Carya glabra (Mill.) Sweet	pignut hickory
Carya tomentosa (Poir.) Nutt.	mockernut hickory
Cornus florida L.	flowering dogwood
Diospyros virginiana L.	common persimmon
Hypericum spp. L.	St. John's-wort
Ilex opaca Ait.	American holly
Nyssa sylvatica Marsh.	black tupelo (blackgum)
Quercus alba L.	white oak
Quercus marilandica Muenchh.	blackjack oak
Quercus nigra L.	water oak
Quercus stellata Wangenh.	post oak
Symplocos tinctoria (L.) L'Hér.	common sweetleaf (horse sugar)
Vaccinium vacillans Torr.	low blueberry
Subshrubs	
Chimaphila maculata (L.) Pursh	striped pipsisswea (spotted wintergreen)
Vines	
Smilax rotundifolia L.	common greenbrier
Vitis rotundifolia Michx.	muscadine grape

Pedon Description

Series:	Dothan
Classification:	Plinthic Paleudult, fine loamy, siliceous, thermic
Location:	Timbered area on farm owned by Mrs. Surles near Benson, NC about 274 m (300 yards) west of Road 1005 and 0.8 km (0.5 mile) north of the junction of Road 1005 and NC Highway 50, Johnston County, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Brandywine surface
A1	
0-13 cm	Very dark gray (10YR 3/1) loamy sand; single grain; loose; clear boundary.
A2	
13-25 cm	Light olive brown (2.5Y 5/4) loamy sand to sandy loam; loose; clear but microintertongued lower boundary.
B1	
25-33 cm	Yellowish brown (10YR 5/4) sandy clay loam; massive; friable; clear boundary.
B21t	
33-51 cm	Yellowish brown (10YR 5/6) sandy clay loam; massive to very weak fine subangular blocky structure; patchy clay films on cleavage faces; friable; clear boundary.
B22t	
51-76 cm	Yellowish brown (10YR 5/6) sandy clay loam; thin patchy clay films on cleavage faces; friable; clear boundary.
B23	
76-97 cm	Yellowish brown (10YR 5/8) sandy clay loam that becomes less clayey with depth; common medium strong brown (7.5YR 5/8) mottles that are friable to very firm; weak fine subangular blocky structure; thin patchy clay films on major cleavage faces; few clean sand grains along cleavage faces; gradual boundary.
B24pl	
97-122 cm	Yellowish brown (10YR 5/4) sandy clay loam; common to many (10 to 15 percent) firm to very firm reddish brown (5YR 4/4) sesquioxide nodules; common medium light brownish gray mottles; massive structure breaking to weak coarse subangular blocky structure; common thin clay films in fine pores; clear boundary.
B25pl	
122-147 cm	Brown to strong brown (10YR 5/3 to 7.5YR 5/6) sandy clay loam that is 20 to 25 percent reddish brown (5YR 4/4) and dark reddish brown (2.5YR 3/4) harsh, dry-feeling, very firm sesquioxide bodies; thin

nearly continuous clay films on cleavages of brown mat rials; clear boundary.

B26pl
147-165 cm — Brown (10YR 5/3) sandy clay loam that is 20 percent red (2.5YR 4/8) and brown (7.5YR 4/4) very firm sesquioxide nodules; common medium gray (10YR 6/1) mottles; clear boundary.

B27pl
165-198 cm — Yellowish brown and gray (10YR 5/6 and 6/1) sandy clay loam that is 5 to 10 percent red (2.5YR 4/8) and brown (7.5YR 4/4) firm to very firm sesquioxide nodules that become less firm and less abundant with depth; gradual boundary.

B31
198-220 cm — Reticulate mottled light brownish gray (10YR 6/2), red (2.5YR 4/6), and strong brown (7.5YR 5/6) sandy clay loam grading to sandy loam; gradual boundary.

B32
220-284 cm — Red (2.5YR 4/6) sandy loam; common light brownish gray (10YR 6/2) mottles and streaks; gradual boundary.

C
284-305+ cm — Yellowish red (5YR 4/6) sandy loam; common light brownish gray (10YR 6/2) streaks and mottles.

Site 14: Faceville

Water-tabl data

Well depth--609 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	471	May	18	427	Sept.	36	381
	2	454		19	457		37	401
	3	444		20	482		38	391
	4	404		21	487		39	416
Feb.	5	373	June	22	482	Oct.	40	460
	6	350		23	447		41	530
	7	322		24	439		42	554
	8	310		25	452		43	554
				26	465			
Mar.	9	297	July	27	472	Nov.	44	526
	10	295		28	467		45	510
	11	287		29	483		46	485
	12	333		30	470		47	424
	13	358					48	381
Apr.	14	404	Aug.	31	475	Dec.	49	322
	15	391		32	457		50	315
	16	398		33	480		51	305
	17	409		34	439		52	328
				35	422			

Prob. > F = 0.0006
r^2 = 0.678

V g tation

None; site 14 is cultivated.

Pedon Description

Series:	Faceville
Classification:	Typic Paleudult, clayey, kaolinitic, thermic
Location:	Near Newton Grove, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Coharie surface, near valley slope
Ap 0-25 cm	Dark grayish brown (10YR 4/2) loamy sand; single grain; loose; abrupt boundary.
B21t 25-76 cm	Yellowish red (5YR 4/8) sandy clay; weak fine subangular blocky structure; few patchy clay films; firm; slightly plastic; gradual boundary.
B22t 76-114 cm	Yellowish red (5YR 4/6) sandy clay to sandy clay loam; few yellowish brown (10YR 5/6) mottles; massive; firm; gradual boundary.
B23t 114-152 cm	Yellowish red (5YR 4/6) sandy clay loam; massive; friable to firm; gradual boundary.
B24t 152-193 cm	Strong brown (7.5YR 5/6) sandy clay loam; common brown to pale brown (10YR 5/3-6/3) mottles and common firm red (2.5YR 4/6) mottles; massive; friable; gradual boundary.
B25t 193-218 cm	Variegated brownish yellow, pale brown, and red (10YR 6/8 and 6/3, and 2.5YR 4/6) sandy clay loam; massive; friable; gradual boundary.
B3 218-244 cm	Variegated red (10YR 4/8) and yellowish brown and light gray (10YR 5/8 and 6/1) sandy clay loam; firm to slightly brittle; massive; clear boundary.
C 244-310+ cm	Light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) sandy clay loam; few mica flakes and few yellowish red (5YR 4/6) mottles; massive; friable to firm.

Site 6: Goldsboro taxadjunct

Water-table data

Well depth--246 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	211	May	18	119	Sept.	36	--
	2	162		19	109		37	--
	3	142		20	71		38	--
	4	102		21	68		39	--
F b.	5	79	June	22	84	Oct.	40	145
	6	20		23	84		41	0
	7	38		24	71		42	0
	8	64		25	119		43	86
				26	168			
Mar.	9	76	July	27	180	Nov.	44	180
	10	36		28	145		45	--
	11	33		29	127		46	211
	12	56		30	122		47	--
	13	89					48	--
Apr.	14	112	Aug.	31	170	Dec.	49	--
	15	84		32	150		50	--
	16	58		33	195		51	--
	17	76		34	--		52	--
				35	--			

Prob. >F = 0.0001
r^2 = 0.819

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Carya tomentosa (Poir.) Nutt.	mockernut hickory
Pinus taeda L.	loblolly pine
Quercus falcata Michx.	southern red oak
Understory	
Trees and shrubs	
Acer rubrum L.	red maple
Carya glabra (Mill.) Sweet	pignut hickory
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)
Cornus florida L.	flowering dogwood
Diospyros virginiana L.	common persimmon
Ilex glabra (L.) Gray	inkberry (bitter gallberry)
Ilex opaca Ait.	American holly
Liquidambar styraciflua L.	American sweetgum
Nyssa sylvatica Marsh	black tupelo (black gum)
Oxydendrum arboreum (L.) DC.	sourwood
Quercus alba L.	white oak
Quercus nigra L.	water oak
Quercus stellata Wangenh.	post oak
Sorbus arbutifolia (L.) Heynhold.	red chokeberry
Symplocos tinctoria (L.) L'Hér.	common sweetleaf (horse sugar)
Vaccinium elliottii Chapm.	Elliott blueberry
Vaccinium vacillans Torr.	low blueberry
Vines	
Smilax rotundifolia L.	common greenbrier
Vitis rotundifolia Michx.	muscadine grape

Pedon Description

Seri s:	Goldsboro taxadjunct*
Classification:	Aquic Paleudult, fine loamy, siliceous, thermic
Location:	Timbered area on farm owned by Mrs. Surles near Benson, NC. About 274 m (300 yards) west of Road 1005 and 0.8 km (0.5 mile) north of the junction of Road 1005 and NC Highway 50, Johnston County, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Brandywine surface
A1	
0-8 cm	Dark gray (10YR 4/1) loamy sand; single grain; loose; clear boundary.
A2	
8-36 cm	Light olive brown (2.5YR 5/4) loamy sand; single grain; loose; clear boundary.
B21t	
36-66 cm	Dark yellowish brown (10YR 4/4) sandy clay loam; massive; friable; clear boundary.
B22te	
66-86 cm	Yellowish brown (10YR 5/6) sandy clay loam; many strong brown (7.5YR 5/8) and pale brown (10 YR 6/3) mottles; massive; friable; clear boundary.
B23te	
86-114 cm	Yellowish brown (10YR 5/6) sandy clay loam; common light brownish gray and strong brown (10YR 6/2 and 7.5YR 5/6) mottles; gray mottles are sandy loam; massive; friable; clear boundary.
B24t	
114-165 cm	Light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) sandy clay loam; gray bodies are more clayey than brown bodies; massive; friable; slightly plastic; gradual boundary.
B3	
165-233 cm	Variegated gray (10YR 5/1), red (2.5YR 4/8), and brownish yellow (10YR 6/6) sandy clay loam to sandy loam; few clay films on cleavages; massive; friable; abrupt boundary.
IIC	
233-290+ cm	Pale yellow (2.5Y 7/4) loamy sand.

* This soil is in a transitional area between Dothan and Rains soils. See soil no. S65NC51-3 (National Soil Survey Laboratory, Lincoln, Nebraska, pedon number) for laboratory data pertaining to similar pedons.

Sites 9, 12, and 20: Goldsboro

Water-table data

Well depth 238 cm at site 9; 609 cm at site 12; 609 cm at site 20

Month	Week	Water-table depth			Month	Week	Water-table depth		
		9	12	20			9	12	20
		cm					cm		
Jan.	1	168	207	61	July	27	277	287	141
	2	178	180	--		28	254	289	--
	3	168	170	41		29	241	307	154
	4	147	132	--		30	249	292	--
Feb.	5	107	124	29	Aug.	31	279	295	136
	6	96	122	--		32	--	267	--
	7	190	107	41		33	--	290	--
	8	112	96	--		34	--	292	157
						35	--	320	--
Mar.	9	107	84	67	Sept.	36	--	322	176
	10	91	84	--		37	--	343	--
	11	81	74	--		38	--	335	171
	12	107	89	75		39	--	277	--
	13	102	81	--					
Apr.	14	129	117	69	Oct.	40	269	236	153
	15	107	112	--		41	0	221	--
	16	122	130	91		42	28	256	168
	17	130	130	--		43	150	294	--
May	18	142	155	93	Nov.	44	249	317	209
	19	140	170	--		45	--	335	--
	20	130	196	123		46	--	315	--
	21	155	223	--		47	--	305	237
						48	--	320	--
June	22	180	241	124	Dec.	49	--	322	227
	23	173	226	--		50	--	302	--
	24	172	221	--		51	--	292	234
	25	206	246	146		52	--	223	--
	26	262	272	--					

	9	12	20
Prob. > F =	0.0001	0.0001	0.0001
r^2 =	0.732	0.726	0.770

Vegetation

(loblolly pine-hardwood forest type--No. 82)

	Scientific name	Common name	Site		
			9	12	20
Overstory					
Trees					
	Acer rubrum L.	red maple	X		
	Liquidambar styraciflua L.	American sweetgum	X	X	X
	Liriodendron tulipifera L.	yellow-poplar		X	X
	Pinus taeda L.	loblolly pine	X	X	X
	Quercus falcata Michx.	southern red oak	X		
Understory					
Trees and shrubs					
	Acer rubrum L.	red maple		X	X
	Clethra alnifolia L.	summersweet clethra (sweet pepperbush)	X		
	Cornus florida L.	flowering dogwood		X	X
	Ilex glabra (L.) Gray	inkberry (bitter gallberry)	X	X	X
	Ilex opaca Ait.	American holly	X	X	X
	Liquidambar styraciflua L.	American sweetgum	X	X	X
	Myrica cerifera L.	southern waxmyrtle		X	X
	Nyssa sylvatica Marsh.	black tupelo (black gum)		X	X
	Oxydendrum arboreum (L.) DC.	sourwood	X	X	X
	Prunus serotina Ehrh.	black cherry (wild)	X		
	Quercus nigra L.	water oak	X	X	X
	Gaylussacia frondosa (L.) Torr. & Gray	dangleberry		X	
	Quercus falcata Michx.	southern red oak	X	X	
	Quercus marilandica Muenchh.	blackjack oak	X		X
	Quercus nigra L.	water oak	X		X
	Symplocos tinctoria (L.) L'Hér.	common sweetleaf (horse sugar)	X	X	X
	Vaccinium vacillans Torr.	low blueberry	X	X	X
Vines					
	Gelsemium sempervirens (L.) Ait.f.	Carolina jessamine (yellow)			X
	Parthenocissus quinquefolia (L.) Planch.	Virginia creeper			X
	Rhus radicans L.	poison-ivy			X
	Smilax rotundifolia L.	common greenbrier	X		
	Vitis rotundifolia Michx.	muscadine grape	X	X	

Pedon Description--site 9[1/]

Series:	Goldsboro[2/ 3/]
Classification:	Aquic Paleudult, fine loamy, siliceous, thermic
Location:	Near Newton Grove, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Coharie surface
Ap	
0-18 cm	Dark gray (10YR 4/1) loamy sand; weak fine granular structure; many roots; very friable; clear boundary.
B1	
18-28 cm	Light yellowish brown (10YR 6/4) sandy loam; weak medium subangular blocky structure; friable; clear smooth boundary.
B21t	
28-51 cm	Light yellowish brown (10YR 6/4) sandy loam to sandy clay loam; w ak medium subangular blocky structure; few pores; clean sand grains in some large pores; friable; clear smooth boundary.
B22te	
51-74 cm	Light yellowish brown (10YR 6/4) sandy clay loam; few fine to medium strong brown (7.5YR 5/6) mottles in lower part; common medium pores lined with clean sand grains; few clear sand grains on faces of w ak structural aggregates; weak fine subangular blocky structure; friable; clear wavy boundary.
B23te	
74-102 cm	Light yellowish brown (10YR 6/4) sandy clay loam; many fine to medium strong brown and gray (7.5YR 5/8 and 10YR 6/2) mottles; gray mottles start at 84 cm; massive; friable; yellowish brown and gray bodies have less clay than strong brown bodies; gradual boundary.
B24te	
102-142 cm	Variegated yellowish brown (10YR 5/8) and light gray (10YR 7/2) sandy clay loam; yellowish brown bodies of sandy clay loam; light gray bodies of sandy loam; massive; friable; thin discontinuous clay films in pores; few to common fine pores; few pores lined with clean sand grains; clear smooth boundary.

1/ Pedon description for sites 12 and 20 are similar to that for site 9.
2/ This pedon is in a transitional area between Norfolk and Rains soils.
3/ See soils no. S65NC80-1 and S65NC80-2 (National Soil Survey Laboratory, Lincoln, Nebraska, pedon number) for laboratory data pertaining to similar pedons.

B25t

142-196 cm — Variegated strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) sandy clay loam; massive; slightly firm; many patchy thin discontinuous clay films in pores and on rare cleavage faces; gradual smooth boundary.

B3

196-254 cm — Yellow (10YR 7/6) sandy clay loam; many coarse soft red (10YR 4/6) mottles and common medium light brownish gray (10YR 6/2) mottles; massive; friable to firm; patchy clay films in some pores and on rare cleavage faces; gradual boundary.

C

254-289+ cm — Mixed yellow and light brownish gray (10YR 7/6 and 6/2) sandy clay loam; common fine soft red (10YR 4/6) mottles.

Site 21: Goldsboro

Water-table data

Well depth--234 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	213	May	18	114	Sept.	36	114
	2	94		19	107		37	213
	3	64		20	41		38	234
	4	46		21	25		39	165
Feb.	5	48	June	22	30	Oct.	40	41
	6	0		23	64		41	0
	7	30		24	38		42	0
	8	41		25	83		43	53
				26	122			
Mar.	9	46	July	27	137	Nov.	44	162
	10	0		28	94		45	--
	11	13		29	64		46	201
	12	13		30	36		47	--
	13	68					48	--
Apr.	14	76	Aug.	31	84	Dec.	49	--
	15	71		32	46		50	--
	16	23		33	97		51	--
	17	58		34	68		52	--
				35	104			

Prob. > F = 0.0003
r^2 = 0.682

Vegetation

Vegetation at site 21 is similar to that at site 22, but Arundinaria gigantea (Walt.) Muhl. (giant cane) does not grow at site 21.

Pedon Description

Series:	Goldsboro
Classification:	Aquic Paleudult, fine loamy, siliceous, thermic
Location:	0.35 km (0.22 mile) north-northeast of Dunns Crossroads, Wilson County, NC
Slope:	0-1 percent, slightly convex; middle Coastal Plain, Sunderland surface
A1 0-8 cm	Very dark gray (10YR 3/1) loamy sand; friable; common roots; abrupt boundary.
A2 8-20 cm	Light olive brown to light yellowish brown (2.5Y 5/4 to 6/4); massive; friable; abrupt boundary.
B1 20-41	Yellowish brown (10YR 5/4 to 5/6) sandy loam to sandy clay loam; massive; friable; clear smooth boundary.
B21te 41-71 cm	Yellowish brown (10YR 5/6) sandy clay loam; common medium light gray (10YR 6/1) mottles starting at 46 cm; some mottles are small bodies of clean sand grains and others are areas of gray sandy clay loam; massive; friable; gradual smooth boundary.
B22te 71-102 cm	Yellowish brown (10YR 5/6) sandy clay loam to clay loam; common fine to medium gray (10YR 5/1) mottles; massive; friable; few patchy thin clay films on cleavage faces; few fine yellowish red (5YR 4/8) mottles in lower part; gradual smooth boundary.
B23t 102-127 cm	Mixed yellowish brown and light gray (10YR 5/6 and 6/1) sandy clay loam to clay loam; common fine red (2.5YR 5/8) mottles; massive; firm; clear boundary.
B24x 127-157 cm	Light gray (10YR 6/1) sandy clay loam; many fine brownish yellow (10YR 6/8) and common fine red (10YR 4/8) mottles; about 10 percent of the light gray matrix is slightly brittle; friable; massive; clear wavy boundary.
B25t 157-193 cm	Light gray (10YR 7/1) sandy clay loam; few to common yellowish brown (10YR 5/6) mottles; massive; friable; common medium gray clay films bridging sand grains; clear boundary.

B3 193-213 cm	Mixed light gray (10YR 6/1) and yellowish brown (10YR 5/6) sandy clay loam; massive; firm; clear boundary.
C 213-226 cm	Brownish yellow (10YR 6/6) coarse sand and clay (sandy clay loam); common white crushable feldspar grains; clear boundary.
C 226-244 cm	Yellowish brown (10YR 5/6) sandy loam containing coarser sand than above; abrupt boundary.
C 244-289 cm	Yellowish brown and light gray (10YR 5/8 and 7/1) smooth silty clay to silty clay loam; firm to very firm in places.

Site 31: Goldsboro taxadjunct

Water-tabl data

Well depth--290 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	170	May	18	114	Sept.	36	2
	2	81		19	112		37	36
	3	58		20	64		38	45
	4	46		21	38		39	38
Feb.	5	46	June	22	41	Oct.	40	66
	6	5		23	53		41	107
	7	10		24	41		42	124
	8	25		25	71		43	168
				26	91			
Mar.	9	33	July	27	99	Nov.	44	206
	10	10		28	66		45	157
	11	30		29	38		46	224
	12	46		30	25		47	--
	13	89					48	--
Apr.	14	89	Aug.	31	61	Dec.	49	--
	15	74		32	46		50	--
	16	33		33	74		51	--
	17	64		34	36		52	--
				35	33			

Prob.> F = 0.0010

r^2 = 0.804

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Carya tomentosa (Poir.) Nutt.	mockernut hickory
Liquidambar styraciflua L.	American sweetgum
Quercus alba L.	white oak
Quercus falcata Michx.	southern red oak
Understory	
Trees and shrubs	
Acer rubrum L.	red maple
Carya tomentosa (Poir.) Nutt.	mockernut hickory
Cornus florida L.	flowering dogwood
Gaylussacia frondosa (L.) Torr. & Gray	dangleberry
Ilex opaca Ait.	American holly
Liquidambar styraciflua L.	American sweetgum
Nyssa sylvatica Marsh.	black tupelo (black gum)
Oxydendrum arboreum (L.) DC.	sourwood
Persea borbonia (L.) Spreng.	redbay persea
Pinus taeda L.	loblolly pine
Quercus alba L.	white oak
Quercus falcata Michx.	southern red oak
Quercus nigra L.	water oak
Subherbs	
Hypericum hypercoides (L.) Crantz	St. Andrew's cross (St.-John's-wort)
Vines	
Gelsemium sempervirens (L.) Ait. f.	Carolina jessamine (yellow)
Lonicera japonica Thunb.	Japanese honeysuckle
Rhus radicans L.	poison-ivy
Vitis rotundifolia Michx.	muscadine grape

Pedon Description

Series:	Goldsboro taxadjunct*
Classification:	Aquic Paleudult, fine loamy, siliceous, thermic
Location:	Timbered tract south of Road 1627, northeast of Road 1628, and east of railroad track at northeast edge of city limits of Stantonsburg, Wilson County, NC
Slope and geomorphic surface:	0-1 percent, slightly convex; lower Coastal Plain, Wicomico surface
A1 0-8 cm	Very dark gray (10YR 3/1) silt loam to loam; weak medium subangular blocky structure; friable; clear irregular boundary.
A2 8-25 cm	Pale brown (10YR 6/3) silt loam to loam; massive; friable; clear wavy boundary.
B1 25-43 cm	Yellowish brown (10YR 5/6) sandy clay loam to loam; weak fine subangular blocky structure; friable; clear smooth boundary.
B21t 43-84 cm	Yellowish brown (10YR 5/6) sandy clay to clay loam; many fine yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure with thin patchy clay films; firm; gradual boundary.
B22t 84-106 cm	Variegated yellowish brown (10YR 5/6), light gray, (10YR 7/1) and strong brown (7.5YR 5/8) clay loam; weak medium subangular blocky structure; firm; common discontinuous clay films; clear boundary.
B3 106-137 cm	Light gray (10YR 7/1) sandy clay loam; many yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and yellowish red (5YR 5/8) bodies of clay loam; massive; firm; clear boundary.
C 137-193 cm	Variegated light gray (N 7/0) and dark brown (7.5YR 4/4) sandy clay; firm; massive; abrupt boundary.
C 193-229 cm	Light gray (N 7/0) and light yellowish brown (10YR 6/6) sandy clay loam; massive; firm; abrupt boundary.
C 229-242 cm	Light gray (10YR 7/1), light brownish gray (10YR 6/2) and red (2.5YR 4/8) sandy loam grading down to a loamy sand near the base of observation.

* Area is transitional to Aquults.

Site 25: Leon

Water-table data

Well depth--144 cm

Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm
Jan.	1	13	July	13	0
	2	8		14	0
Feb.	3	6	Aug.	15	0
	4	6		16	0
Mar.	5	6	Sept.	17	0
	6	24		18	0
Apr.	7	24	Oct.	19	26
	8	63		20	58
May	9	39	Nov.	21	58
	10	39		22	31
June	11	0	Dec.	23	4
	12	0		24	6

Prob.> F = 0.0006

r^2 = 0.728

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Pinus palustris Mill.	longleaf pine (dominant)
Pinus serotina Michx.	pond pine (dominant)
Quercus marilandica Muenchh.	blackjack oak
Understory	
Trees and shrubs	
Diospyros virginiana L.	common persimmon
Ilex glabra (L.) Gray	inkberry (bitter gallberry)
Myrica cerifera L.	southern waxmyrtle
Vaccinium stamineum L.	common deerberry (squaw huckleberry)
Grasses	
Aristida spp. L.	threeawn (dominant)

Pedon Description

Series:	Leon
Classification:	Aeric Haplaquod, sandy, siliceous, thermic
Location:	About 0.6 km (0.4 mile) south of the junction of Roads 1103 and 1105 on Road 1103, then 0.2 km (0.1 mile) east of Road 1103, Lenoir County, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Sunderland surface
A1 and A2 0-13 cm	Gray (N 5/0) sand of clean sand grains and black organic material; gray (N 4/0) when rubbed between fingers; massive; very friabl ; clear smooth boundary.
A2 13-33 cm	Grayish brown (10YR 5/2) sand; single grain; loose; abrupt smooth boundary.
Bh1 33-48 cm	Darker than dark brown (7.5YR 3/2) sand to loamy sand; massive; friable to slightly brittle; clear wavy boundary.
(B) 48-76 cm	Pale brown to light yellowish brown (10YR 6/3 to 6/4) loamy sand; few fine strong brown (7.5YR 5/6) mottles; gradual wavy boundary.
A'2 76-112 cm	Light gray (10YR 6/1) sand; massive to single grain; very friable to loose; flows when wet; abrupt irregular boundary.
B'h 112-155+ cm	Brown (7.5YR 4/2) to black (5YR 2/1) sand; considerable horizontal variation in color; massive; friable; most sand grains coated with organic material.

Sites 38, 48, and 52: Leon

Water-table data

Well depth: 122 cm at site 38; 117 cm at site 48; 127 cm at site 52

Month	Week	Water-table depth (cm) 38	48	52	Month	Week	Water-table depth (cm) 38	48	52
Jan.	1	118	43	26	July	27	107	77	52
	2	118	33	17		28	113	68	49
	3	118	43	16		29	114	61	49
	4	118	40	20		30	115	63	65
Feb.	5	117	46	27	Aug.	31	118	64	78
	6	117	52	30		32	---	79	90
	7	116	50	27		33	--	80	91
	8	110	46	25		34	120	70	88
						35	88	45	78
Mar.	9	101	41	24	Sept.	36	68	33	67
	10	95	39	26		37	67	31	63
	11	92	36	26		38	68	33	67
	12	97	41	28		39	81	46	77
	13	104	48	29					
Apr.	14	108	52	26	Oct.	40	96	59	86
	15	109	52	26		41	111	74	92
	16	109	52	26		42	111	74	92
	17	110	60	35		43	118	77	96
May	18	109	64	37	Nov.	44	--	80	97
	19	107	67	41		45	--	85	97
	20	106	67	39		46	--	85	94
	21	106	61	48		47	--	82	94
						48	117	78	94
June	22	107	56	57	Dec.	49	109	74	94
	23	113	54	68		50	108	74	95
	24	114	54	68		51	108	73	93
	25	115	63	63		52	110	75	95
	26	115	71	58					

	38	48	52
Prob. > F =	0.0156	0.0449	0.0023
r^2 =	0.715	0.568	0.691

Vegetation

(longleaf pine-forest type--No. 70 and pond pine-forest type--No. 98)

Scientific name	Common name	Site 38	Site 48	Site 52
Overstory				
Trees				
Pinus palustris Mill.	longleaf pine (scattered)	X		X
Understory				
Trees and shrubs				
Acer rubrum L.	red maple		X	
Diospyros virginiana L.	common persimmon	X		
Ilex coriacea (Pursh) Chapm.	large gallberry	X	X	
Ilex glabra (L.) Gray	inkberry (bitter gallberry)	X	X	X
Ilex laevigata (Pursh) A. Gray	smooth winterberry		X	X
Magnolia virginiana L.	sweetbay magnolia	X		X
Myrica cerifera var. *pumila* Michx.	dwarf waxmyrtle	X		X
Quercus laevis Walt.	turkey oak			X
Quercus virginiana Mill.	live oak	X		
Grasses				
Andropogon gerardii Vitman	big bluestem	X	X	
Aristida stricata Michx.	pineland threeawn	X	X	X
Ferns				
Pteridium aquilinum (L.) Kuhn.	bracken	X	X	X
Vines				
Smilax laurifolia L.	laurel greenbrier		X	

Pedon Description--site 38*

Series:	Leon
Classification:	Aeric Haplaquod, sandy, siliceous, thermic
Location:	Southwest of Pine Valley private school along Woods Road in New Hanover County, NC. Exact location shown on New Hanover County photo 3GG-18
Geomorphic surface:	Talbot surface
A1 0-13 cm	Black (10YR 2/1) loamy sand; weak fine granular structure; very friable; common fine and few medium roots; clear smooth boundary.
A2 13-25 cm	Gray (10YR 6/1) sand; structureless; loose; few medium roots.
B1h 25-36 cm	Dark brown (7.5YR 3/2) sand; massive; weakly cemented; clear wavy boundary.
B2h 36-46 cm	Strong brown (7.5YR 5/6) sand; massive; weakly cemented; spots and streaks of dark brown (7.5YR 4/2); gradual wavy boundary.
A'2 46-96 cm	Light gray (10YR 7/2) loamy sand; very friable; few streaks and spots of brownish yellow (10YR 6/6); gradual wavy boundary.
B3h 96-162 cm	Dark reddish brown (5YR 2/2) sand; massive; weakly cemented; strongly cemented in some areas; streaks and mottles of dark brown, brownish yellow, and light gray.

* Pedon description for sites 48 and 52 is similar to that for site 38.

Water-table data

Well depth 147 cm at site 39; 152 cm at site 49; 127 cm at site 50

Month	Week	Water-table depth (cm) 39	49	50	Month	Week	Water-table depth (cm) 39	49	50
Jan.	1	88	90	82	July	27	104	107	89
	2	83	89	84		28	94	98	82
	3	84	90	86		29	86	95	76
	4	85	97	90		30	84	96	83
Feb.	5	86	107	94	Aug.	31	81	97	89
	6	86	113	97		32	95	107	106
	7	84	109	96		33	97	109	106
	8	80	98	86		34	85	117	102
						35	52	108	85
Mar.	9	73	86	75	Sept.	36	36	108	78
	10	70	76	45		37	31	103	75
	11	66	73	65		38	35	108	78
	12	73	80	70		39	58	110	90
	13	80	87	76					
Apr.	14	82	90	79	Oct.	40	83	113	104
	15	83	91	80		41	108	116	117
	16	83	92	80		42	43	116	117
	17	96	106	88		43	104	122	120
May	18	102	101	92	Nov.	44	102	125	123
	19	108	117	96		45	97	129	126
	20	105	113	94		46	97	126	125
	21	107	116	99		47	102	124	124
						48	106	120	120
June	22	110	118	104	Dec.	49	112	118	118
	23	112	126	113		50	110	117	117
	24	121	126	113		51	110	115	116
	25	118	121	106		52	75	118	118
	26	112	114	98					

	39	49	50
Prob. >F =	0.0007	0.0080	0.0088
r^2 =	0.788	0.723	0.683

Vegetation*--site 49

(longleaf pine-forest type--No. 70)

Scientific name	Common name
Overstory	
Trees	
Pinus palustris Mill.	longleaf pine (scattered)
Understory	
Trees and shrubs	
Ilex glabra (L.) Gray	inkberry (bitter gallberry)
Ilex laevigata (Pursh) A. Gray	smooth winterberry
Magnolia virginiana L.	sweetbay magnolia
Myrica cerifera L.	southern waxmyrtle
Quercus laevis Walt.	turkey oak
Grasses	
Aristida stricta Michx.	pineland threeawn
Ferns	
Pteridium aquilinum (L.) Kuhn.	bracken

* Vegetation at sites 39 and 50 is the same as that at site 38.

Pedon Description--Site 39*

Series:	Leon
Classification:	Aeric Haplaquod, sandy, siliceous, thermic
Location:	Southwest of Pine Valley private school along Woods Road in New Hanover County, NC. Exact location shown on New Hanover County photo 3GG-18
Slope and geomorphic surface:	0-1 percent; lower Coastal Plain
A1 0-8 cm	Very dark gray (10YR 2/1) sand; structureless; loose; many clean sand grains; few fine roots; clear smooth boundary.
A2 8-61 cm	Gray (10YR 6/1) sand; structureless; loose; abrupt wavy boundary.
B1h 61-107 cm	Very dark gray (5YR 3/1) sand; massive; weakly cemented; clear smooth boundary.
B2h and C1 107-119 cm	Black (5YR 2/1) and light gray (10YR 7/1) stratified sand; structureless; loose diffuse boundary.
B3h 119-162	Dark reddish brown (5YR 2/2) sand; massive; weakly cemented.

* Pedon description for sites 49 and 50 is similar to that for site 39.

Water-table data

Well depth--147 cm at site 40; 152 cm at site 47

Month	Week	Water-table depth		Month	Week	Water-table depth		Month	Week	Water-table depth	
		40	47			40	47			40	47
		cm				cm				cm	
Jan.	1	56	85	May	18	86	102	Sept.	36	22	94
	2	57	80		19	94	109		37	19	88
	3	58	79		20	91	106		38	21	37
	4	59	80		21	92	111		39	46	103
Feb.	5	62	86	June	22	95	117	Oct.	40	71	113
	6	63	87		23	102	128		41	97	48
	7	60	83		24	103	129		42	98	121
	8	56	77		25	96	125		43	94	127
					26	88	121				
Mar.	9	49	69	July	27	78	116	Nov.	44	87	130
	10	46	67		28	68	109		45	81	132
	11	42	64		29	60	105		46	80	129
	12	50	72		30	86	106		47	82	126
	13	58	80						48	82	127
Apr.	14	63	82	Aug.	31	110	106	Dec.	49	84	122
	15	64	84		32	--	113		50	83	122
	16	64	84		33	--	116		51	82	120
	17	78	97		34	116	117		52	85	123
					35	62	102				

	40	47
Prob.> F	= 0.0001	0.0017
r^2	= 0.882	0.717

Vegetation

Vegetation at site 40 is the same as that at site 38. There is no vegetation at site 47.

Pedon Description--site 40*

Series:	Leon
Classification:	Aeric Haplaquod, sandy, siliceous, thermic
Location:	Southwest of Pine Valley private school along Woods Road in New Hanover County, NC. Exact location shown in New Hanov r County photo 3GG-18
Slope and geomorphic surface:	0-1 percent; lower Coastal Plain
A1 0-10 cm	Very dark gray (10YR 3/1) loamy sand; weak fine granular structure; very friable; common fine and medium roots; many clean sand grains; clear smooth boundary.
A2 10-25 cm	Gray (10YR 5/1) sand; single grain; loose abrupt wavy boundary.
B1h 25-41 cm	Dark reddish brown (5YR 2/2) sand; massive; weakly cemented; few clean sand grains; few medium roots; diffuse boundary.
B1h and C1 41-48 cm	Dark reddish brown (5YR 2/2), dark brown (10YR 4/3), and reddish yellow (7.5YR 6/6) sand; loose; few concr tions and streaks weakly cemented; gradual wavy boundary.
C1 48-76 cm	Gray (10YR 6/1) sand; single grain; loose; many dark r ddish brown and reddish yellow distinct coarse mottles; clear irregular boundary.
B2h 76-162 cm	Black (5YR 2/1) and dark reddish brown (5YR 2/2, 3/3) sand; weakly to strongly cemented in some areas; massive; few pockets and small areas of gray sand.

* Pedon description for site 47 is similar to that for site 40.

Site 7: Lynchburg

Water-table data

W l l depth--246 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	208	May	18	112	Sept.	36	--
	2	180		19	99		37	--
	3	162		20	68		38	--
	4	122		21	71		39	--
F b.	5	79	June	22	91	Oct.	40	137
	6	20		23	89		41	0
	7	36		24	81		42	2
	8	56		25	119		43	89
				26	165			
Mar.	9	68	July	27	175	Nov.	44	178
	10	33		28	145		45	--
	11	33		29	124		46	213
	12	51		30	130		47	--
	13	76					48	--
Apr.	14	96	Aug.	31	178	Dec.	49	--
	15	76		32	180		50	--
	16	64		33	211		51	--
	17	81		34	--		52	188
				35	--			

Prob. > F = 0.0001
r^2 = 0.748

Vegetation

Veg tation at site 7 is the same at site 6.

Pedon Description

Series:	Lynchburg
Classification:	Aeric Paleaquult, fine loamy, siliceous, thermic
Location:	Timbered area on farm owned by Mrs. Suries near Benson, NC, about 274 m (300 yards) west of Road 1005 and 0.8 km (0.5 mile) north of the junction of Road 1005 and NC Highway 50, Johnston County, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Brandywine surface.
A1 0-18 cm	Very dark gray (10YR 3/1) loamy sand; single grain; loose; clear wavy boundary.
A2 18-36 cm	Grayish brown (2.5Y 5/2) loamy sand; single grain; loose; clear boundary.
Bte 36-61 cm	Light olive brown (2.5Y 5/4) sandy loam; many medium and fine grayish brown (2.5Y 5/2) mottles; the grayish brown bodies have many clean sand grains; massive; friable; clear boundary.
A'21 61-81 cm	Grayish brown (2.5Y 5/2) sandy loam to loamy sand; common light olive brown (2.5Y 5/4) mottles; friable; massive; clear boundary.
A'22 and Bt 81-99 cm	Grayish brown (2.5Y 5/2) sandy loam to loamy sand; many light brownish gray (2.5Y 6/2) loamy sand bodies and few yellowish brown (10YR 5/6) bodies; massive; friable; cl ar boundary.
B'21t 99-127 cm	Pale brown (10YR 6/3) and strong brown (7.5YR 5/6) sandy clay loam; common fine to medium soft yellowish red (5YR 4/6) mottles; massive; firm; slightly plastic; gradual boundary.
B'22t 127-162 cm	Light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) sandy clay loam; common soft smeary yellowish red (5YR 4/6) mottles; massive; friable; gradual boundary.

B31

162-213 cm — Light brownish gray (10YR 6/2) sandy clay loam; common soft red (2.5YR 4/8) and light brownish yellow (10YR 6/4) mottles; massive; friable; clear boundary.

B32

213-243 cm — Red (2.5YR 5/6) sandy loam; common light brownish gray (10YR 6/2) sandy clay loam bodies; clear boundary.

C

243-284+ cm — Light yellowish brown (10YR 6/4) sand; common gray and red streaks.

Site 19: Lynchburg

Water-table data

Well depth--609 cm

Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm
Jan.	1	38	July	13	105
	2	12		14	110
Feb.	3	9	Aug.	15	87
	4	19		16	92
Mar.	5	29	Sept.	17	109
	6	52		18	122
Apr.	7	52	Oct.	19	119
	8	85		20	128
May	9	87	Nov.	21	140
	10	96		22	151
June	11	90	Dec.	23	122
	12	103		24	122

Prob. > F = 0.0001
r^2 = 0.802

Vegetation

None; site 19 is in pasture.

Pedon Description

Series:	Lynchburg
Classification:	Aeric Paleaquult, fine loamy, siliceous, thermic
Location:	Near Newton Grove, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Coharie surface
Ap 0-30 cm	Very dark gray (10YR 3/1) sandy loam; massive; friable; abrupt boundary.
A2 30-33 cm	Pale brown (10YR 6/3) sandy loam; massive; friable; abrupt boundary.
B1 33-44 cm	Pale yellow (2.5Y 7/4) sandy loam; few medium to fine brownish yellow (10YR 6/6) mottles; massive; friable; matrix color grades to pale brown (10YR 6/6) in lower 5 cm; clear boundary.
B21t 44-61 cm	Light gray (10YR 7/2) sandy loam to sandy clay loam with common medium and coarse brownish yellow (10YR 6/6) bodies of sandy clay loam; massive; friable; clear boundary.
B22t 61-89 cm	White (10YR 8/2) sandy clay loam to sandy loam with common to many coarse yellow (10YR 7/6) mottles and few to common medium yellowish red (5YR 5/8) mottles; massive; friable; gradual boundary.
B23 89-124 cm	Yellowish brown (10YR 5/4) sandy loam with few to common medium light gray (10YR 7/1 to 7/2) mottles and common to many medium strong brown (7.5YR 5/8) mottles; massive; friable to firm; gradual boundary.
B31 124-147 cm	Light yellowish brown (10YR 6/4) sandy loam; common coarse light gray (10YR 7/2) and reddish yellow (7.5YR 6/6) mottles; massive; friable; gradual boundary.
B32 147-178+ cm	Mixed reddish yellow (7.5YR 6/6) and light gray (10YR 7/2) sandy loam; common fine yellowish red (5YR 5/8) mottles; massive; friable; base of observation 178 cm.

Site 32: Lynchburg taxadjunct

Water-table data

Well depth--229 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	150	May	18	79	Sept.	36	+5
	2	66		19	79		37	15
	3	43		20	41		38	15
	4	28		21	18		39	15
Feb.	5	30	June	22	20	Oct.	40	18
	6	+2		23	33		41	41
	7	+10		24	15		42	51
	8	+2		25	38		43	71
				26	53			
Mar.	9	2	July	27	68	Nov.	44	112
	10	+2		28	46		45	170
	11	18		29	28		46	130
	12	20		30	13		47	157
	13	48					48	157
Apr.	14	36	Aug.	31	38	Dec.	49	198
	15	30		32	20		50	178
	16	5		33	48		51	175
	17	36		34	20		52	201
				35	20			

Prob. > F = 0.0017

r^2 = 0.787

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Acer rubrum L.	red maple
Quercus nigra L.	water oak
Understory	
Trees and shrubs	
Acer rubrum L.	red maple
Carya tomentosa (Poir.) Nutt.	mockernut hickory
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)
Cornus florida L.	flowering dogwood
Ilex opaca Ait.	American holly
Myrica cerifera L.	southern waxmyrtle
Nyssa sylvatica Marsh.	black tupelo (black gum)
Oxydendrum arboreum (L.) DC.	sourwood
Persea borbonia (L.) Spreng.	redbay persea
Quercus alba L.	white oak
Quercus nigra L.	water oak
Vines	
Lonicera japonica Thunb.	Japanese honeysuckle
Smilax rotundifolia L.	common greenbrier
Vitis rotundifolia Michx.	muscadine grape
Grasses	
Arundinaria gigantea (Walt.) Muhl.	giant cane

Pedon Description

Series:	Lynchburg taxadjunct
Classification:	Aeric Paleaquult, fine loamy, siliceous, thermic
Location:	In a timbered tract south of Road 1627, northeast of Road 1628, and east of railroad tracks at northeast edge of city limits of Stantonsburg, Wilson County, NC
Slope and geomorphic surface:	0-1 percent; lower Coastal Plain, Wicomico surface
Ap 0-30 cm	Dark brown (10YR 3/3) sandy loam; many roots; weak fine subangular blocky structure; friable; abrupt boundary.
B21t 30-52 cm	Pale brown (10YR 6/3) sandy loam with common fine yellowish brown (10YR 5/8) mottles; massive; friable; clear boundary.
B22t 52-68 cm	Gray and yellowish brown (10YR 5/1 and 5/8), in about qual parts, sandy clay loam; few yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure; friable; gradual smooth boundary.
B23t 68-119 cm	Gray (10YR 5/1) strong brown (7.5YR 5/6) sandy clay loam with common fine red (2.5YR 4/6) mottles; massive; friable to firm; clear boundary.
B3 119-168 cm	Gray and strong brown (10YR 5/1 and 7.5YR 5/6) sandy clay loam to sandy clay with common fine and medium red (2.5YR 4/6) mottles; massive; firm; gradual boundary.
C 168-183 cm	Light gray (10YR 6/1) sandy clay to clay with common red (2.5YR 4/8) and brownish yellow (10YR 6/6) mottles; massive; firm; gradual boundary.
C 183-244 cm	Light gray (N 6/0) clay grading to sandy clay loam; massiv ; firm to friable; clear boundary.
C 244-290+ cm	Light gray (10YR 6/1) loamy sand; massive; friable.

Site 51: Lynn Hav n

Water-table data

Well depth--117 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	22	May	18	30	Sept.	36	17
	2	9		19	36		37	15
	3	9		20	34		38	17
	4	10		21	41		39	36
Feb.	5	11	June	22	50	Oct.	40	54
	6	12		23	61		41	73
	7	10		24	61		42	74
	8	8		25	58		43	77
				26	54			
Mar.	9	8	July	27	50	Nov.	44	79
	10	8		28	46		45	80
	11	7		29	43		46	79
	12	9		30	52		47	77
	13	9					48	74
Apr.	14	13	Aug.	31	61	Dec.	49	73
	15	14		32	74		50	73
	16	14		33	75		51	73
	17	24		34	59		52	74
				35	36			

Prob. >F = 0.0003
r^2 = 0.762

Vegetation

Vegetation at site 51 is the same as that at site 43.

Pedon Description

Series:	Lynn Haven
Classification:	Typic Haplaquod, sandy, siliceous, thermic
Location:	1.4 km (0.9 mile) east of NC highway 132 on Road 1327; 1.3 km (0.8 mile) north on ponded and dirt road, west on Woods Road 1,097 m (3,600 feet), New Hanover County, NC. Exact location of site 5l is shown on New Hanover County photo 3GG-42
Slope and geomorphic surface:	0-l percent; lower Coastal Plain
Al 0-30 cm	Black (10YR 2/1) sand containing enough organic matter to give loamy appearance; weak granular structure; many fin and medium roots; many clean sand grains; clear smooth boundary.
A2 30-43 cm	Gray (10YR 6/1) sand; single grain; loose; clear wavy boundary.
Blh 43-162 cm	Black (5YR 2/1) sand; massive; weakly to somewhat strongly cemented in places; some streaks, pockets, and tongues of gray sand to a depth of 102 to 127 cm (40 to 50 in); appear to be root channels and stump holes at a depth of 147 to 162 cm.

Site 26: Murville

Water-table data

Well depth--178 cm

Month	Week	Water-table depth	Month	Week	Water table depth
		cm			cm
Jan.	1	+13	July	13	+19
	2	+17		14	+14
Feb.	3	+18	Aug.	15	+19
	4	+18		16	+17
Mar.	5	+13	Sept.	17	+16
	6	4		18	+16
Apr.	7	4	Oct.	19	+7
	8	43		20	18
May	9	14	Nov.	21	18
	10	19		22	14
June	11	+24	Dec.	23	29
	12	+14		24	56

Prob. > F = 0.0022

r^2 = 0.687

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Acer rubrum L.	red maple
Magnolia virginiana L.	sweetbay magnolia
Pinus palustris Mill.	longleaf pine
Pinlus serotina Michx.	pond pine
Understory	
Trees and shrubs	
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)
Ilex glabra (L.) Gray	inkberry (bitter gallberry)
Ilex opaca Ait.	American holly
Leucothoe racemosa (L.) Gray	sweetbells Leucothoe (fetter bush) (dominant)
Nyssa sylvatica Marsh.	black tupelo (black gum)
Persea borbonia (L.) Spreng.	redbay persea (dominant)
Vaccinium stamineum L.	common deerberry (squaw huckleberry)
Ferns	
Osmunda spp. L.	Osmunda fern

Pedon Description

Series:	Murville*
Classification:	Typic Haplaquod, sandy, siliceous, thermic
Location:	About 0.6 km (0.4 mile) south of the junction of Roads 1103 and 1105 on Road 1103, then 0.2 km (0.1 mile) east of Road 1103, Lenoir County, NC
Slope and geomorphic surface:	0 percent; middle Coastal Plain, Sunderland surface
A1 0-10 cm	Black (5YR 2/1), slick, greasy sand or loamy sand; organic matter masks the mineral texture; moderate medium granular structure; friable; about 20 percent clean sand grains; many roots; abrupt indistinct (visually) boundary.
Bh1 10-23 cm	Darker than black (5YR 2/1) sand to loamy sand; somewhat greasy feeling, but less so than in A1 horizon; massive; firm to friable and slightly brittle; few to no clean sand grains; gradual boundary.
A2 23-30 cm	Gray (10YR 5/1) sand; single grain; loose; abrupt smooth boundary.
Bh2 30-46 cm	Black (5YR 2/1) loamy sand; massive; firm to friable and slightly brittle; clear smooth boundary.
Bh3 46-180+ cm	Very dark gray (10YR 3/1 but closer to 7.5YR) loamy sand; massive; friable; all grains coated with organic matter.

* Se soil no. S69NC54-1 (National Soil Survey Laboratory, Lincoln, Nebraska, pedon number) for laboratory data pertaining to a similar pedon.

Water-table data

Well depth--147 cm at sites 35, 36, and 37; 91 cm at site 53

Month	Week	Water-table depth (cm)				Month	Week	Water-table depth (cm)			
		35	36	37	53			35	36	37	53
Jan.	1	+2	+2	+1	8	July	27	63	45	30	30
	2	+3	+3	+2	2		28	50	36	23	25
	3	+3	+3	+3	2		29	24	28	18	24
	4	+2	+2	+3	3		30	39	30	22	35
Feb.	5	+1	+1	+3	4	Aug.	31	36	30	24	45
	6	0	+1	+3	5		32	49	45	36	58
	7	+1	+1	+3	3		33	52	47	38	60
	8	+1	+1	+3	3		34	44	38	30	43
							35	16	14	12	21
Mar.	9	+1	+1	+2	2	Sept.	36	+3	+3	+3	1
	10	0	+1	+2	3		37	+4	+4	+3	1
	11	+1	+1	+2	3		38	+3	+3	+3	1
	12	4	+1	+1	4		39	18	15	13	17
	13	13	1	0	6						
Apr.	14	14	1	0	6	Oct.	40	34	30	23	31
	15	16	2	0	7		41	52	46	26	47
	16	16	2	0	7		42	53	47	37	48
	17	29	8	5	16		43	51	38	29	52
May	18	34	14	10	21	Nov.	44	45	24	17	53
	19	40	19	17	27		45	40	13	6	54
	20	35	15	14	25		46	36	10	4	52
	21	44	28	23	28		47	30	8	4	51
							48	21	3	1	49
June	22	54	42	33	30	Dec.	49	14	2	1	47
	23	71	62	47	36		50	14	1	1	47
	24	71	62	47	36		51	12	1	0	46
	25	70	56	43	35		52	17	1	0	48
	26	67	52	37	32						

	35	36	37	53
Prob. >F =	0.0001	0.0023	0.0075	0.0011
r^2 =	0.774	0.651	0.715	0.720

Vegetation--sites 35, 36, and 37[1/, 2/]

(pond pine-forest type--No. 98)

Scientific name	Common name
Overstory	
Trees	
Pinus palustris Mill.	longleaf pine (scattered)
Understory	
Trees and shrubs	
Cyrilla racemiflora L.	American cyrilla (titi)
Gordonia lasianthus (L.) Ellis	loblolly gordonia
Ilex coriacea (Pursh) Chapm.	large gallberry
Ilex glabra (L.) Gray	inkberry (bitter gallberry)
Liquidambar styraciflua L.	American sweetgum
Magnolia virginiana L.	sweetbay magnolia
Myrica cerifera L.	southern waxmyrtle
Myrica cerifera var. plumila Michx.	dwarf waxmyrtle
Nyssa sylvatica Marsh.	black tupelo (black gum)
Vaccinium crassifolium Andr.	creeping blueberry
Vines	
Smilax laurifolia L.	laurel greenbrier (bamboo)
Grasses	
Andropogon gerardii Vitman	big bluestem
Ferns	
Pteridium aquilinum (L.) Kuhn.	bracken

1/ Pond pines do not grow in the immediate vicinity of sites 35, 36, and 37.
2/ Sit 53 is cultivated.

Pedon Description--Site 35*

Series:	Murville
Classification:	Typic Haplaquod, sandy, siliceous, thermic
Location:	On Emmert property 488 m (1,600 feet) east of NC Highway 132 and 7.6 m (25 feet) north of a canal, New Hanover County, NC
Slope and geomorphic surface:	0-1 percent; lower Coastal Plain
A1 0-20 cm	Black (7.5YR N/2) loamy sand; enough organic matter to give mucky appearance; weak granular structure to structur less; very friable when dry; many clean sand grains and many fine and medium-size roots; diffuse boundary.
B1h 20-114 cm	Black (10YR 2/1) loamy sand; massive; weakly cemented in places; sodium fluoride very strong reaction; few to common roots and pores in upper part of horizon; gradual wavy boundary.
C1 114-142 cm	Pale brown (10YR 6/3) sand; structureless; loose; abrupt wavy boundary.
B'2 142-151 cm	Pale brown (10YR 6/3) sandy clay loam; weak fine subangular blocky structure; friable; abrupt wavy boundary.
C2 151-162 cm	Light brownish gray (10YR 6/2) sand; structureless; loose.

* Pedon description for sites 36, 37, and 53 is similar to that for site 35.

Sit 41, 42, and 43: Murville

Wat r-table data

Well depth--147 cm at sites 41, 42, and 43

Month	Week	Water-table depth			Month	Week	Water-table depth		
		41	42	43			41	42	43
		cm					cm		
Jan.	1	14	4	1	July	27	52	46	19
	2	8	3	0		28	46	37	15
	3	8	0	0		29	42	32	13
	4	9	1	0		30	49	36	30
Feb.	5	14	1	0	Aug.	31	46	40	47
	6	14	1	0		32	64	52	68
	7	10	0	0		33	66	54	69
	8	9	0	0		34	57	42	49
						35	34	19	23
Mar.	9	8	0	0	Sept.	36	17	+1	+1
	10	9	0	0		37	12	+2	+1
	11	8	0	0		38	17	+1	0
	12	12	3	0		39	36	26	24
	13	17	8	1					
Apr.	14	16	8	1	Oct.	40	56	49	46
	15	18	10	1		41	74	74	70
	16	18	10	1		42	74	75	70
	17	31	19	7		43	64	57	50
May	18	36	24	13	Nov.	44	49	40	29
	19	43	30	19		45	35	20	8
	20	41	27	17		46	31	17	7
	21	38	33	24		47	26	16	10
						48	19	14	14
June	22	52	39	33	Dec.	49	14	14	17
	23	63	50	44		50	14	14	17
	24	63	50	45		51	12	12	16
	25	60	50	37		52	10	15	12
	26	57	48	29					

	41	42	43
Prob. >F =	0.0011	0.0012	0.0006
r^2 =	0.678	0.655	0.699

Vegetation

(pond pine-forest type--No. 98)

Scientific name	Common name
Overstory	
Trees	
Pinus serotina Michx.	pond pine
Understory	
Trees and shrubs	
Cyrilla racemiflora L.	American cyrilla (titi)
Gordonia lasianthus (L.) Ellis	loblolly-bay gordonia
Ilex coriacea (Pursh) Chapm.	large holly
Ilex glabra (L.) Gray	inkberry (bitter gallberry)
Ilex laevigata (Pursh) A. Gray	smooth winterberry
Lyonia lucida (Lam.) K. Koch	fetterbush lyonia
Magnolia virginiana L.	sweetbay magnolia
Persea borbonia (L.) Spreng.	redbay persea
Vines	
Smilax laurifolia L.	laurel greenbrier
Grasses	
Andropogon gerardii Vitman	big bluestem
Ferns	
Pteridium aquilinum (L.) Kuhn.	braken
Mosses	
Sphagnum spp.	sphagnum moss

Pedon Description--Site 41*

Series:	Murville
Classification:	Typic Haplaquod, sandy; siliceous, thermic
Location:	About 1.6 km (1 mile) east of Murrayville, NC, along Paper Company Road. Exact location shown on New Hanover County photo 3GG-60
Slope and geomorphic surface:	0 percent; lower Coastal Plain
A1	
0-41 cm	Black (N 2/0) loamy sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; gradual smooth boundary.
B1h	
41-124 cm	Black and very dark gray (10YR 2/1 to 3/1) loamy sand; massive; weakly cemented; few clean sand grains; strongly acid; gradual smooth boundary.
C1	
124-147 cm	Dark grayish brown (10YR 4/2) sand; single grain; loose; strongly acid; gradual boundary.
C2	
147-162 cm	Brownish yellow (10YR 6/6) and very pale brown (10YR 7/4) sand; single grain; loose; strongly acid.

* Pedon description for sites 42 and 43 is similar to that for site 41.

Sites 13 and 15: Norfolk

Water-table data*

Well depth--609 cm at sites 13 and 15

Month	Week	Water-table depth		Month	Week	Water-table depth		Month	Week	Water-table depth	
		13	15			13	15			13	15
		cm				cm				cm	
Jan.	1	480	114	May	18	416	149	Sept.	36	564	143
	2	508	--		19	424	--		37	604	--
	3	498	91		20	429	167		38	592	156
	4	437	--		21	447	--		39	498	--
Feb.	5	368	83	June	22	455	154	Oct.	40	416	193
	6	336	--		23	427	--		41	373	--
	7	342	90		24	427	--		42	455	214
	8	330	--		25	439	164		43	498	--
					26	478	--				
Mar.	9	305	122	July	27	470	144	Nov.	44	523	213
	10	295	--		28	465	--		45	510	--
	11	279	--		29	465	158		46	472	--
	12	320	130		30	462	--		47	526	145
	13	320	--						48	--	--
Apr.	14	375	128	Aug.	31	483	147	Dec.	49	--	98
	15	358			32	485	--		50	--	--
	16	386	149		33	513	--		51	--	64
	17	396			34	526	155		52	--	--
					35	556	--				

	13	15
Prob. >F =	0.0001	0.0001
r^2 =	0.782	0.797

* Semimonthly (15-day) water level.

Vegetation

None; sites 13 and 15 are cultivated.

Pedon Description--Site 13*

Series:	Norfolk
Classification:	Typic Paleudult, fine loamy, siliceous, thermic
Location:	Near Newton Grove, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Coharie surface
Ap 0-23 cm	Dark grayish brown (10YR 4/2) loamy sand; single grain; loose; abrupt boundary.
A2 23-38 cm	Yellowish brown (10YR 5/4) loamy sand; single grain; loose; abrupt boundary.
B1 38-48 cm	Yellowish brown (10YR 5/6) sandy clay loam; massive; friable; clear boundary.
B21t 48-84 cm	Strong brown (7.5YR 5/6) sandy clay loam; common yellowish brown (10YR 5/6) mottles; massive; friable; gradual boundary.
B22t 84-114 cm	Strong brown to yellowish brown (7.5YR 5/6 to 10YR 5/6) sandy clay loam; weak fine subangular blocky structure; gradual boundary.
B23t 114-168 cm	Yellowish brown (10YR 5/6) sandy clay loam, 5 percent less clay than in the B22t horizon; common yellowish red (5YR 4/6) mottles; friable; gradual boundary.
B31 168-208 cm	Yellowish brown (10YR 5/6) sandy loam or sandy clay loam; common medium grayish brown (10YR 5/2) mottles; few slightly brittle red (2.5YR 4/6) mottles near base; massive; friable; gradual boundary.
B32 208-229 cm	Variegated red (2.5YR 4/6), yellowish brown (10YR 5/6), and light brownish gray (10YR 6/2) sandy loam; massive; friable; clear boundary.
C 229-312+ cm	Brown (10YR 5/3) sandy loam to sandy clay loam; common medium light brownish gray and brownish yellow (10YR 6/2 and 6/8) mottles; massive; friable.

* Pedon description for site 15 is similar to that for site 13.

Water-table data

Well depth--609 cm at sites 16, 17, and 18

Month	Week	Water-table depth			Month	Week	Water-table depth		
		16	17	18			16	17	18
		cm					cm		
Jan.	1	41	41	38	July	13	96	86	107
	2	27	27	18		14	121	102	117
Feb.	3	16	29	18	Aug.	15	119	99	97
	4	27	51	30		16	152	124	170
Mar.	5	50	57	46	Sept.	17	158	130	249
	6	59	56	48		18	145	117	221
Apr.	7	51	51	53	Oct.	19	140	109	114
	8	72	68	71		20	142	107	55
May	9	74	68	61	Nov.	21	166	124	99
	10	105	91	79		22	152	127	267
June	11	98	86	79	Dec.	23	139	127	376
	12	112	96	112		24	137	135	335

	16	17	18
Prob. >F =	0.0001	0.0001	0.0001
r^2 =	0.820	0.798	0.833

Vegetation

(loblolly pine-hardwood forest type--No. 81 and 82)

Scientific name	Common name	Site 16	Site 17	Site 18
Overstory				
Trees				
Pinus taeda L.	loblolly pine	X	X	X
Quercus falcata Michx.	southern red oak		X	X
Quercus marilandica Muenchh.	blackjack oak			X
Quercus nigra L.	water oak		X	
Understory				
Trees and shrubs				
Acer rubrum L.	red maple	X		X
Amelanchier conadensis (L.) Medic.	shadblow serviceberry	X		
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)	X		X
Cornus florida L.	flowering dogwood	X		
Diospyros virginiana L.	common persimmon			
Gaylussacia dumosa (Andr.) Torr & Gray	dwarf huckleberry		X	
Gaylussacia frondosa (L.) Torr. & Gray	dangleberry		X	
Ilex glabra (L.) Gray	inkberry	X	X	X
Liquidambar styraciflua L.	American sweetgum	X	X	X
Myrica cerifera L.	southern waxmyrtle	X		X
Nyssa sylvatica Marsh.	black tupelo (black gum)	X	X	X
Oxydendrum arboreum (L.) DC.	sourwood	X		
Quercus falcata Michx.	southern red oak	X	X	
Quercus marilandica Muenchh.	blackjack oak	X		X
Quercus nigra L.	water oak	X		X
Quercus sellata Wangenh.	post oak	X		X
Rhododendron nudiflorum (L.) Torr.	pinxterbloom azalea		X	
Rhus copallinum L.	winged sumac		X	
Vaccinium elliottii Chapm.	Elliott blueberry		X	
Vaccinium spp. L.	blueberry	X		X
Vines				
Smilax rotundifolia L.	common greenbrier	X	X	X
Vitis rotundifolia Michx.	muscadine grape		X	
Ferns				
Pteridium aquilinum (L.) Kuhn.	bracken	X		
Grasses				
Andropogon virginicus L.	broomsedge bluestem		X	
Herbs				
Desmodium spp. Desv.	tickclover	X	X	
Eupatorium spp. L.	thoroughwort		X	

Pedon Description--Site 18*

Series:	Norfolk
Classification:	Typic Paleudult, fine loamy, siliceous, thermic
Location:	Near Newton Grove, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Coharie surface
A1 0-13 cm	Very dark grayish brown (10YR 3/2) sandy loam; friable; clear boundary.
A2 13-25 cm	Pale brown (10YR 6/3) sandy loam; massive; friable; clear boundary.
B1 25-38 cm	Light yellowish brown (10YR 6/4) sandy loam, finer textur d than that in the A1 and A2 horizons; massive; friable; gradual boundary.
B21te 38-66 cm	Brownish yellow (10YR 6/6) sandy clay loam with common pale brown (10YR 6/3) bodies of sandy loam; massive; friable; clear boundary.
B22te 66-89 cm	Brownish yellow (10YR 6/8 and 6/6) sandy clay loam; common very pale brown (10YR 7/4) mottles; weak subangular blocky structure; friable; clear boundary.
B23t 89-140 cm	Brownish yellow (10YR 6/6) sandy clay loam; few to common soft smeary red (2.5YR 4/6) mottles and common fine pale brown and light brownish gray (10YR 6/3 and 6/2) mottles; massive; friable; gradual boundary.
B31 140+ cm	Brownish yellow (10YR 6/6 to 6/8) sandy loam to sandy clay loam; thin discontinuous clay films on rare cl avag ; few red and gray mottles; color changes to light gray (10YR 7/1) at 230 cm.

* Pedon description for sites 16 and 17 is similar to that for site 18.

Site 8: Rains

Water-table data

Well depth--284 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	183	May	18	79	Sept.	36	--
	2	152		19	74		37	--
	3	137		20	51		38	--
	4	91		21	53		39	--
Feb.	5	58	June	22	64	Oct.	40	165
	6	10		23	58		41	+23
	7	23		24	53		42	+15
	8	33		25	89		43	79
				26	132			
Mar.	9	41	July	27	142	Nov.	44	86
	10	15		28	117		45	277
	11	15		29	104		46	231
	12	28		30	109		47	--
	13	43					48	--
Apr.	14	61	Aug.	31	152	Dec.	49	--
	15	46		32	152		50	--
	16	36		33	183		51	--
	17	48		34	--		52	162
				35	--			

Prob. >F = 0.0001

r^2 = 0.758

Vegetation

(loblolly pine-forest type--No. 81)

Scientific name	Common name
Overstory	
Trees	
Pinus taeda L.	loblolly pine
Understory	
Trees and shrubs	
Acer rubrum L.	red maple
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)
Cornus florida L.	flowering dogwood
Diospyros virginiana L.	common persimmon
Ilex opaca Ait.	American holly
Magnolia virginiana L.	Sweetbay magnolia
Nyssa sylvatica Marsh.	black tupelo (black gum)
Oxydendrum arboreum (L.) DC.	sourwood
Quercus falcata Michx.	southern red oak
Quercus nigra L.	water oak
Quercus phellos L.	willow oak
Rhus copallinum L.	flameleaf sumac or winged sumac
Sorbus arbutifolia (L.) Heynhold	red chokeberry
Symplocos tinctoria (L.) L'Hér.	common sweetleaf (hors sugar)
Vaccinium vacillans Torr.	low blueberry
Vines	
Gelsemium sempervirens (L.) Ait. f.	Carolina jessamine (yellow)
Smilax rotundifolia L.	common greenbrier
Vitis rotundifolia Michx.	muscadine grape

Pedon Description

Series:	Rains*
Classificati n:	Typic Paleaquult, fine loamy, siliceous, thermic
Location:	Timbered area on farm owned by Mrs. Surles near Benson, NC about 274 m (300 yards) west of Road 1005 and 0.8 km (0.5 mile) north of the junction of Road 1005 and NC Highway 50, Johnston County, NC

Geomorphic surface: Brandywine surface

A1 0-13 cm	Black (10YR 2/1) sandy loam; weak fine granular structure; friable; clear boundary.
A2g 13-36 cm	Gray (10YR 5/1) sandy loam; massive; friable; clear boundary.
B21tg 36-76 cm	Gray (10YR 5/1) sandy clay loam to sandy loam with common medium yellowish brown (10YR 5/4) mottles; massive; friable; slightly plastic; clear boundary.
B22te 76-102 cm	Gray (10YR 6/1) sandy clay loam to sandy loam; common fine strong brown (7.5YR 5/6) mottles; part of the gray has irregular small bodies of clean sand grains; massive; friable; clear wavy boundary.
B23t 102-137 cm	Light brownish gray (10YR 6/2) sandy clay loam; strong brown (7.5YR 5/6) and common yellowish red (5YR 4/8) mottles; massive; friable; gradual boundary.
B24t 137-162 cm	Yellowish brown (10YR 5/4) sandy clay loam with many fine to medium yellowish brown (10YR 5/8) and common gray (10YR 5/1) mottles; some of the gray bodies are sandy loam; massive; firm; clear boundary.

* See soil no. S65NC51-2 (National Soil Survey Laboratory, Lincoln, Nebraska, pedon number) for laboratory data pertaining to a similar pedon.

B25t 162-190 cm	Yellowish brown (10YR 5/4) sandy clay loam grading to nearly sandy loam; many medium gray (10YR 5/1) mottles and few fine soft smeary red (2.5YR 4/8) mottles; massive; firm; clear boundary.
B3 190-244 cm	Brown (10YR 5/3) sandy loam; common coarse gray (10YR 6/1) mottles in lower part; massive; friable; abrupt boundary.
C 244-289+ cm	Brownish yellow (10YR 6/6) loamy sand; nearly fluid ben ath water table.

Site 10: Rains

Water-table data

W l l depth--289 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	147	May	18	102	Sept.	36	--
	2	180		19	96		37	--
	3	173		20	99		38	--
	4	142		21	132		39	--
F b.	5	102	June	22	155	Oct.	40	160
	6	94		23	145		41	48
	7	107		24	145		42	56
	8	102		25	168		43	150
				26	216			
Mar.	9	86	July	27	226	Nov.	44	221
	10	84		28	213		45	254
	11	64		29	213		46	216
	12	84		30	221		47	--
	13	58					48	—
Apr.	14	91	Aug.	31	246	Dec.	49	--
	15	71		32	251		50	--
	16	96		33	279		51	--
	17	96		34	--		52	--
				35	--			

Prob. >F = 0.0001

r^2 = 0.692

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Liquidambar styraciflua L.	American sweet gum
Pinus taeda L.	loblolly pine
Prunus serotina Ehrh.	black cherry (wild)
Quercus falcata Michx.	southern red oak
Quercus phellos L.	willow oak
Understory	
Trees and shrubs	
Acer rubrum L.	red maple
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)
Nyssa sylvatica Marsh.	black tupelo (black gum)
Oxydendrum arboreum (L.) DC.	sourwood
Quercus alba L.	white oak
Quercus falcata Michx.	southern red oak
Symplocos tinctoria (L.) L'Hér.	common sweetleaf (horse sugar)
Vaccinium vacillans Torr.	low blueberry
Vines	
Smilax rotundifolia L.	common greenbrier
Vitis rotundifolia Michx.	muscadine grape
Grasses	
Arundinaria gigantea (Walt.) Muhl.	giant cane

Pedon Description

Series:	Rains*
Classification:	Typic Paleaquult, fine loamy, siliceous, thermic
Location:	Near Newton Grove, NC
Slope and geomorphic surface:	0 percent; middle Coastal Plain, Coharie surface
Ap 0-20 cm	Very dark gray (10YR 3/1) loamy sand to sandy loam; weak fine granular structure; friable; abrupt smooth boundary.
A and B 20-30 cm	Intermixed light brownish gray and dark gray (10YR 6/2 and 4/1) sandy loam; weak fine subangular blocky structure; friable; clear smooth boundary.
B21tg 30-61 cm	Light brownish gray (10YR 6/2) sandy clay loam; common medium yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; few thin discontinuous clay films; few pores lined with clean sand; friable; gradual smooth boundary.
B22tg 61-102 cm	Gray (10YR 6/1) sandy loam to sandy clay loam; common medium to coarse yellowish brown (10YR 5/6) mottles; weak coarse angular to subangular blocky structure; thin discontinuous gray clay films on few peds; gradual smooth boundary.
B23tg 102-135 cm	Gray (10YR 6/1) sandy clay loam, 5 percent more clay than in the B21 and B22 horizons; common medium and coarse strong brown (7.5YR 6/8) mottles; weak medium to coarse angular to subangular blocky structure; thin nearly continuous gray and brown clay films on peds; firm; clear smooth boundary.
B24tg 135-168 cm	Gray (10YR 6/1) sandy clay loam to sandy clay; common medium yellowish brown (10YR 5/6) mottles and common medium soft smeary red (10YR 5/8) bodies mottled with yellow; very weak coarse angular blocky structure; thick to thin continuous to discontinuous clay films on ped faces and in a few pores; clear smooth boundary.

* See soil S65NC80-3 (National Soil Survey Laboratory, Lincoln, Nebraska, pedon number) for laboratory data.

B3

168-224 cm — Gray (10YR 6/1) sandy clay loam to sandy clay; common coarse yellowish brown mottles; massive; firm; common patchy clay films along cleavage faces; clear smooth boundary.

C

224-289 cm — Variegated white and light gray (10YR 8/1 and 6/1) sandy clay to sandy clay loam; vertically stratified beds with fine sand and beds with coarse sand; a few clay bridges at a depth of 289 cm.

Site 33: Rains

Water-table data

Well depth--210 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	117	May	18	68	Sept.	36	+8
	2	46		19	66		37	5
	3	25		20	28		38	8
	4	13		21	2		39	8
Feb.	5	13	June	22	2	Oct.	40	8
	6	+10		23	8		41	23
	7	+10		24	0		42	36
	8	+5		25	10		43	56
				26	25			
Mar.	9	+2	July	27	28	Nov.	44	96
	10	+5		28	18		45	142
	11	8		29	0		46	109
	12	8		30	+2		47	147
	13	30					48	160
Apr.	14	28	Aug.	31	15	Dec.	49	198
	15	25		32	13		50	178
	16	5		33	33		51	188
	17	30		34	13		52	196
				35	10			

Prob. >F = 0.0018
r^2 = 0.785

Vegetation

Vegetation at site 33 is similar to that at site 32.

Pedon Description

Series:	Rains
Classification:	Typic Paleaquult, fine loamy, siliceous, thermic
Location:	In a timbered tract south of Road 1628, northeast of Road 1628, and east of railroad tracks at northeast edge of city limits of Stantonsburg, Wilson County, NC
Slope and geomorphic surface:	0-1 percent; lower Coastal Plain, Wicomico surface
A1 0-15 cm	Very dark grayish brown (10YR 3/2) loamy sand; massive to weak irregularly shaped aggregates; very friable; clear smooth boundary.
A2 15-38 cm	Dark gray (10YR 4/1) loamy sand; massive; friable; abrupt smooth boundary.
B21t 38-76 cm	Gray (10YR 5/1) and yellowish brown (10YR 5/6), in equal amounts, sandy clay loam to sandy clay; weak fine subangular blocky structure; friable to firm; gradual boundary.
B22t 76-114 cm	Gray (10YR 5/1) and yellowish brown (10YR 5/6), in equal amounts, sandy clay loam; massive; firm; clear boundary.
B3 114-137 cm	Gray (10YR 5/1) sandy clay loam that has much less clay than the B21 and B22 horizons; massive; friable; clear boundary.
C 137-290 cm	Gray (10YR 6/1) coarse sandy loam grading to coarse sand; massive; friable to very friable.

Site 46: Rimini

Water-table data

Well depth--185 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	109	May	18	129	Sept.	36	84
	2	104		19	135		37	82
	3	107		20	132		38	85
	4	107		21	136		39	106
Feb.	5	104	June	22	141	Oct.	40	128
	6	104		23	151		41	151
	7	102		24	152		42	152
	8	99		25	136		43	151
				26	132			
Mar.	9	92	July	27	118	Nov.	44	149
	10	89		28	110		45	149
	11	86		29	102		46	149
	12	94		30	118		47	145
	13	104					48	138
Apr.	14	129	Aug.	31	135	Dec.	49	133
	15	135		32	167		50	132
	16	132		33	168		51	131
	17	136		34	146		52	133
				35	43			

Prob. > F = 0.0003
r^2 = 0.795

Vegetation

Vegetation at site 46 is same as that at site 44.

Pedon Description

Series:	Rimini
Classification:	Grossarenic Entic Haplohumod, sandy, siliceous, thermic
Location:	1.0 km (0.6 mile) each of NC Highway 132 on Road 1327, New Hanover County, NC. Exact location shown on New Hanover County photo 3GG-40
Slope and geomorphic surface:	0-1 percent; lower Coastal Plain
A1	
0-5 cm	Dark gray (10YR 4/1) sand; single grain; few fine roots; clear smooth boundary.
A2	
5-51 cm	White (10YR 8/1) sand; single grain; slightly acid; clear wavy boundary.
A3	
51-130 cm	Very pale brown (10YR 7/4) sand; single grain; loose; few streaks and splotches of dark brown sand; irregular boundary.
B1h	
130-173 cm	Dark reddish brown (5YR 2/2), dark reddish gray (5YR 4/2), and reddish gray (5YR 5/2) sand; massive; weakly cemented; slightly acid; gradual wavy boundary.

Site 22: Toisnot

Water-table data

Well depth--81 cm at site 22-1; 279 cm at site 22-2

Month	Week	Water-table depth		Month	Week	Water-table depth		Month	Week	Water-table depth	
		22-1	22-2			22-1	22-2			22-1	22-2
		cm				cm				cm	
Jan.	1	68	211	May	18	56	76	Sept.	36	2	10
	2	30	135		19	46	71		37	28	64
	3	18	114		20	30	28		38	30	76
	4	18	84		21	25	43		39	23	71
Feb.	5	18	91	June	22	28	56	Oct.	40	8	71
	6	5	41		23	41	94		41	18	96
	7	8	81		24	28	84		42	30	162
	8	15	84		25	46	147		43	43	178
					26	53	201				
Mar.	9	18	84	July	27	53	226	Nov.	44	66	233
	10	2	10		28	36	211		45	--	246
	11	8	15		29	30	196		46	63	206
	12	20	13		30	18	173		47	68	112
	13	51	36						48	66	23
Apr.	14	61	58	Aug.	31	53	198	Dec.	49	71	+5
	15	46	58		32	23	152		50	58	+10
	16	20	36		33	48	183		51	66	+8
	17	28	41		34	23	104		52	--	71
					35	23	76				

	22-1	22-2
Prob. >F =	0.0003	0.0072
r^2 =	0.659	0.572

Vegetation

(loblolly pine-forest type--No. 81)

Scientific name	Common name
Overstory	
Trees	
Pinus taeda L.	loblolly pine
Quercus alba L.	white oak
Understory	
Trees and shrubs	
Acer rubrum L.	red maple
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)
Gaylussacia frondosa (L.) Torr. & Gray	dangleberry
Liquidambar styraciflua L.	American sweetgum
Magnolia virginiana L.	sweetbay magnolia
Nyssa sylvatica Marsh.	black tupelo (black gum)
Oxydendron arboreum (L.) DC.	sourwood
Persea borbonia (L.) Spreng.	redbay persea
Quercus alba L.	white oak
Quercus nigra L.	water oak
Sorbus arbutifolia (L.) Heynhold.	red chokeberry
Vines	
Rhus radicans L.	poison-ivy
Vitis rotundifolia Michx.	muscadine grape
Grasses	
Arundinaria gigantea (Walt.) Muhl.	giant cane

Pedon Description

Series:	Tolsnot
Classification:	Typic Fragiaquult, fine loamy, siliceous, thermic
Location:	0.35 km (0.22 mile) north-northeast of Dunns Crossroads, Wilson County, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Sunderland surface
A1 0-8 cm	Very dark gray (10YR 3/1) loamy sand to sandy loam; massive; friable; many roots; clear boundary.
A2 8-28 cm	Grayish brown (10YR 5/2) sandy loam to loamy sand; massive; friable; abrupt boundary.
B21x 28-56 cm	Light gray (10YR 6/1) and yellowish brown (10YR 5/6) sandy loam in equal amounts; few yellowish red (5YR 4/6) mottles; light gray bodies are moderately brittle sandy clay loam; yellowish brown bodies are friable sandy clay loam; brittle material has few pores and few to no uncoated sand grains; massive; gradual boundary.
B22x 56-86 cm	Same as B21x horizon, but only 25 percent of light gray bodies are brittle; clear boundary.
B23x 86-107 cm	Light brownish gray and yellowish brown (10YR 6/2 and 5/4) sandy clay loam; gray bodies are sandy loam and all are brittle (50 percent of horizon); browner bodies are friable sandy clay loam; massive; clear boundary.
B24tg 107-150 cm	Gray and yellowish brown (10YR 5/1 and 5/6) sandy clay loam with common red (2.5YR 4/8) mottles; massive; common thick dark gray clay films in channels and on cleavage faces; clear wavy boundary.
B25tg 150-198 cm	Light gray (10YR 6/1) and brownish yellow (10YR 6/6) sandy clay loam; becomes dominantly light gray near base; massive; firm; large masses of darker gray clay flows 2 cm long and 0.3 cm wide in lower part; gradual boundary.
B3 198-229 cm	Light gray (10YR 7/1) sandy loam; massive; friable; gradual boundary.

C
229-246 cm — Brownish yellow (10YR 6/6) sandy loam; clear boundary.

C
246-287 cm — Dark brown to light yellowish brown (7.5YR 4/4 to 2.5YR 6/4) sandy loam and sandy clay in vertical beds; abrupt boundary.

C
287+ cm — Yellowish brown (10YR 5/6) smooth silty clay to silty clay loam; firm.

Sit s 1, 2, and 3: Varina

Wat r-table data

Well depth--762 cm at site 1; 260 cm at site 2-1; 863 cm at site 2-2; 883 cm at site 3

Month	Week	Water-table depth				Month	Week	Water-table depth			
		1	2-1	2-2	3			1	2-1	2-2	3
		cm						cm			
Jan.	1	676	239	584	640	July	27	576	--	642	683
	2	617	190	670	734		28	584	254	650	691
	3	632	185	688	752		29	554	251	610	698
	4	607	193	668	729		30	572	248	635	676
Feb.	5	490	185	554	615	Aug.	31	541	254	612	653
	6	493	150	574	622		32	610	256	688	729
	7	488	107	579	645		33	566	--	648	686
	8	465	132	554	620		34	676	--	764	782
							35	704	--	803	798
Mar.	9	411	165	493	564	Sept.	36	--	--	--	874
	10	450	173	516	592		37	--	--	--	836
	11	457	190	518	592		38	--	--	--	841
	12	487	229	541	607		39	640	--	726	747
	13	460	--	498	556						
Apr.	14	475	--	513	566	Oct.	40	503	208	556	620
	15	493	--	528	584		41	335	124	356	647
	16	531	--	571	630		42	307	89	553	465
	17	551	--	604	655		43	396	140	454	541
May	18	523	--	589	632	Nov.	44	465	183	549	607
	19	584	--	640	673		45	536	--	617	643
	20	594	--	635	668		46	572	--	655	681
	21	594	--	632	670		47	726	--	828	803
							48	--	--	--	--
June	22	554	--	599	637	Dec.	49	--	--	--	--
	23	543	--	599	635		50	--	--	--	--
	24	566	--	625	660		51	--	--	754	--
	25	551	--	612	648		52	--	221	543	--
	26	569	--	637	678						

	1	2-1	2-2	3
Prob. > F =	0.0144	0.0125	0.0006	0.0004
r^2 =	0.564	0.570	0.674	0.691

Vegetation

None; sites 1, 2, and 3 are cultivated.

Pedon Description--Site 1 [1/] [2/]

Series:	Varina
Classification:	Plinthic Paleudult, clayey, kaolinitic, thermic
Location:	All sites on east fence line of J. Paul Creech Farm about 0.8 km (0.5 mile) west of the junction of NC Highway 50 and County Road 1305, Johnston County, NC
Slope and geomorphic surface:	0-1 percent; upper Coastal Plain, Plain View surface
Ap 0-25 cm	Dark grayish brown (10YR 4/2) loamy sand; single grain; abrupt boundary.
A2 25-46 cm	Very pale brown (10YR 7/4) loamy sand; single grain; abrupt boundary.
B21t 46-107 cm	Brownish yellow (10YR 6/6) nearly massive sandy clay; horizon changes gradually to reddish yellow (7.5YR 6/8) at 76 cm; few soft to firm redder mottles; clear boundary.
B22tpl 107-168 cm	Strong brown (7.5YR 5/6) sandy clay with common firm to extremely firm yellowish red (2.5YR 5/8 to 4/8) sesquioxide nodules; clear boundary.
B23tpl 168-213 cm	Variegated red (10YR 4/8), yellowish brown (10YR 5/8), and white (10YR 8/2) sandy clay; harsh and dry feeling; red bodies sharply separated from the yellowish brown and white bodies.
B31 213-290 cm	Variegated red (2.5YR 5/6), brownish yellow (10YR 6/6), and white (10YR 8/2) sandy clay to sandy clay loam; red bodies are soft and will stain fingers; common medium to coarse quartz gravel.
B32 290-355 cm	Like B31 horizon, but mottling pattern becomes coarser and gravel increases in abundance.

1/ Pedon description for sites 2 and 3 is similar to that for site 1.
2/ See soils no. S62NC51-6 and S62NC51-7 (National Soil Survey Laboratory, Lincoln, Nebraska, pedon number) for laboratory data pertaining to similar pedons.

Site 4: Not designated

Water-table data

Well depth--701 cm

Month	Week	Water-table depth	Month	Week	Water-table depth	Month	Week	Water-table depth
		cm			cm			cm
Jan.	1	470	May	18	439	Sept.	36	584
	2	480		19	452		37	599
	3	480		20	427		38	604
	4	465		21	427		39	498
Feb.	5	399	June	22	424	Oct.	40	384
	6	371		23	429		41	282
	7	389		24	434		42	320
	8	396		25	444		43	381
				26	470			
Mar.	9	389	July	27	475	Nov.	44	437
	10	378		28	457		45	470
	11	381		29	429		46	457
	12	399		30	432		47	566
	13	401					48	678
Apr.	14	409	Aug.	31	437	Dec.	49	--
	15	401		32	460		50	--
	16	406		33	457		51	--
	17	432		34	508		52	688
				35	538			

Prob. >F = 0.0009
r^2 = 0.662

Vegetation

None; site 4 is cultivated.

Pedon Description

Series:	Not designated
Classification:	Typic Hapludult, clayey, kaolinitic, thermic
Location:	On east fence line of J. Paul Creech Farm, about 0.8 km (0.5 mile) west of the junction of NC Highway 50 and County Road 1305, Johnston County, NC
Slope and geomorphic surface:	7 percent north; young erosional surface
Ap 0-25 cm	Dark grayish brown (10YR 4/2) loamy sand; very friable; abrupt boundary.
B21t 25-51 cm	Reddish yellow (7.5YR 6/8) sandy clay; weak fine subangular blocky structure; few fine gravels; gradual boundary.
B22t 51-81 cm	Reddish yellow (7.5YR 6/8) sandy clay loam; massive; firm; gradual boundary.
B3 81-142 cm	Reddish yellow (5YR 7/6) sandy clay loam to sandy clay with many red (2.5YR 5/6) and brownish yellow (10YR 6/6) mottles; massive; common to many gravels 2 cm across; sands are coarse; gradual boundary.
C 142+ cm	Red (2.5YR 5/6) sandy loam; many coarse white (10YR 8/1) mottles; few clay lenses 1 cm thick; base of observation 310 cm.

Site 23: Not designat d

Water-table data

Well depth--107 cm at site 23-1; 290 cm at site 23-2

Month	Week	Water-table depth		Month	Week	Water-table depth		Month	Week	Water-table depth	
		23-1	23-2			23-1	23-2			23-1	23-2
		cm				cm				cm	
Jan.	1	74	198	May	18	38	66	Sept.	36	25	96
	2	20	234		19	36	66		37	99	61
	3	+2	241		20	5	53		38	--	76
	4	+5	213		21	10	56		39	76	122
Feb.	5	+2	168	June	22	15	56	Oct.	40	2	145
	6	+10	168		23	23	86		41	+13	124
	7	8	208		24	2	102		42	+5	104
	8	13	165		25	23	122		43	25	119
					26	51	155				
Mar.	9	18	104	July	37	56	180	Nov.	44	76	168
	10	+8	81		28	38	203		45	--	188
	11	+2	89		29	23	185		46	91	231
	12	+2	74		30	13	203		47	--	157
	13	13	20						48	--	86
Apr.	14	18	23	Aug.	31	41	196	Dec.	49	--	+5
	15	15	41		32	20	231		50	--	+5
	16	2	68		33	56	196		51	--	+5
	17	18	68		34	28	178		52	--	64
					35	36	122				

	23-1	23-2
Prob. > F =	0.0001	0.0003
r^2 =	0.713	0.675

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Acer rubrum L.	red maple*
Liquidambar styraciflua L.	American sweetgum
Nyssa sylvatica Marsh.	black tupelo (black gum)*
Pinus taeda L.	loblolly pine
Quercus phellos L.	willow oak
Understory	
Trees and shrubs	
Acer rubrum L.	red maple
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)
Ilex opaca Ait.	American holly
Liquidambar styraciflua L.	American sweetgum
Magnolia virginiana L.	sweetbay magnolia
Nyssa sylvatica Marsh.	black tupelo (black gum)
Quercus nigra L.	water oak
Quercus phellos L.	willow oak
Vaccinium stamineum L.	common deerberry (squaw huckelberry)
Vines	
Smilax rotundifolia L.	common greenbrier
Grasses	
Arundinaria gigantea (Walt.) Muhl.	giant cane

* About 90 percent of the stand is Acer rubrum L. and Nyssa sylvatica Marsh.

Pedon Description

Series:	Not designated
Classification:	Fragiaquult, fine silty, siliceous, thermic
Location:	About 0.35 km (0.22 mile) north-northeast of Dunns Crossroads, Wilson County, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Sunderland surface
A1 0-20 cm	Dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; friable; many roots; clear indistinct boundary.
A2 20-43 cm	Dark gray (10YR 4/1) silt loam with common fine gray (10YR 5/1 and 6/1) streaks and mottles; massive to weak subangular blocky structure; friable; clear but indistinct boundary.
B21te 43-91 cm	Gray (10YR 6/1) silty clay loam with many coarse yellowish brown (10YR 5/6) and dark reddish brown (5YR 3/4) bodies; gray matrix is silt loam to silty clay loam; brown bodies are silty clay loam; massive; friable; clear boundary.
A'2 91-112 cm	Gray (10YR 5/1 to 6/1) silt loam; massive; friable; clear boundary.
B'21tx and A'2x 112-145 cm	Gray (10YR 7/1) silty clay loam with yellowish brown (10YR 5/6) silty clay loam bodies; massive; gray bodies of moderately to slightly brittle silty clay loam to silt loam; massive; friable to very firm; gradual boundary.
B'22te 145-173 cm	Gray (10YR 6/1) silty clay loam to silt loam; common strong brown (7.5YR 5/6) bodies of silty clay loam; few bodies of white (10YR 8/1) clear sand and silt grains; massive; friable to very firm; clear boundary.
B3t 173-213 cm	Light gray (5YR 7/2) silty clay loam with common gray (10YR 6/1) bodies; few to common light gray (10YR 5/1) clay films on cl avage; massive; firm; few mica flakes; clear to gradual boundary.
C 213-292+ cm	Strong brown (7.5YR 5/6) smooth silty clay to silty clay loam; common fine mica; massive; firm.

Site 24: Not designated

Water-table data

Well depth--162 cm

Month	Week	Water-table depth
		cm
Jan.	1	23
	2	8
Feb.	3	8
	4	8
Mar.	5	8
	6	30
Apr.	7	30
	8	76
May	9	46
	10	46
Jun	11	0
	12	0
July	13	0
	14	5
Aug.	15	5
	16	5
Sept.	17	0
	18	0
Oct.	19	25
	20	64
Nov.	21	64
	22	38
Dec.	23	30
	24	46

Prob. > F = 0.0001

r^2 = 0.837

Vegetation

(loblolly pine-forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Pinus palustris Mill.	longleaf pine
Pinus taeda L.	loblolly pine (dominant)
Quercus falcata Michx.	southern red oak
Quercus laevis Walt.	turkey oak
Quercus marilandica Muenchh.	blackjack oak
Quercus nigra L.	water oak
Quercus phellos L.	willow oak
Quercus stellata Wangenh.	post oak
Quercus velutina Lam.	black oak
Understory	
Trees and shrubs	
Liquidambar styraciflua L.	American sweetgum
Nyssa sylvatica Marsh.	black tupelo (black gum)
Symplocos tinctoria (L.) L'Hér.	common sweetleaf (horse sugar)
Vaccinimum stamineum L.	common sweetleaf (squaw huckleberry)
Vines	
Smilax rotundifolia L.	common greenbrier

Pedon Description

Series:	Not designated
Classification:	Grossarenic Entic Haplohumod, sandy, siliceous, thermic
Location:	About 0.6 km (0.4 mile) south of the junction of Roads 1103 and 1105 on Road 1103, then 0.2 km (0.1 mile) east of Road 1103, Lenoir County, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Sunderland surface
A1 and A2	
0-13 cm	Very dark grayish brown (10YR 3/2) sand; about 50 percent of horizon is clean sand grains; material held together in irregular clumps with organic matter; weak ball-like structure; very friable; abrupt smooth boundary.
A2	
13-46 cm	Yellower light yellowish brown (10YR 6/4) but redder than (2.5Y 6/4) loamy sand; single grain; loose; most grains have a yellow coating; clear but indistinct boundary.
B21t	
46-76 cm	Yellowish brown (10YR 5/8) loamy sand; distinctly more clay than in the A2 horizon; massive; friable; gradual boundary.
B22te	
76-107 cm	Brownish yellow (10YR 6/6) to olive yellow (2.5Y 6/6) loamy sand; common medium light gray (2.5Y 7/2) mottles; massive; friable, clear boundary.
B24	
107-122 cm	Brownish yellow (10YR 6/6) loamy sand to sand; many streaks and mottles of strong brown (7.5YR 5/8); massive; very friable; clear boundary.
Bh1	
122-137 cm	Grayish brown (10YR 5/2) sand; massive; very friable; clear boundary.
Bh2	
137-256+ cm	Darker than dark reddish brown (5YR 2/2) sand; massive; friable, organic material coats all grains.

Sites 27 and 28: Not designated

Water-table data

Well depth--226 cm at site 27; 103 cm at site 28

Month	Week	Water-table depth		Month	Week	Water-table depth	
		27	28			27	28
		cm				cm	
Jan.	1	126	117	July	13	132	134
	2	103	100		14	146	142
Feb.	3	99	96	Aug.	15	102	113
	4	116	105		16	121	139
Mar.	5	151	139	Sept.	17	122	152
	6	158	139		18	148	158
Apr.	7	155	141	Oct.	19	167	147
	8	175	161		20	179	147
May	9	134	134	Nov.	21	181	165
	10	157	151		22	179	200
June	11	129	135	Dec.	23	186	224
	12	161	155		24	217	265

	27	28
Prob. > F =	0.0001	0.0001
r^2 =	0.859	0.824

Vegetation

(loblolly pine-hardwood forest type--No. 82 and southern scrub oak--forest type--No. 72)

Scientific name	Common name	Site 27	Site 28
Overstory			
Trees			
Carya tomentosa (Poir.) Nutt.	mockernut hickory		X
Pinus taeda L.	loblolly pine	X	X
Quercus incana Bartr.	bluejack oak	X	
Quercus margaretta Ashe	dwarf post oak (scrubby)	X	
Quercus laevis Walt.	turkey oak	X	X
Understory			
Trees and shrubs			
Castanea pumila (L.) Mill.	chinquapin		X
Diospyros virginiana L.	common persimmon	X	X
Gaylussacia frondosa (L.) Torr. & Gray.	dwarf huckleberry	X	
Myrica cerifera L.	southern waxmyrtle	X	X
Nyssa sylvatica Marsh.	black tupelo (black gum)		X
Pinus taeda L.	loblolly pine		X
Quercus falcata Michx.	southern red oak		X
Quercus incana Bartr.	bluejack oak		X
Quercus laevis Walt.	turkey oak	X	X
Quercus margaretta Ashe	dwarf post oak (scrubby)		X
Quercus marilandica Muenchh.	blackjack oak	X	X
Quercus stellata Wangenh.	post oak		X
Vaccinium tenellum Ait.	smallcluster rabbiteye blueberry	X	X
Perennial herbs			
Cnidoscolus stimulosus (Michx.) Engelm. & A. Gray.	risky treadsoftly	X	
Subherbs			
Hypericum hypericoides (L.) Crantz.	St. Andrew's cross (St.-John's-wort)		X
Vines			
Gelksemium sempervirens (L.) Ait. f.	Carolina jessamine (yellow)	X	X
Vitis rotundifolia Michx.	muscadine grape	X	X
Grasses			
Aristida purpurascens Poir.	arrowfeather threeawn	X	

Pedon Description--Site 27*

Series:	Not designated
Classification:	Grossarenic Entic Haplohumod, sandy, siliceous, thermic
Location:	South on Road 1104 0.8 km (0.5 mile) from the junction of Road 1105, then 0.4 km (0.25 mile) east of Road 1104, Lenoir County, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Sunderland surface
A1 and A2 0-15 cm	Grayish brown to dark grayish brown (10YR 5/2 to 4/2) sand; weak ball-like clumps of grains held together by organic matter; about 50 percent clean sand grains; very friable; abrupt wavy boundary.
A2 15-66 cm	Pale brown (10YR 6/3) sand; single grain; loose; clear wavy boundary.
A and B 66-76 cm	Light yellowish brown and pale brown (10YR 6/4 and 6/3) sand; massive; very friable to loose; few yellowish brown (10YR 5/6) bodies; abrupt wavy boundary.
B21te 76-91 cm	Strong brown to yellowish brown (7.5YR 5/6 to 10YR 5/6) loamy sand to sandy loam; about 5 percent clean sand grains around root channels; massive; friable; clear smooth boundary.
B22te 91-109 cm	Strong brown (7.5YR 5/6) loamy sand; massive; very friable; grains are coated; common small bodies of clean sand grains; clear smooth visually indistinct boundary.
B23te 109-130 cm	Yellowish brown (10YR 5/6) loamy sand; common bodies of clean sand grains around pores; matrix grains are coated; massive; very friable; clear smooth but (visually) indistinct boundary.
B3 130-150 cm	Yellowish brown (10YR 5/8) sand to loamy sand; grains have thin coating; few horizontally discontinuous bands more than 0.5 cm thick and 10 cm long near base; gradual smooth boundary.

* Pedon description for site 28 is similar to that for site 27.

Bh1
150-173 cm — Dark brown (7.5YR 3/2) sand; massive; friable; grains have reddish cast from coatings; very few clean sand grains or bodies; abrupt wavy boundary.

Bh2
173-183 cm — Dark brown (7.5YR 3/2) sand; common 1- to 2-mm darker bodies; common to few fine black pellets; massive; friable; clear wavy boundary.

Bh3
183-193 cm — Dark reddish brown (5YR 2/2) sand; few gravels; massive; friable; abrupt smooth boundary.

Bh4
193-218 cm — Blacker than very dark brown (10YR 2/2) sand; all grains are individually coated but there seems to be little bridging; massive; very friable.

Sites 29 and 30: Not designated

Water-table data

Well depth--274 cm at site 29; 200 cm at site 30

Month	Week	Water-table depth (cm) 29	30	Month	Week	Water-table depth (cm) 29	30
Jan.	1	48	14	July	13	17	0
	2	48	9		14	47	8
Feb.	3	24	2	Aug.	15	30	8
	4	24	2		16	55	8
Mar.	5	35	2	Sept.	17	83	32
	6	52	21		18	83	32
Apr.	7	52	21	Oct.	19	74	32
	8	98	60		20	75	41
May	9	58	39	Nov.	21	75	41
	10	76	39		22	142	90
June	11	19	0	Dec.	23	205	145
	12	34	0		24	205	145

	29	30
Prob.> F	0.0001	0.0001
r^2	0.830	0.817

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name	Site 27	Site 28
Overstory			
Trees			
Pinus taeda L.	loblolly pine	X	X
Quercus nigra L.	water oak	X	X
Understory			
Trees and shrubs			
Acer rubrum L.	red maple		X
Carya tomentosa (Poir.) Nutt.	mockernut hickory	X	
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)		X
Diospyros virginiana L.	common persimmon	X	
Gaylussacia frondosa (L.) Torr. & Gray.	dangleberry	X	
Ilex glabra (L.) Gray	inkberry		X
Ilex opaca Ait.	American holly		X
Kalmia angustifolia L.	lambkill kalmia		X
Liquidambar styraciflua L.	American sweetgum		X
Myrica cerifera L.	southern waxmyrtle		X
Nyssa sylvatica Marsh.	black tupelo (black gum)	X	X
Persea borbonia (L.) Spreng.	redbay persea		X
Pinus taeda L.	loblolly pine	X	
Quercus alba L.	white oak		X
Quercus falcata Michx.	southern red oak	X	X
Quercus incana Bartr.	bluejack oak	X	
Quercus laevis Walt.	turkey oak	X	X
Quercus margaretta Ashe	dwarf post oak	X	X
Quercus marilandica Muenchh.	blackjack oak	X	X
Quercus nigra L.	water oak	X	X
Quercus stellata Wangenh.	post oak	X	X
Rhododendron nudiflorum (L.) Torr.	pinxterbloom azalea (pinxter flower)		X
Rhus copallina L.	flameleaf sumac	X	
Vaccinium arboreum Marsh.	farkleberry	X	
Vaccinium tenellum Ait.	smallcluster rabbiteye blueberry		X
Vines			
Gelksemium sempervirens (L.) Ait. f.	Carolina jessamine (yellow)		X
Vitis rotundifolia Michx.	muscadine grape	X	
Grasses			
Aristida purpurascens Poir.	arrowfeather threeawn	X	

Pedon Description--site 30*

Series:	Not designated
Classification:	Entic Haplohumod, coarse loamy, siliceous, thermic
Location:	South on Road 1004, 0.8 km (0.5 mile) from junction of Roads 1105 and 1104, then 0.4 km (0.25 mile) east of Road 1104, Lenoir County, NC
Slope and geomorphic surface:	0-1 percent; middle Coastal Plain, Sunderland surface
A1 and A2	
0-13 cm	Dark gray (10YR 4/1) sand held together by organic matter; about 50 percent of the grains are clean; very friable; abrupt boundary.
A2	
13-48 cm	Light yellowish brown (2.5Y 6/4) sand; single grain; loose; clear boundary.
B2t	
48-71 cm	Light olive brown (2.5Y 5/4) sandy loam; massive; friable; gradual boundry.
A'2	
71-122 cm	Light brownish gray (10YR 6/2) sand; common fine pale brown (10YR 6/3) mottles; massive; very friable; gradual boundary.
Bh	
122-202+ cm	Brown to grayish brown (7.5YR 5/2 to 10YR 5/2) loamy sand with common ground; grades to dark gray (10YR 4/1 to 5YR 4/1); massiv ; friable.

* Pedon description for site 29 is similar to that for site 30, but the B2t horizon is dark gray (10YR).

Site 34: Not designated

Water-tabl data

Well depth--91 cm at site 34-1; 234 cm at site 34-2

Month	Week	Water-table depth		Month	Week	Water-table depth		Month	Week	Water-table depth	
		34-1	34-2			34-1	34-2			34-1	34-2
		cm				cm				cm	
Jan.	1	43	74	May	18	33	36	Sept.	36	+8	5
	2	8	48		19	30	41		37	+2	8
	3	+2	46		20	10	18		38	+2	20
	4	+2	36		21	+5	8		39	+2	28
F b.	5	+2	20	June	22	+2	5	Oct.	40	2	30
	6	+8	-2		23	+2	20		41	5	23
	7	+2	8		24	+2	23		42	15	23
	8	+2	10		25	+2	20		43	28	43
					26	2	15				
Mar.	9	0	10	July	27	2	5	Nov.	44	64	79
	10	+5	+2		28	0	5		45	91	107
	11	+2	5		29	+2	+2		46	71	109
	12	+2	5		30	+5	8		47	--	188
	13	10	13						48	--	--
Apr.	14	10	10	Aug.	31	0	15	Dec.	49	--	--
	15	8	10		32	+2	28		50	--	--
	16	+2	2		33	2	20		51	--	--
	17	15	20		34	+2	15		52	--	--
					35	+2	5				

	34-1	34-2
Prob. > F =	0.0001	0.0089
r^2 =	0.871	0.729

Vegetation

(loblolly pine-hardwood forest type--No. 82)

Scientific name	Common name
Overstory	
Trees	
Acer rubrum L.	red maple
Liquidambar styraciflua L.	American sweetgum
Understory	
Trees and shrubs	
Acer rubrum L.	red maple
Clethra alnifolia L.	summersweet clethra (sweet pepperbush)
Cyrilla racemiflora L.	American cyrilla (titi)
Ilex opaca Ait.	American holly
Liquidambar styraciflua L.	American sweetgum
Magnolia virginiana L.	sweetbay magnolia
Nyssa sylvatica Marsh.	black tupelo (black gum)
Persea borbonia (L.) Spreng.	redbay persea
Pinus taeda L.	loblolly pine
Quercus nigra L.	water oak
Quercus phellos L.	willow oak
Vaccinium corymbosum L.	highbush blueberry
Rushes	
Juncus dichotomus Ell.	poverty rush
Juncus effusus L.	common rush
Perennial herbs	
Rhexia mariana L.	Maryland meadowbeauty
Sedges	
Scirpus spp. L.	bulrush
Vines	
Rhus radicans L.	poison ivy
Smilax rotundifolia L.	common greenbrier

Pedon Description

Series:	Not designated
Classification:	Typic Paleaquult, clayey, kaolinitic, thermic
Location:	In a timbered tract south of Road 1627, northeast of Road 1628, and east of railroad tracks at northeast edge of city limits of Stantonsburg, Wilson County, NC
Slope and geomorphic surface:	0 percent; lower Coastal Plain, Wicomico surface
A1 0-20 cm	Black (10YR 2/1) silt loam; weak coarse granular to irregular blocky structure; friable; clear boundary.
A3 20-36 cm	Very dark gray (10YR 3/1) silt loam; moderate fine subangular blocky structure; friable; clear boundary.
B1 36-61 cm	Gray (10YR 5/1) silt loam that contains more clay than that in the A1 and A3 horizons; moderate fine subangular blocky structure; friable; slightly sticky; clear boundary.
B2t 61-81 cm	Gray (10YR 6/1) silty clay loam; weak medium subangular blocky structure; friable; clear boundary.
B3 81-122 cm	Gray (10YR 6/1) silty clay loam with common medium yellowish brown (10YR 6/1) mottles; weak to moderate medium subangular blocky structure; firm; clear boundary.
C 122-142 cm	Gray (10YR 6/1) silt loam; massive; firm and slightly brittle; clear boundary.
C 142-178 cm	Very dark gray (10YR 3/1) silt loam; massive; friable; sticky.

U.S. GOVERNMENT PRINTING OFFICE: 1987-719-319/1344