Georgia
and the Southeast

PHYSICAL/CULTURAL INFORMATION

A compilation of information
by
students of Roger D. Moore, faculty

School of Environmental Design
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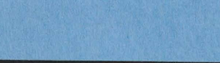

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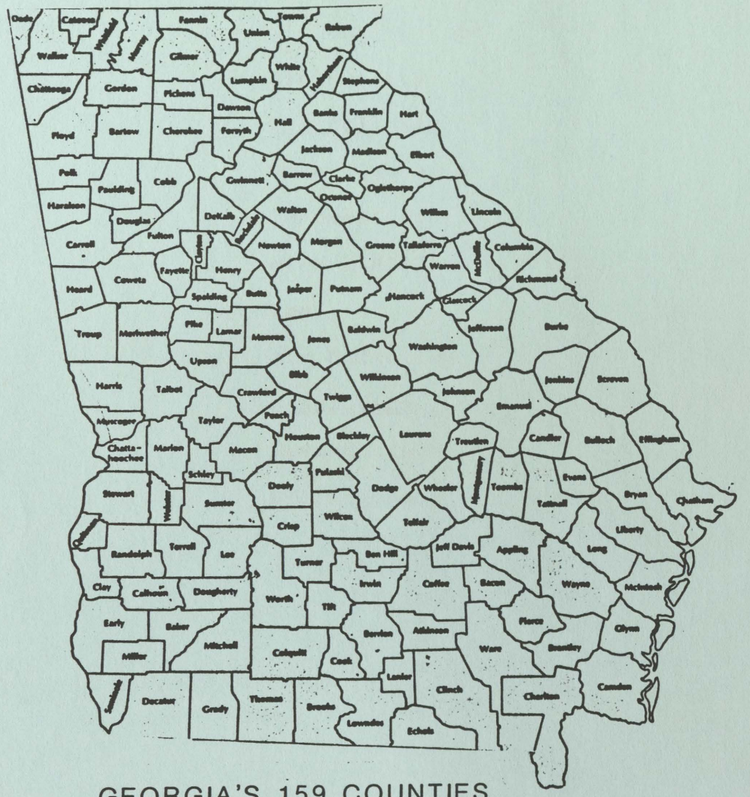
PREPARED BY KEN CARSON & ALEX LEVY



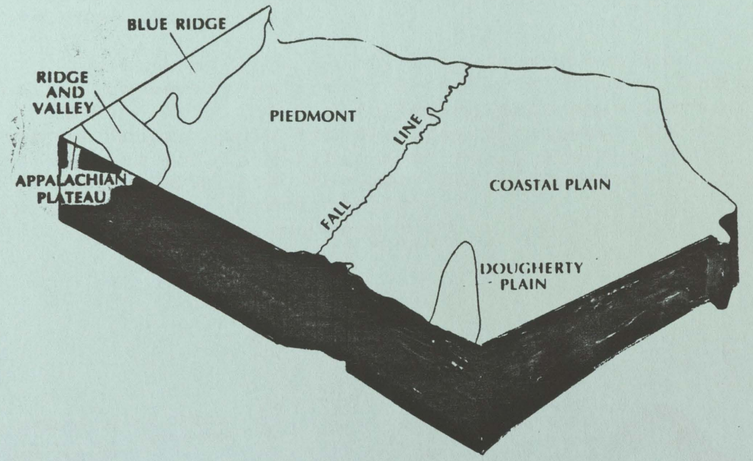
GEORGIA'S 159 COUNTIES

Contents

GEORGIA: CLIMATE AND MICROCLIMATE

Prepared by Ken Carson & Alex Levy

Georgia; a state of 159 counties, encompasses 58,910 square miles of mountains, rivers, lakes, swamps, and barrier islands; just a few of the many landforms throughout the state. But in all of her variety, Georgias average climate can be closely paired with the individual local climates throughout the state. One such region is the Athens-Clarke County area, but even within suah a localized area there can be microclimates with temperature and humidity conditions widely different from one another.



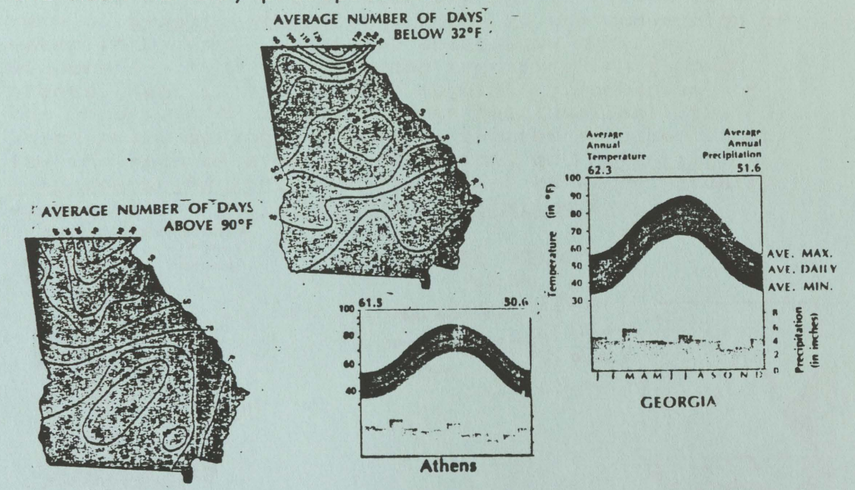
Source: The Atlas of Georgia

Temperature

Georgias highest temperatures normally occur in July and are lowest in January. Mean temperatures state wide vary more in Winter. Atlantic breezes are responsible for moderating minimum summer temperatures.(1) The annual average temperature for the state of Georgia is 62.3 F.

Latitude, elevation, atmospheric circulation patterns, and proximity to the Atlantic Ocean all control Georgia's temperature patterns. While South central Georgia annually has greater than 90 days of temperatures above 90 F, the mountains experience fewer than ten such days. Though, the mountains experience more than 120 days of temperatures at or below freezing, while the extreme Northeast and coastal areas see fewer than 30 such days. Thus, the state average reflects a nominal balance of temperature extremes throughout Georgia.(2)

In Athens-Clark County average minimum and maximum temperatures are 35 F- 56 F in January, and 68 F - 90 F in July.(3) The following maps show average days of hot and cold temperatures throughout the state. The climate graphs exhibit mean daily maximum and minimum temperatures, the mean daily temperature, and the mean monthly precipitation.(4)



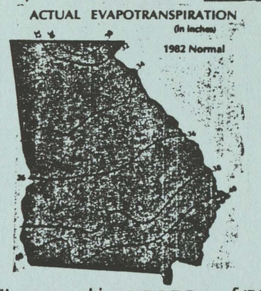
Reprinted from; The Atlas of Georgia P.38

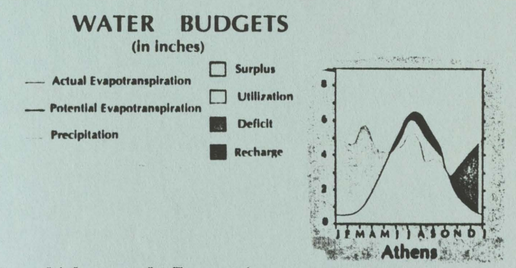
Precipitation and Evapotranspiration

In North Georgia, the frequency of warm and cold fronts makes precipitatoin totals highest in the late Winter and early Spring. Moist Gulf air produces additional rainfall. Normally, frequent July thunderstorms produce a secondary maximum of precipitation over Georgia. Occasional tropical storms make late Summer the season of maximum rainfall in Southeast Georgia. The entire state has its least rain in October; the East central portion in March; and the extreme Southeast in November.(5) On average Georgia recieves 51.6 inches of precipitation annually.

Athens-Clarke County is located in the Humid Subtropical climatic zone. Rainfall averages about 48 inches annuallly and is fairly evenly distributed throughout the year. There is usually a slight maximum of precipitation in the late spring and early summer, and the minimum rainfall occurs in the fall. Convectional thunderstorms are a usual occurrence during the summer months, happening on an average of about 40 days a year. During the winter, precipitation is in the form of frontal or cyclonic showers, which are generally less intense than the summer variety. (6)

Accompanying the rate of precipitation (water which fills the soil's water storage capacity) is the rate of evapotranspiration, which is the conversion of water into vapor. Vegetated areas lose water by evaporation from the soil and transpiration through plants. Heat is the primary regulating mechanism for the vaporization of water. Such heat availability, which peaks during the Summer, creates an upper limit for the rate of evapotranspiration, or 'Potential Evapotranspiration,' and the amount of water actually vaporized is 'Actual Evapotranspiration.'(7)



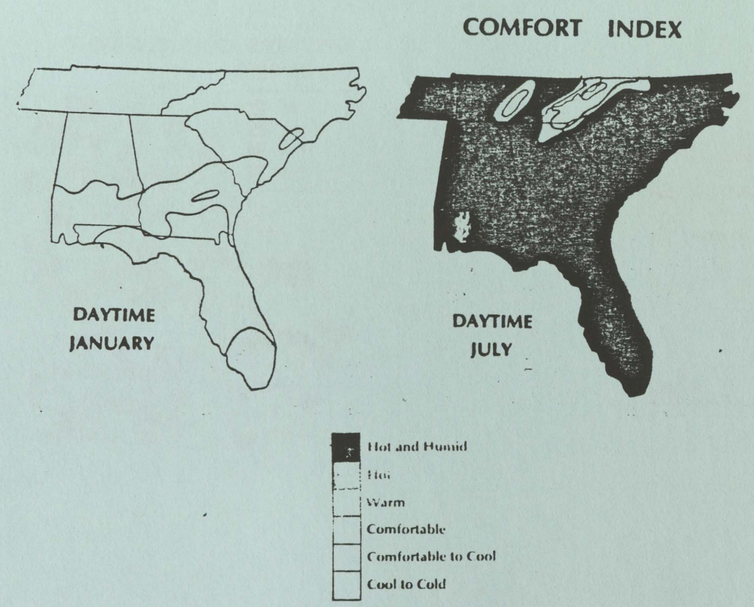


These diagrams, from The Atlas of Georgia, p. 42 graphically illustrate the trends of precipitation and evapotranspiration.

Comfort Zones

Coupled with a usually high annual humidity average, the brisk to sultry annual temperatures throughout this state lend themselves to generally one or two significant 'comfort zones'. Although "comfort" is a relative term, varying from person to person, it is possible to devise averages of comfort reported by many individuals.(8)

During the daytime in July almost the entire state is inundated with uncomfortably hot and humid conditions; only a minute portion of the Northeast mountains remains warm to reasonably comfortable. However, during the daytime in January a completely different trend exists. The entire mountain and piedmont area is classified as cool to cold, the upper coastal plain as comfortable to cool, and the South central area as comfortable.(9)

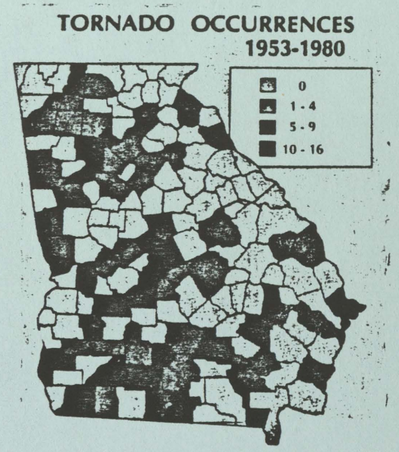


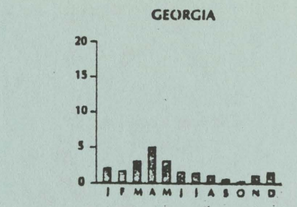
Source: The Atlas of Georgia p.45

Violent Weather

Georgia, being in an area of generally warm temperatures, is subject to regular westerly air masses, or fronts. These fronts are responsible for producing the snow squalls in the Winter and the violent Spring and Summer storms that we sometimes associate with lightning, heavy downpours of rain and hail, and the awesome tornado.

Tornadoes may occur when a rapidly moving cold front combines with warm, moist air, causing intense thunderstorm activity. Thunderstorms conductive to tornado formation in Georgia are most likely in April and least likely in October. Nearly every Georgia county has experienced a tornado. However, violent tornadoes causing fatalities and extensive property damage are concentrated in the state's north central area. Across the Southeast, the mountainous and coastal regions experience fewer and less intense tornadoes.(10)

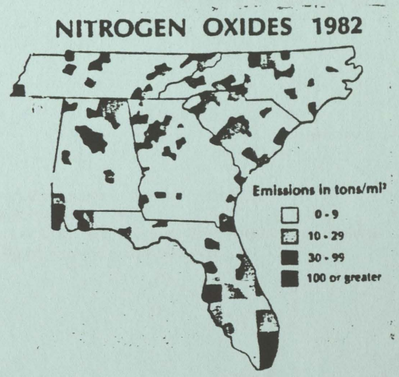


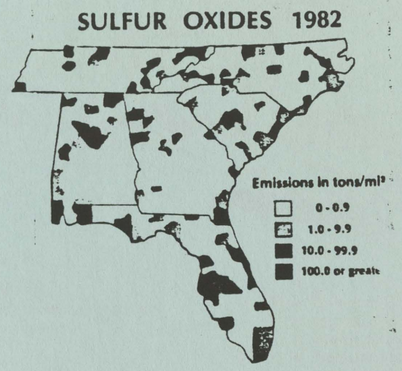


Reprinted from: The Atlas of Georgia p.46

Air Quality

One greatly increasing concern of climatologists is the constantly shifting air quality. Estimates by county of pollution density graphically portray both the great reange in emission concentrations and the impact of pollutant sources. Most "hot spots" for both sulfur and nitrogen oxides emissions in Georgia and adjacent states correspond with the locations of power plants, and, to a lesser extent, with metropolitan and industrial areas. Downwind from these power plants sulfur oxides are in greater concentration than elsewhere, but they still meet federal air quality standards.(11)

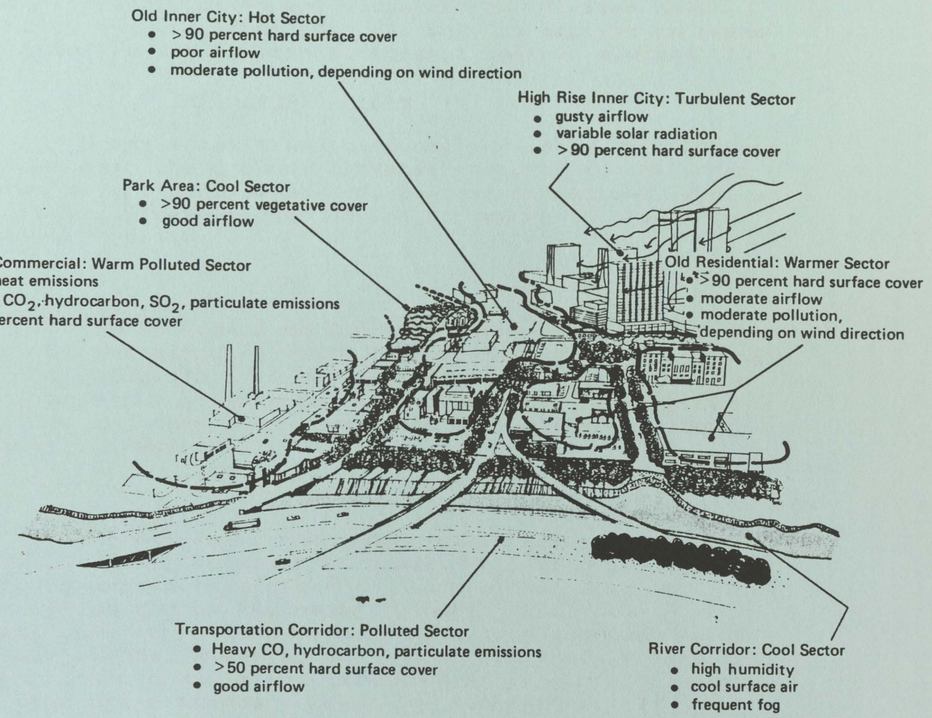




Reprinted from: The Atlas of Georgia p.47

Microclimate

The climate of an urban area is an important issue for regional authorities. However, climatic variations within the city have become increasingly important issues to planners, architects and landscape architects. Solar radiation around tall buildings is, perhaps, the easiest climatic variation to visualize. Temperature, fog, pollution, and wind are also important climatic variations.(12)



Microclimatic conditions associated with different sectors of a city. (Based on an original drawing by Mary-Margaret Jones, Johnson, Johnson and Roy, Inc.)

From Landscape Planning: Environmental Applications
W.M. Marsh p.54

Solar Radiation

Buildings intercept the sun's rays, and, depending on the sun angle and buliding height, can cast a shadow of considerable size. Where buildings are in close proximity to one another a "shadow corridor" may form. Pockets sheltered from light radiation are illuminated only by diffused and reflected radiation only, amounting to very small solar gains.(13)

Temperature

Geographically diverse surfaces, activities, and physical features within the urban environment develop significantly different temperatures. Studies have shown, however, that this may only be applied to areas not influences by strong regional weather systems.(14)

Wind and Airflow

Urban areas tend to reduce the speed at which air flows near the ground. Elevated features in the urban area divert airflow upward, in most situations, and, as a result, leave slower moving air currents closer to the ground.(15)

Fog

The incidence of fog around the urban environment can be increased two-fold from that of the surrounding countryside. This is due to increased condensation on air particle pollutants, and, of course, is usually higher in areas along the coast and in near or along river valleys.(16)

Air Pollution

Intensified in the inner city, air pollution is usually lower in suburban areas. Pollution levels may vary sharpoly from place to place within the city. This is influenced by two major factors: "[1] the site-specific nature of many pollution sources" (e.g. power plants, higways, and industrial areas); "and [2] short term changes in the mixing and flushing capacity of the urban boundary layer" of atmosphere.(17)

Conclusion

It is the microclimate that is, perhaps, a more important factor to the planner and landscape architect, than the regional climate. It is site specific and best illuminates the conditions under which a specific project is to be undertaken. However, few planners and designers have been able to incorporate climatic variables to affect their information base for decision making. Accounting for this is the level of scientific understanding of microclimate in the urban environment (18), but with the increasing demands on the planner and designer to sympathize with the urban condition, a thorough and comprehensive understanding of the state, regional, and local climates will enable us to accomodate, ammend, and possibly repair urban areas inundated with vast arrays of climatic conditions. Education is the key, the application is up to us.

References

1. The Atlas of Georgia: T.W. Hodler & H.A. Schretter, The Institute of Community and Area Development - The University of Georgia, 1986. (p.38)

2. Ibid. (p.40)

3. Athens-Clarke County Planning Commission, Land Use Study; 1979. (p.9)

4. The Atlas of Georgia. (p.38)

5. Ibid. (p.38)

6. Land Use Plan. (p.4)

7. The Atlas of Georgia. (p. 42)

8. Ibid. (p.45)

9. Ibid. (p.45)

10. Ibid. (p.46)

11. Ibid. (p.48)

12. Landscape Planning: Environmental Applications. W. M. Marsh. (p.53)

13. Ibid. (p.54)

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15. Ibid. (p.55)

16. Ibid. (p.58)

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Travel Investment Factors in the Georgia Piedmont. North Georgia Planning and Development Commission

GEORGIA

GEOLOGY PHYSIOGRAPHY TOPOGRAPHY

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GEORGIA

THE STATE

LOCATION AND SIZE

The state of Georgia is situated between the parallels,"30 21' 20" and 35 north latitude and the meridians 80 50' 24" and 85 36' west of Greenwich, "(McCallie, S.W.,Physical Geography of georgia."The State as a Whole", 1925, p. 3). It is the southern most of the Atlantic Seaboard states, with the exception of Floridia. It's bourders on the north touch Tennessee and North Carolina, to the northeast South Carolina and on the east they touch the Atlantic Ocean, on the south Floridia and west Floridia and Alabama.

On the boundary line between South Carolina, the banks of four rivers separate Georgia. From the east the Savannah river, Tugaloo river, Tallulah river and Chattooga river trace a line to North Carolina.

All five boundary lines of Georgia are of different lenghts with no two of the sides parallel. The north to south boundary, the greatest lenght of the state"(Approximately 320 miles)",(McCallie, p.4), exceeds its greatest width from east to west by"60 miles",(McCallie,p.4).

Georgia is the largest state east of the Mississippi river. Its Area ,"59,265 square miles",(McCallie, p. 4). It is larger than England and Wales and more than one-Fourth the size of France.

TOPOGRAPHY

Like most of the States of the Atlantic slope, Georgia does not have the same topographic character everywhere, but differs considerably in appearance in different portions. Some parts of the State are mountainous, some have a broadly rolling upland surface trenched by deep and narrow valleys, some parts are nearly level plains. The portions of the State characterized by different sorts of topography are not scattered, but are divided into several portions-one dominantly mountainous, anoher chiefly rolling upland, and lower half coastal plain.

(see Fig. 1)

The part of the state that lies south of the Fall Line, from Augusta through Milledgeville and Macon to Columbus, although hilly in portions , is on the flat side or gently rolling hills that are so gental that they appear to be broad and somewhat uneven plain. Within this coastal plain, lies the cast line where the topography is low and very nearly level throughout broad areas, but farther inland its surface lies higher nad is rolling or even hills.

Most of the northwestern part of the state is occupied by a broad, relatively low-lying area called valley. It is really made up of several partly merging valleys with broad and flat or gental floors. These valleys are partly separated by numbers of mountain ranges.

Below the Valleys, the the south, lies the Central Upland. Much of this upland is nearly flat and appears form a vantage point as one uneven plain. Near the northern portion of this area where the main streams are located, the surface is cut by fairly deep valleys and here bold hills or small mountains stand well abouve the general level of the surface.

GEOLOGY

The geology of Georgia is as diversified as its topography. "The rocks of the State include the classes igneous (chiefly granites), metamorphic (schist, gneiss, marble, etc.), and sedimentary (and or sandstone, clay, shale, limestone)." (McCallie, p.5).

The oldest rocks of Georgia, the Archean and metamorphic Cambrian, form a broad belt in the highland and central upland; the Paleozoic rocks, except the metamorphic Cambrian rocks, make up the northwest corner of the state, in the valley and the plateau; and the cretaceous, tertiary, nd Quarternary formations make up the entire coastal plain, according to S.W. McMallie, (McCallie, p.6).

PHYSIOGRAPHY

To explain the origin of the present surface features of Georgia, it is not necessary to go back far into geologic history. These features, are geologically rather recent. "The present form of the land surface in Georgia and elsewhere is the result of the work of natural agents. The various ways in which such agents operate to shape land surfaces are included under the general term *process*. The work of the agents is affected by the fact that different parts of the surface differ in position and in the character of the material forming them." (Laurence LaForge, Physical Geography of Georgia ,"The study of Surface Features"; 1925, P.13).

As has already been stated, Georgias' topography in not uniform but widely different in parts of the state. The state lies in two major physiographic divisions of the United States: "The Atlantic Plain on the southest and the Appalachian region to the northwest" (LaForge,1925,p.14). The Appalachain Valley extends from New York to Alabama. The Atlantic Plain, which lies in the Coastal Plain area of the State, borders the coast of the United States form the southern New Englands into Mexico.

(See Fig. 2)

REGIONS

THE COASTAL PLAIN

LOCATION AND SIZE

The Coastal Plain region of Georgia is all of Georgia south of a crooked line connectiong Columbus, Macon, Milledgeville, and Augusta. "This includes an area of nearly 35,650 bsquare miles, over half the total are of the State",(Cooke, Wythe; Physical Geography of Georgia, "The Coastal Plain", 1923, p.19.).

The Coastal Plain differs form the Central Upland, mainly in the kind of rocks that underlie it. The Central Upland is underlain by very old granites and other crystal form rocks. The Coastal Plain is built of much younger sand and clay, and limestone resting on a base of buried crystalline rocks of the Central Upland. On many of the ridges it is difficult to tell where the Central Uplands ends and the Coastal Plains begains. The major differance shows along the valleys and stream beds where hard, unweathered crystalline rocks crop out in the bed or banks of the streams and gives rise to water falls or rapids. In the Coastal Plain, softer and in many places unconsolidated sediments offer little obstruction to the streams. "Falls are so numerous and so characteristic along the boundary between the Central Upland and the Coastal Plain that the line joining the points where the streams cross the boundary is called the Fall Line,"(Cooke, p.19.).

(See Fig. 1)

TOPOGRAPHY

The coastal terraces in Georgia cover an area of about 18000 square miles, or about half of the Coastal Plain. They extend inland from the Atlantic Ocean about 60 miles on the eastern boundary of the State and about 175 miles along the Florida line. The inner margin passes form the Floridia line ar the Ochlockonee river to the vicinity of Thomasville and thence northeastward therough Allapaha to Savannah River east of Sylvania. In addition to this main area, a large embayment extends into the dougherty Plain between Donaldsonville and Bainbridge and up the valey of the Flint probably at least as far as Baconton.

Savannah, the principal city of the Coastal Plain and the most important port, is the greatest market for Sea Island cotton in the world. Brunswick is an important seaport. St. Marys and Darien are seaports at the mouths of St. Marys River and Altamaha River. Waycross and Valdostsa are railroad centers.

GEOLOGY

*The geology of the Coastal Plain is less complex than that of other part of Georgia.

The region is underlin by sediments ranging in age from Upper Cretaceous to Recent which crop out in roughly parellel bands with the oldest resting upon crystalline rocks of the Central Upland and the youngest at the sea coast. The beds dip gently southeastward at rates ranging from about 35 feet to the mile at the Fall Line to very little at the coast.*

Beds of Eocene age make up the southern part of the Fall Line Hills. Red sand is the predominant constituent of the Eocene, except in the Flint and lower Chattahoochee valleys, where white limestone forms the top of the series.

THE CENTRAL UPLAND

LOCATION AND SIZE

The Greater part of the northern section of Georgia is a wide upland which crosses ythe middle of the State between the Valley and the Coastal Plain . "It has an area of about 18100 square miles and comprises 31 per cent of the whole State".(LaForge, p.57).

The Central Upland is also called the Piedmint Upland of Georgia. "In Georgia it occupies ten time as much area as the valley or Mountainous Upland, so that most of it cannot be literally 'at the foot of the mountains,' and the name piedmont is therefore in a measure mileading",(McCallie, p.55).

(See Fig. 1)

TOPOGRAPHY

The Central Upland as its name indicates, an Uplsand area. Its general altitude above sea level is a little, "less than 2000 feet along the southern base of the Highland, and 1,100 tp 1,500 feet along its northerwestern margin, next to the Valley,"(LaForge, p.60). Along its southern margin, next to the Coastal Plain, its altitude is 500 to 700 feet above sea level. The suface descends southeastward from one side of the Uplands to the other, but slope is not uniform nor is it in the sme direction everywhere. several plateausand upland areas, lying at different altitudes, areseparated from one another, in some places by sloping escarpments, in other places by too broad and slit to be called escarpments, and still other places by slopes so slit thet they are not seen as slopes .

GEOLOGY

The surface of the Central Uplands was developed entirely by the action of running water over the surface, *degradation.* Part of the rocks of the Central Upland are made up of material from the breaking up of older rocks, and deposited as nearly level layers of sediment in standing or running water. Some of them were laid down on what was a sea bottom, but they are now found up to 200 feet above todays sea level.(McCallie,p.87).

Although the chief ccause of degradation in this region is flowing water, it is also aided by the removal of material through the breaking up of solid rocks by natrural weathering. The softening and braking up of hard rocks by weathering has proceeded to a depth of many feet over a large portion of the Upland.

The HIGHLAND

LOCATION AND SIZE

The Georgia Highland, also the Valley rgion are the smallest portion of the state. They are situated in the northeast corner of Georgia. "They are a part of the much greater mass of the Appalachian mountains,"(Keith, Arthur., Physical Geogtaphy of Georgia."The Highland", 1925,p.95). The Highland enters the State from North Carolina and Tennessee, where it forms the Largest and Highest mass of Mouatains. Beginning in the corner of the State it has a with of 92 miles east and west along the State Boundary, and its southwest end is 48 miles south of the Boundary; Its area is about 1,850 square miles,(Keith, p. 95).

The nothern boundary of the State runs almost eat to west and is just south of the 35th degree of lattitudes; this is not in the slightest way a natrual boundary of the Highland. Its west boundary runs roughly noth to south at the foot of the mountains, where they spring sharply up from the flat Appalachian Valley. The southeast boundary is formed by a similar rise of Mountains, except for a few miles at the northeast end, where it is formed by the Chattooga River.

Topography

The Blue Ridge as a divide is almost continuously high. The two points it is formed by narrow plateaus, one of 1,750 feet, between Ellijay and Toccoa rivers, and the other 2,100 feet, in Rabun Gap, between Little Tennesse basin and that of Chattooga River.(Keith, P.104). Both of these passes are bordered closely by mountains above 2000 feet in hight, which are themselves only spurs from the main mountain masses. By far the greater part of the Blue Ridge is above 3,00 feet in Hight, and various sections of that sort are only separated by a few narrow notches or gaps. The lowest stretch of importance runs soutwestward from the town of Blue Ridge for a straight distance of 5 miles; all of this in the area of 2,00 feet above sea level.

GEOLOGY

The rocks of the Highland are almost entirely crystalline, the particles of which they are composed have crystal outlines and are not worn fragments such as are seen in ordinary sands and muds.(Keith, p.129). A few of the rocks in the extreme western part of the Highland, especially the conglomerates, are made up of fragments of minerals, Chiefly feldspar and quartz. As Now stands, the rocks of the Highland includes marble, slate, phyllite, shist, quartzite, graywacke, conglomerate, and gneiss. All of these were originally fragmental or sedimentary rocks. In Addition, there are large area of granite, of gneiss created from gratnet pressure, of diorit and granite-gneisses all formed by granite pressure.

LOCAL: CLARKE COUNTY

In Georgia in 1950 a study was done in order to establish the general distributions of major exposed rock units in the county. The study, however, was not a detailed study, and work was slow because at that time there was no topographic map of the county. Most of this report is based on the findings of the 1950 geologic study of the county.

PHYSIOGRAPHY

Clarke County is located in the Central upland of the Piedmont, and the county actually straddles two plateaus: the northern Midland Slope, and the southern Washington Plateau. (See figures 3 and 4.)(Parizek, Eldon J. , "A Preliminary Investigation of the Geology of Clarke County, Ga." , The Bulletin, 1951, p. 21.) The difference between these two plateaus is almost imperceptible in the field however. Clarke County, consisting of 125 square miles, is the smallest county in the state. (Parizek, p. 21.)

The obvious characteristics of Clarke County are its gently rolling, southeast-sloping upland, and its many streams which have left their mark on the land. The Oconee River is the major river in the county, and it acts as the main drainage artery for Clarke County and several nearby counties. (Parizek, p. 21) Several tributaries join the Oconee to separate the uplands, which gives that area a topography different from the rest of the county. The maximum relief --the difference in elevation between the highest and lowest points--in the area is 350 feet, although the average is quite a bit less. (Parizek, p. 21.)

Geologists have found that the county has a prominent mantle, which was formed from a combination of humid climate and weak rocks that erode easily. According to Parizek, " the uplands and steeper slopes have thin soils and are comparatively free of forest growth, while lowlands have a thicker mantle and are often heavily wooded." (Parizek, p. 24.)

GEOLOGY

Field work from the 1950 study indicates that there are five major types of rock bodies in Clarke County. (See figure 5.)These include granite, the Carolina series schist, the Carolina contact phase, migmatite and gneissoid granite. (See figure 5.) The 1950 study revealed that there is a large, partially exposed, discordant body of granite in Clarke County. Geologists believe that it is part of a plutonic mass that is roughly the size of a batholith. (Parizek, p. 24.) The surrounding country rock is a Carolina schist in metamorphosed beds of unknown age. In areas where the Carolina schist and the granite make contact, several different rock units have formed.

The granite body is massive and coarse-grained in general, although in some areas there is a smaller-grained variety. (Parizek, p. 25.) The granite is a light to dark grey when fresh; the color changes to a dull, dark brown when the elements weather it. The distance to the granitic bedrock is shallowest on steeper slopes and uplands. Because water penetrates to bedrock more easily in valleys, there is a much thicker layer of surface material above the granite in these areas. (Parizek, p. 25.) Sections of exposed granite are the result in many places of uneven topography in Clarke County.

The Carolina schist is a tan to reddish-brown color, and it is made up of "micaceous quartzose schists and gneisses." (Parizek, p. 26) The series is a combination of igneous and sedimentary rocks in thin beds which are interspersed with layers of mica and quartz. These beds are clearly crushed and folded, and they show signs of slippage. (Parizek, p. 26.)

Near the contact of the Carolina schist and the granite a new, irregularly shaped rock is formed. Altough this new rock is different in aspect from the Carolina schist, geologists labeled it the " Carolina contact phase."(Parizek, p.26.) This new rock is reddish-brown in color; is sheared, crushed, and folded; and it has various sizes of quartz veins running through it. (Parizek, p. 26.)

Migmatic rocks were formed when magma penetrated surrounding layers of gneiss and schist. There are several exposed migmatic rocks near the contact zone in Clarke County. The migmatites are made up of layers of tan, medium to coarse grained granite and a dark-tinted hornblende-biotite combination. (Parizek, p. 27.)

Gneissoid granites are abundant in certain exposed areas within the county. These rocks developed close to the contact zone. Dominant characteristics of these gneissoid granites are inclusions and prismatic minerals that have directional banding, or layering, through the gneiss. (Parizek, p. 27.) Because of this banding, geologists believe the gneissoid-granites were part of the primary flow. (Parizek, p. 27.)

Different rock types have made many different formations within Clarke County. The first type, inclusions, are formed when a minute portion of liquid, solid, or gas is enclosed by a mineral mass. Many of these are found in the contact zone surrounding the granite pluton. These inclusions have a variety of shapes and sizes, but most are rectangular. (Parizek, p. 29.) Many show the directional flow of the host magma, and many are still obviously sedimentary. Most of the inclusions seem to have a mineral composition similar to the host granite. (Parizek, p. 29.)

Another rock formation common to Clarke County is a dike. Dikes occur where magma has squeezed into fissures in the surrounding country rock. The resulting structure is wall-shaped. There are many areas where dikes appear in Clarke County. Although the specific age of these is unknown, most have a similar appearance, composition, and steepness of dip. (Parizek, p. 30.) Most of the dikes in this part of the state are dark in color, fine to medium grained, and very resistant to erosion. When exposed, weathering causes exfoliation of the dike surface and it creates a coating of iron oxide. (Parizek, p. 30)

The geologic structure of Clarke County is a complex series of folded, crushed, and metamorphosed rock. Although bedding dips near the contact zone have been disturbed, areas away from the zone show dips in the country rock from 25 degrees to 70 degrees in a southerly directon. (Parizek, p.31)

Although the exact age of rock units in Clarke County is unknown, evidence points to the Pre-Cambrian period as a safe bet for the Carolina series. The age of the granite mass and other components is unknown. (Parizek, p.31.)

REAL APPLICATIONS OF GEOLOGY, PHYSIOGRAPHY, AND TOPOGRAPHY

IAN MC HARG AND LAND PLANNING

By now you are probably asking yourself why you need to know any of this information in the first place. The answer lies in the fact that knowledge of land forms and surface structure is essential to any type of land planning. The world famous landscape architect, Ian McHarg, relies heavily on geologic surveys to help him identify areas that must be protected from development. In fact, McHarg pays close attention to the components of the land to be developed; he studies the components (rivers, ponds, lakes, mountains), the structure of the surface (topography, slope), and the actual foundation, or the geology, of the site.

In McHarg's Report to Medford, a town in New Jersey, he listed three specific areas of geologic interest in town which must be protected. The first is a natural gravel deposit, which is socially valuable as a natural supply to the town for road construction and maintenance. (Palmer, Arther E., Toward Eden , 1981, Appendix 3, p. 17) The second area is a "locally unique geological formation of scientific and educational interest." (Palmer, p. 18.) The final area in Medford that McHarg wants to protect is ironstone. It is unique to the region and scarce, as well as being of great scenic and educational interest. (Palmer, p. 18.)

Mc Harg goes on to suggest ordinances and other means to protect these geologic formations. Criteria in deciding to protect a certain area or geologic feature are: economic value, uniqueness, and scientific or educational interest.

AERIAL PHOTOGRAPHY FOR LAND PLANNING: IDENTIFYING LANDFORMS

One of the most practical and helpful applications of the study of land forms is through interpretation of aerial photographs. Study of these photographs allows land planners to determine much of the physical site data necessary for projecting land development. This method permits comparison of whole ecology-related landscape patterns instead of reporting individual features.

Four basic elements are necessary to identify specific landforms from aerial photographs. These are land use, drainage patterns, topography, and photographic tone. (Way. Air Photo Interpretation for Land Planning, 1968, p. 1.) Once the landform is identified, specific characteristics that correspond to that landform can be determined and measured. The landscape architect can make planning decisions based on this information. We will demonstrate how to identify specific residual soils, for example granite, gneiss, schist, and serpentine, as well as transported soils such as those found in sand dunes.

One must bear in mind that soils are generally formed in two ways: a) they are residual-- made up of existing geologic structure, b) they are transported by glaciers, water, or wind. We will examine residual igneous soil first. Granitic formations are commonly found in humid climates, and they are abundant in Georgia. (See figure 6.) Granite forms when

magma intrudes between other layers of rock and cools slowly. Once it is exposed, granite typically exfoliates when weathered. (Way, p. 29.) Drainage patterns on a regional level are radial, while on a local level they appear dendritic. Topography in these areas consists of massive, rounded, dome-like hills with fairly steep side slopes. When fractures develop, they often form an uneven surface and curvilinear lines. (Way, p. 29.)

The tone of these formations in photos is usually white with some sharp boundaries. The main way to identify granite formations is by their dome-like topography; curving, dendritic drainage; and by the fracture pattern. (Way, p. 29) Construction such as building highways on granitic formations requires blasting when excavating. It has a good base and sub base, but seepage problems can occur. (Way, p. 29.)

Three types of metamorphic rocks can be found in Georgia: gneiss, schist, and serpentine. Gneiss is a major component of the Georgia piedmont. It is a metamoorphic rock similar to granite that has a banded appearance. (Way, p. 35.) Drainage patterns in gneissoid formations are dense, somwhat dendritic, angular, and somewhat parallel. This area has sharp crested hills that form parallel ridges; this pattern forms because of the banded structure of the rock which results in areas of varying resistance to weathering. (Way, p. 35.) The tone in photographs appears white. The slopes are usually too steep for cultivation in gneissoid formations; most cultivation occurs on the valley floor.

The keys to identifying gneiss formations are their sharp crested hills, angular drainage pattern, and possible parallel drainage pattern. (Way, p. 35) Construction in these areas requires heavy blasting. Gneiss can be used as an aggregate, foundation, and building stone. (Way, p. 35) (See figure 7.)

Schist formations are found throughout the piedmont and the mountains of Georgia. These are highly altered rocks often containing layers of quartz, mica, hornblende, and garnet. (Way, p. 37.) Schists erode easily. (See figure 8.)

Drainage patterns through schist formations are rectangular and medium textured. In thin soil there is only moderate relief and a banded appearance, while in deeper soil hills are smooth and rounded with steep sides. Tone in (black and white) photographs is white to light grey with a banded appearance. (Way, p. 37.) Usually the deeper soil in the hills is used to cultivate timber.

The best way to identify schist formations is to look for a rectangular drainage pattern, U-shaped gullies, faint banding, and round, steep-sided hills. (Way, p. 37.) Excavation in these areas is difficult due to rock slides. Deep soils are usually best for development. (Way, p. 37.)

Serpentine rock formations are common to the Blue Ridge and the Ridge and Valley areas of Georgia. It is formed by "the alteration of intrusive rocks," and it is made up of the mineral serpentine. (Way, p. 41.) (See figure 9.)

Drainage patterns in serpentine formations are regionally dendritic and locally radial. This formation has long, winding ridges connecting elongated, conical hills; the hills usually have convex sideslopes. (Way, p. 41.) The tone in aerial photographs is light to dull grey with definite boundaries. Serpentine soils are difficult to cultivate because of poor nutritive value. (Way, p. 41.)

Serpentine formations can be identified by their winding ridges and smooth surfaces, and by their lack of cultivation and lack of natural cover.

Soils and geologic formations are also created by physical transportation. The best example of this is old sand dunes which were created by wind. These dunes are scattered throughout the coastal plain of Gerogia, and they developed by the action of wind blowing over loose sediments. (See figure 10.) Dune areas have no surface drainage; it is all internal. (Way, p. 85.) The topographic appearance of this formation varies; it appears as horseshoe-shaped or elongated smooth, low ridges. Dunes have a white tone in aerial photos. (Way, p. 85.)

Vegetation is sparse on new dunes; it can be found in the moister areas between dunes. Sand dunes are identified by their small size and distinctive shapes, light tone, and directional arrangement. (Way, p. 85.) Excavation among dune formations is not difficult, it just requires asphalt to stabilize the excavation. (Way, p. 85.)

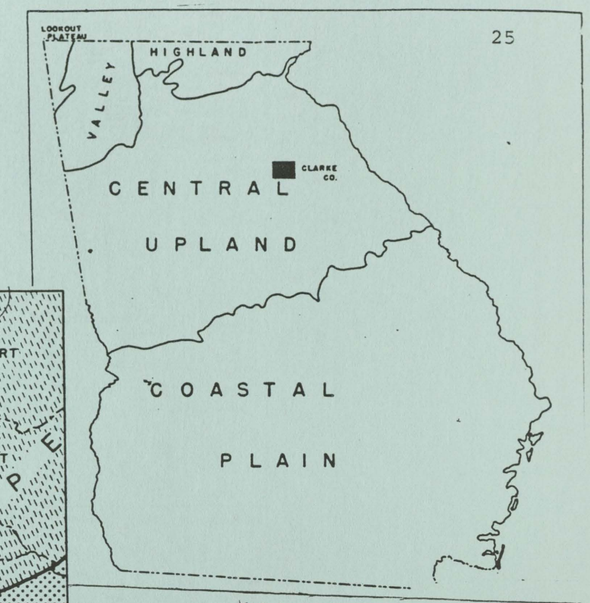


FIGURE 3

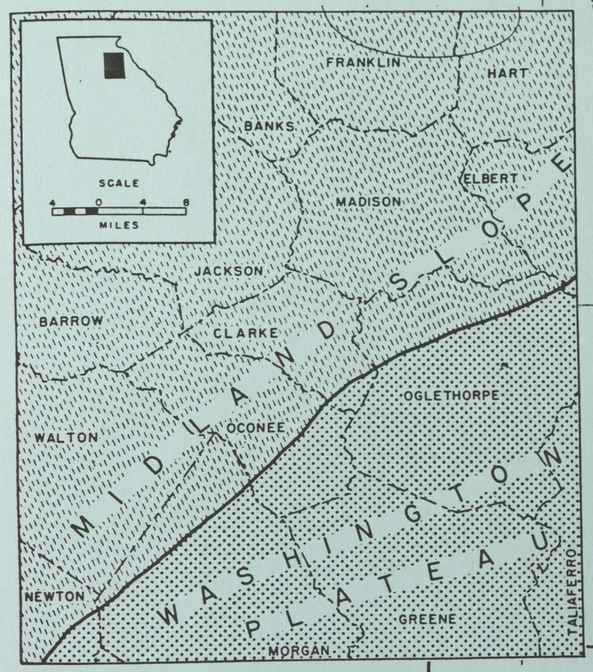


FIGURE 4

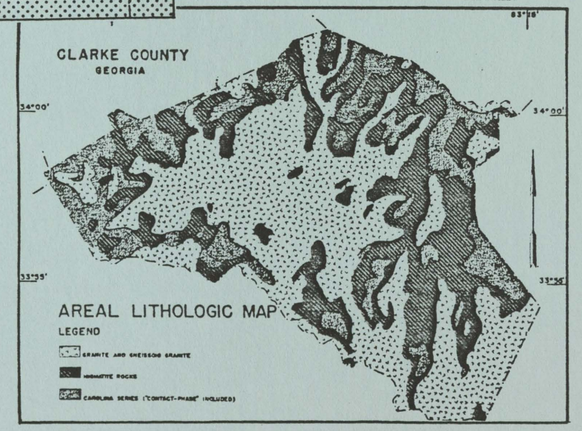
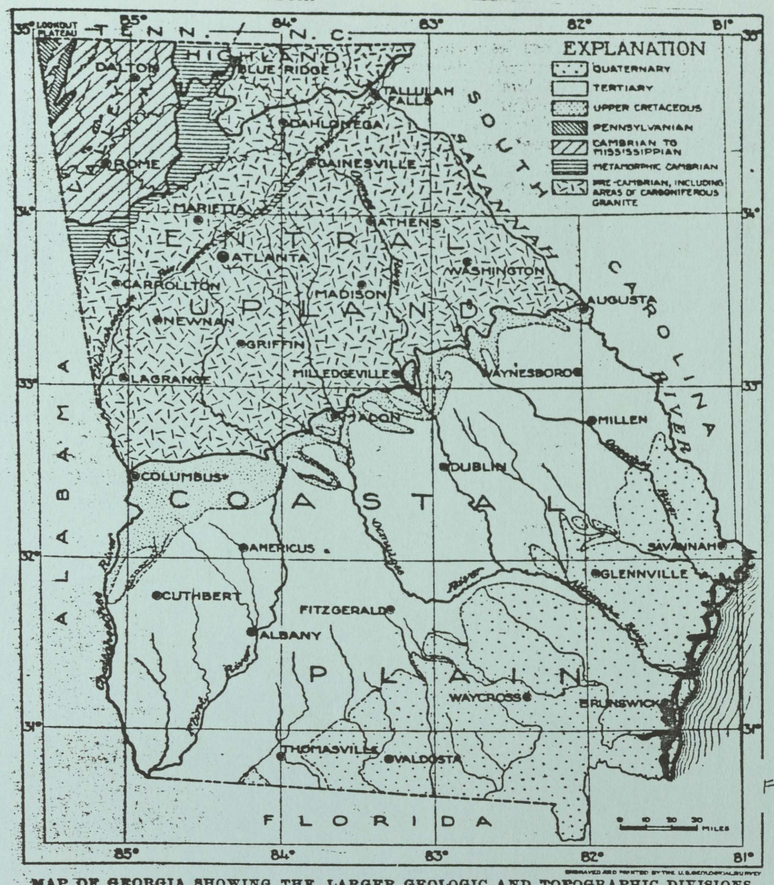


FIGURE 5



MAP OF GEORGIA SHOWING THE LARGER GEOLOGIC AND TOPOGRAPHIC DIVISIONS.

By Wythe Cooke, Laurence LaForge, Arthur Keith, and M. R. Campbell

FIGURE 1

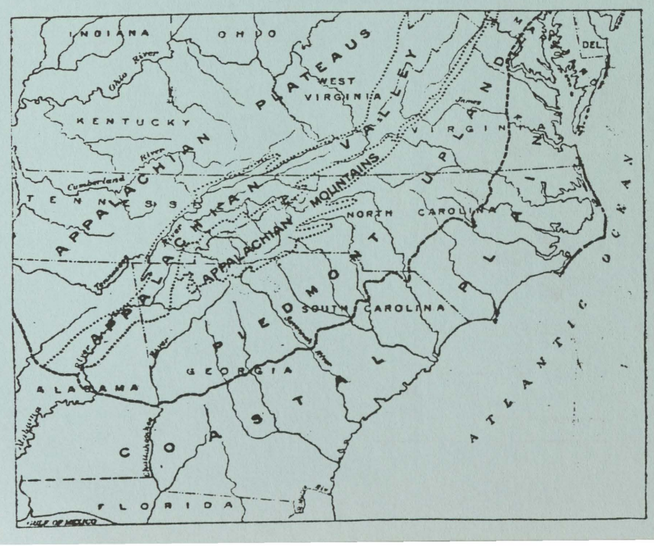


FIGURE 2

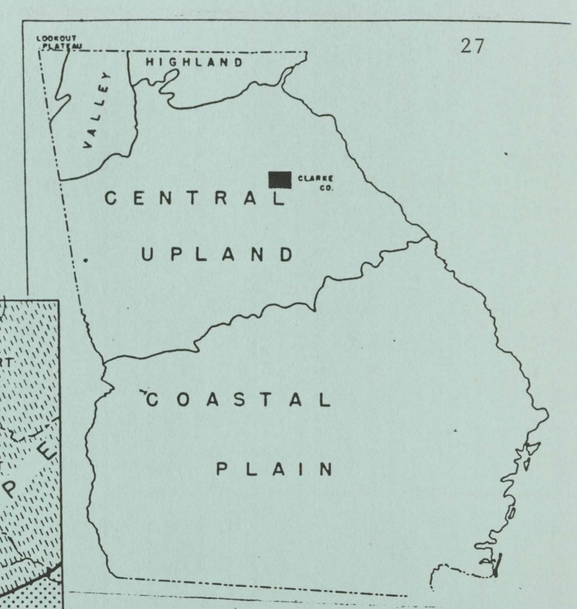


FIGURE 3

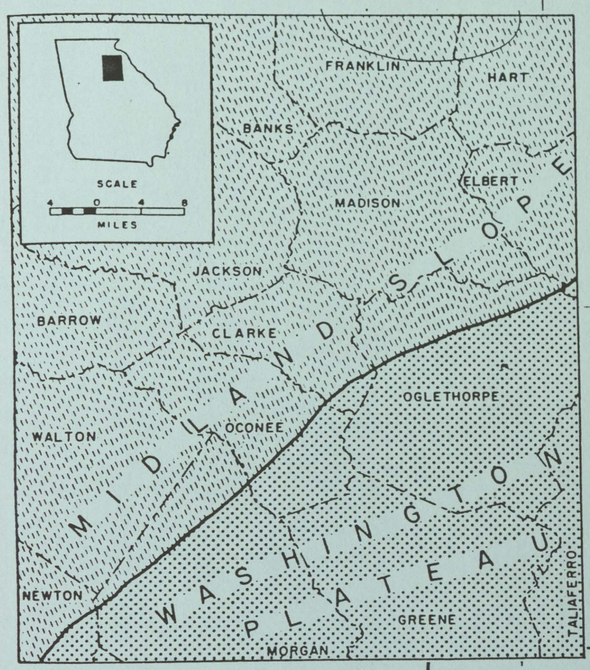
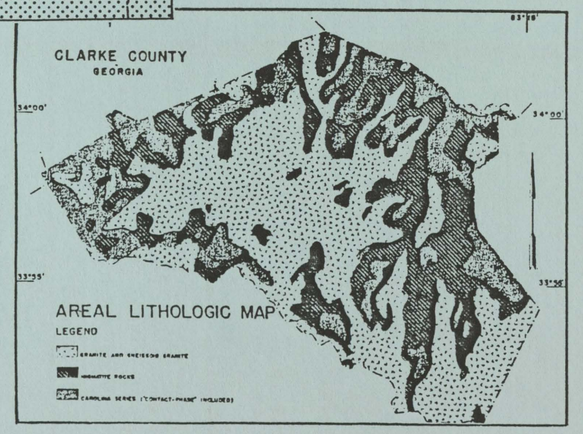


FIGURE 4



FIGURE

LANDFORM: GNEISS

REGIONAL LOCATION: Scattered

DRAINAGE PATTERN:

PHOTO: Gneiss: Stream intersections (I) join at right angles and streams make abrupt bends (B).

North Carolina U.S.D.A. Photos;* September 1940

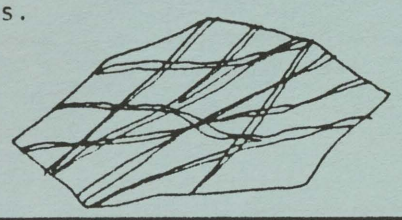
RELATED MATERIAL:

USGS QUAD. Rural Hill, N.C.; 7½'
PHOTOS: USDA(ACJ) Forsyth C., N.C.
OTHER Geomorphology (Lobeck) p.53
*CREDITS Land Form Reports (Belcher) 3

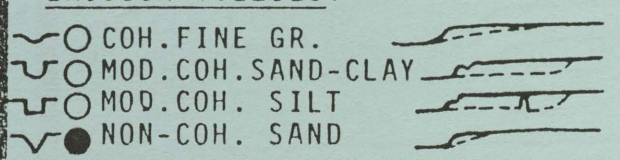
DRAINAGE PATTERN TYPES: Well developed, dense, angular dendritic pattern.

◐ DENDRITIC	○ TRELLIS	○ RADIAL	TEXTURE-
○ PINNATE	○ BARBED	○ CENTRIPIDAL	○ FINE
○ RECTANGULAR	○ DERANGED	○ ANNULAR	● MEDIUM
● ANGULATE	◐ PARALLEL	○ INTERNAL	○ COARSE

FORMATION: Gneiss is a metamorphic rock that is similar to granite. The minerals in gneiss tend to concentrate in alternate zones giving rise to a banded appearance even in small specimens.



EROSION GULLIES:



VEGETATION AND LAND USE: Natural cover with some cultivation on the lower slopes and along the valley floors. The slopes are usually too steep to be cultivated.

TONE: Often obscured by forest cover.

● WHITE	○ MOTTLED
○ LIGHT GRAY	○ BANDED
○ DULL GRAY	○ BOUNDARY-SHARP
○ BLACK	● BOUNDARY-NONE

SOIL CHARACTER: Moderately plastic, deep surface soil. Sand 30-50% Silt 15-50%, Clay 5-40%. Seepage is negligible except along well developed planes of foliation or weathered zone.

MAIN IDENTIFIERS:

1. Steep, sharp-crested hills
2. Angularity in drainage pattern
3. Possible parallelism in drainage.

TOPOGRAPHY: Hills are steep having sharp crests, and are often arranged as parallel ridges. Topo developes because of banding structure indicating changes in rock resistance.

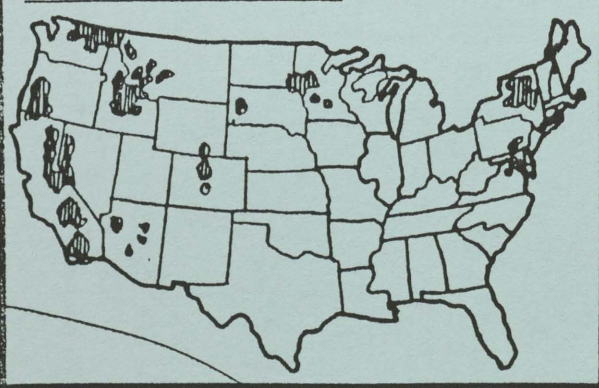
ENGINEERING MATERIALS:

Highway Construction: Requires a great amount of blasting. Fair for aggregate Sometimes used for building stone. Usually suitable for foundations.

FIGURE 7

LANDFORM: GRANITE

REGIONAL LOCATION: Humid



DRAINAGE PATTERN:

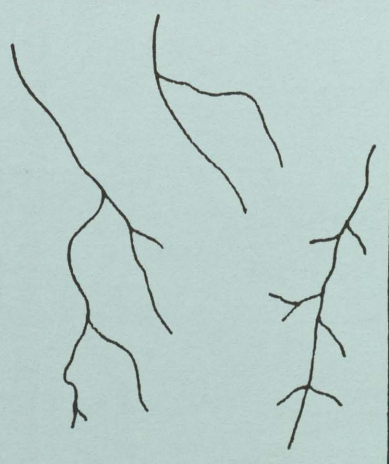
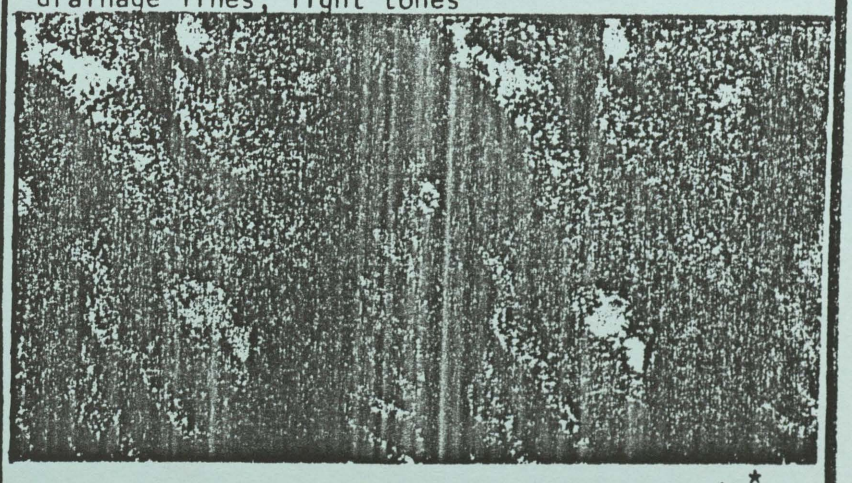


PHOTO: Granite: Bold, rounded hills; curving drainage lines; light tones



Montana U.S.D.A. Photos; August, 1940*

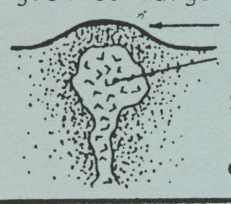
RELATED MATERIAL:

USGS QUAD. Mt. Rushmore, S.D. 15'
PHOTOS: USDA; BNW-7CC-73-74
OTHER Geomorphology (Lobeck) p.44-49
*CREDITS Land Form Reports (Belcher) 3

DRAINAGE PATTERN TYPES: curved and intersect at right angles.

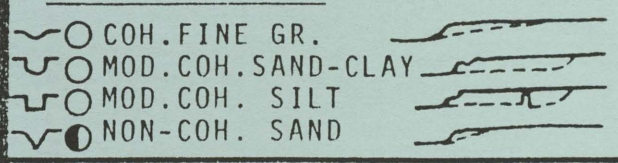
● DENDRITIC local	○ TRELLIS	● RADIAL regional	TEXTURE-
○ PINNATE	○ BARBED	○ CENTRIPIDAL	○ FINE
○ RECTANGULAR	○ DERANGED	○ ANNULAR	○ MEDIUM
○ ANGULATE	○ PARALLEL	○ INTERNAL	● COARSE

FORMATION: Like other intrusive rocks, granite has been formed by the slow cooling of molten masses deep beneath the surface of the earth. Slow cooling allows the crystals to grow to large sizes.



Strongly jointed and fractured. Weathers by exfoliation.

EROSION GULLIES: Varies



VEGETATION AND LAND USE: Sparse vegetation to bare areas in upper portions of hill. Timber growth on lower slopes. Vegetation appears heavier in fractures. Any transported soil will dictate use.

TONE:

● WHITE	○ MOTTLED
○ LIGHT GRAY	○ BANDED
○ DULL GRAY	◐ BOUNDARY-SHARP
○ BLACK	○ BOUNDARY-NONE

SOIL CHARACTER: Varies from bare rock to a deep soil mantle. Topsoil is generally silty sand (few inches), followed by a few feet of compact sandy clay. Rock fragments are then encountered.

MAIN IDENTIFIERS:

1. Massive, dome-like topography
2. Curving, dendrictic drainage
3. Fracture pattern

TOPOGRAPHY: Massive, rounded, dome-like hills with fairly steep side-slopes. Fractures when developed, form a choppy surface and curvilinear lines Absence of stratification & foliation.

ENGINEERING MATERIALS:
Highway Construction: Excavation requires blasting, large boulders. Poor aggregate; good sub-base & base. Local seepage problems occur.

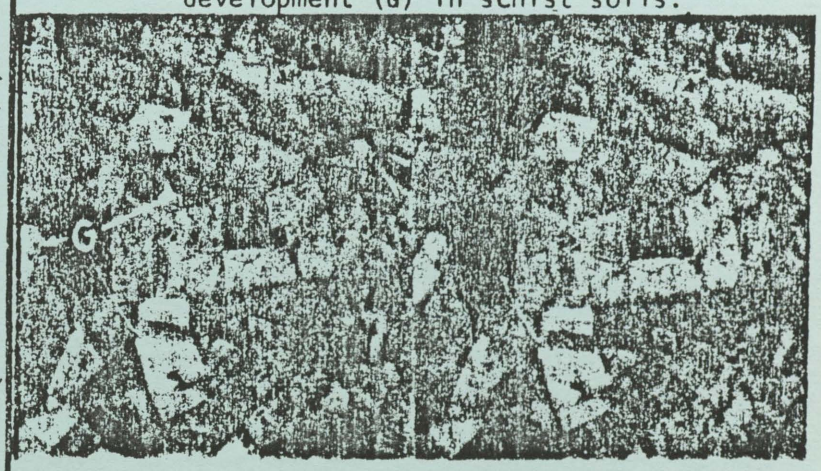
FIGURE 6a

LANDFORM: SCHIST

REGIONAL LOCATION: Scattered

DRAINAGE PATTERN:

PHOTO: Schist in a humid area: Typical gully development (G) in schist soils.



Virginia U.S.D.A. Photos; November, 1943*

RELATED MATERIAL:

USGS QUAD. Scottsville, Va.
PHOTOS: USDA(DVO); SCS(BV,FG)
OTHER Geomorphology(Lobeck) p. 53
*CREDITS Land Form Reports(Belcher)3

DRAINAGE PATTERN TYPES: Results from structural control of drainage.

○ DENDRITIC	○ TRELLIS	○ RADIAL	TEXTURE-
○ PINNATE	○ BARBED	○ CENTRIPIDAL	○ FINE
● RECTANGULAR	○ DERANGED	○ ANNULAR	● MEDIUM
○ ANGULATE	○ PARALLEL	○ INTERNAL	○ COARSE

FORMATION: Schists are highly altered rocks that are thinly laminated. The layers could consist of quartz, mica, hornblende and garnet. Because of their thinly laminated structure schists are easily broken down by weathering.

EROSION GULLIES: Many parallel

- ○ COH. FINE GR.
- ● MOD. COH. SAND-CLAY
- ○ MOD. COH. SILT
- ○ NON-COH. SAND

VEGETATION AND LAND USE:
Thin soil areas: little vegetation Occurs in weaker bands containing more water.
Deep soil areas: hilltops are farmed slopes are in forest

TONE: obscured by vegetation

● WHITE	○ MOTTLED
● LIGHT GRAY	◐ BANDED (faint)
○ DULL GRAY	○ BOUNDARY-SHARP
○ BLACK	● BOUNDARY-NONE

SOIL CHARACTER: In arid or glaciated regions little or no soil is present. In humid areas five to ten feet of soil is common grading into rotten rock. Soil varies from a sandy silt to sandy clay. Internal drainage generally good.

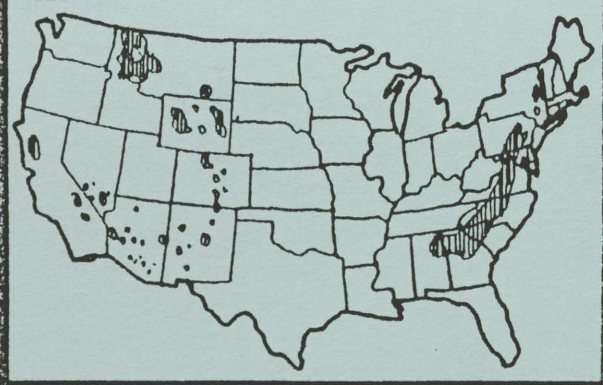
MAIN IDENTIFIERS:
1. Rectangular drainage pattern
2. U-shaped gully development
3. Possible faint banding (arid)
4. rounded, steep sided hills (humid)

TOPOGRAPHY: Thin soils: Moderate relief with rugged surface and faint banding.
Deep soils: Hilltop has a smooth rounded appearance; steep slopes

ENGINEERING MATERIALS:
Highway Construction: In arid or glaciated regions little excavation is needed. Excavation is generally difficult; rock slides are common. Some seepage problems. Deep soils best.

LANDFORM: SERPENTINE

REGIONAL LOCATION Scattered



DRAINAGE PATTERN:

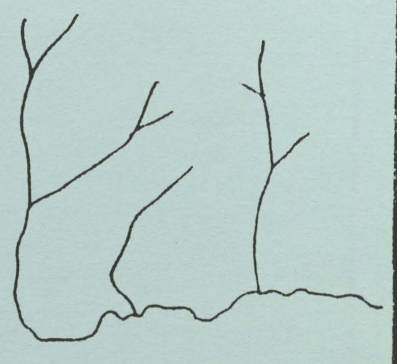
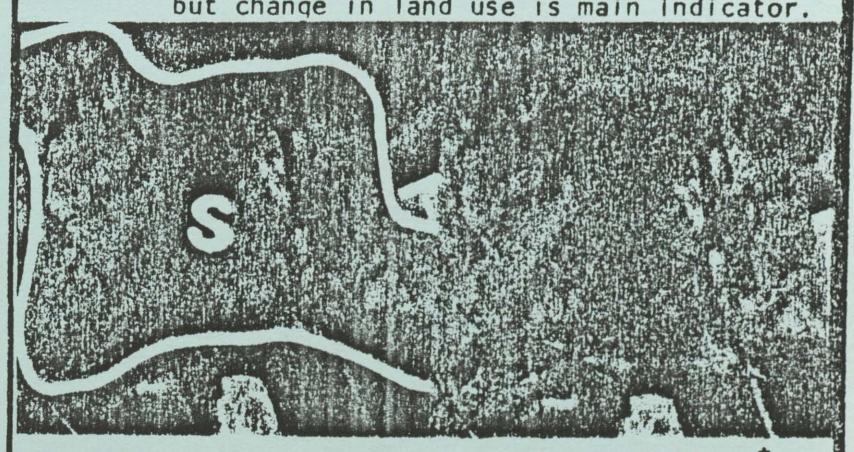


PHOTO: Serpentine: small exposure (S); area is to small to create any topographic conditions, but change in land use is main indicator.



Lancaster Co., Penna. U.S.D.A. Photos 6/47*

RELATED MATERIAL:

USGS QUAD. Conestoga, Pa.; 1956; 7½'
PHOTOS: USDA (Lancaster Co.) AHG
OTHER Geomorphology (Lobeck) p. 41
*CREDITS Land Form Reports (Belcher) 3

DRAINAGE PATTERN TYPES: regionally-dendritic locally- radial

● DENDRITIC	○ TRELLIS	◐ RADIAL	TEXTURE-
○ PINNATE	○ BARBED	○ CENTRIPIDAL	○ FINE
○ RECTANGULAR	○ DERANGED	○ ANNULAR	● MEDIUM
○ ANGULATE	○ PARALLEL	○ INTERNAL	○ COARSE

FORMATION: Serpentine is formed by the alteration of intrusive igneous rocks. It consists chiefly of the mineral serpentine but may contain a variety of other minerals. Serpentine is soft and weathers easily.

EROSION GULLIES: Many short & steep

- ◐ COH. FINE GR.
- ○ MOD. COH. SAND-CLAY
- ◐ MOD. COH. SILT
- ○ NON-COH. SAND

VEGETATION AND LAND USE: A general absence of cultivation. These soils have little nutritive value and even the natural cover is that of the very hardy variety.

TONE: Smooth curving boundary

○ WHITE	○ MOTTLED
● LIGHT GRAY	○ BANDED
● DULL GRAY	● BOUNDARY-SHARP
○ BLACK	○ BOUNDARY-NONE

SOIL CHARACTER: Varies from a silty clay to barren rock. Depth of soil in humid areas is 1' to 5'. Soils are excessively drained. Rock has many slipping planes and causes many landslides. Soil does not swell.

MAIN IDENTIFIERS:

1. Large areas: Sinuous ridge, smooth rounded surfaces, and short gullies
2. Small areas: Lack of cultivation and poor veg. cover; dull gray tone

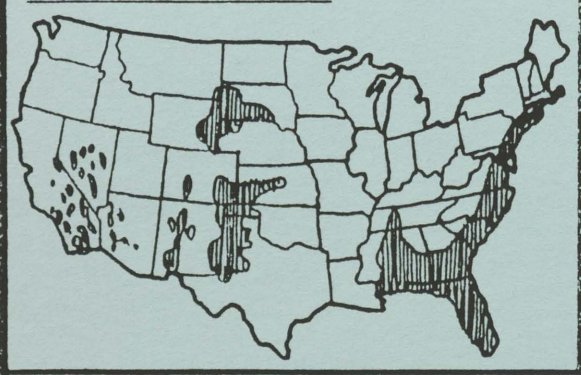
TOPOGRAPHY: Large areas: Long winding ridges connecting elongated conical hills. Small areas: smoothly rounded hills with convex sideslopes.

ENGINEERING MATERIALS:
Highway Construction: Excavation is usually necessary but is not difficult. Rock will slide in road cuts, quarries, and tunnels. Foundations questionable.

FIGURE 9

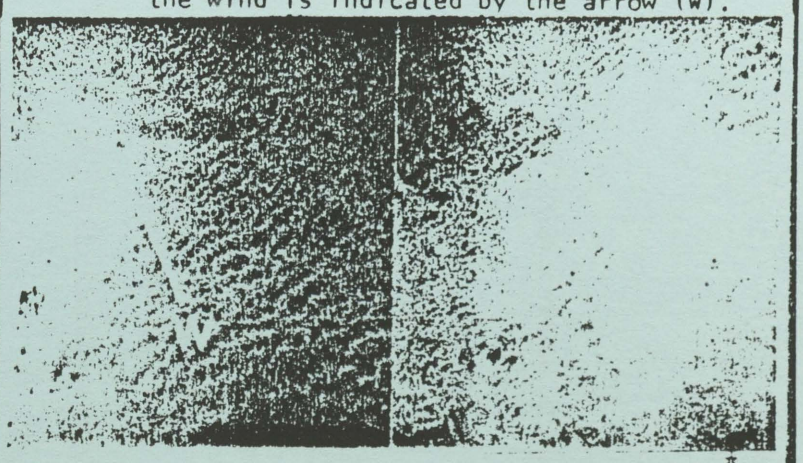
LANDFORM: SAND DUNES

REGIONAL LOCATION: Scattered



DRAINAGE PATTERN:

PHOTO: Large Dune area: Prevailing direction of the wind is indicated by the arrow (W).



White Sands, New Mexico U.S.D.A. Photos 8/41*

RELATED MATERIAL:

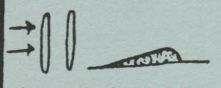
USGS QUAD. Gary, Ind. 1959; 1:24
PHOTOS: USDA BFJ-IV-34-36 Lake, Ind.
OTHER Geomorphology (Lobeck) p382-387
*CREDITS Land Form Reports (Belcher) 6

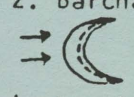
DRAINAGE PATTERN TYPES: No surface drainage

○ DENDRITIC	○ TRELLIS	○ RADIAL	TEXTURE-
○ PINNATE	○ BARBED	○ CENTRIPIDAL	○ FINE
○ RECTANGULAR	○ DERANGED	○ ANNULAR	○ MEDIUM
○ ANGULATE	○ PARALLEL	● INTERNAL	○ COARSE

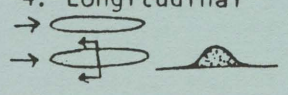
FORMATION: Developed by the action of wind blowing over loose sediments. Dunes are controlled by the following: Sand volumne, grain, wind velocity, topography, and existing vegetation.

1. Transverse
2. Barchane





3. Wind-drift
4. Longitudinal



EROSION GULLIES:

○ COH. FINE GR.	
○ MOD. COH. SAND-CLAY	
○ MOD. COH. SILT	
● NON-COH. SAND	

VEGETATION AND LAND USE: Vegetation is absent except on old stabilized dunes in humid areas. May be more vegetation in areas between dunes where more moisture is present.

TONE:

● WHITE	○ MOTTLED
○ LIGHT GRAY	◐ BANDED
○ DULL GRAY	● BOUNDARY-SHARP
○ BLACK	○ BOUNDARY-NONE

SOIL CHARACTER: Most often composed of quartz sands. Grain size is relatively equal within the same dune. This narrow range in grain size and their lack of angularity are important structural characteristics.

MAIN IDENTIFIERS:

1. Topographical shape, small size
2. light tone
3. Directional arrangement

TOPOGRAPHY: Either Transverse, Barchane, Wind-drift, or Longitudinal as discussed under formation. Each of these typical types, however, could have slight variations.

ENGINEERING MATERIALS:

Highway Construction: Excavation is no problem and dunes are small enough to avoid. Mix fine material or some asphalt to stabilize.

FIGURE 10

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HYDROLOGY OF THE STATE OF GEORGIA
THE PIEDMONT REGION

STUDY PREPARED BY:
TAD BRASWELL and TREY SCHWARTZ

HYDROLOGY OF THE STATE OF GEORGIA

THE PIEDMONT REGION

In the planning for the use of land, one needs to consider many aspects. One of the most important factors is hydrology. In this study we will examine water resources and their hydraulics. These factors will be confronted on both a statewide and regional scale, the Piedmont region in particular. The study will point out problems dealing with the present water situation and alternatives to aid in solving these dilemmas.

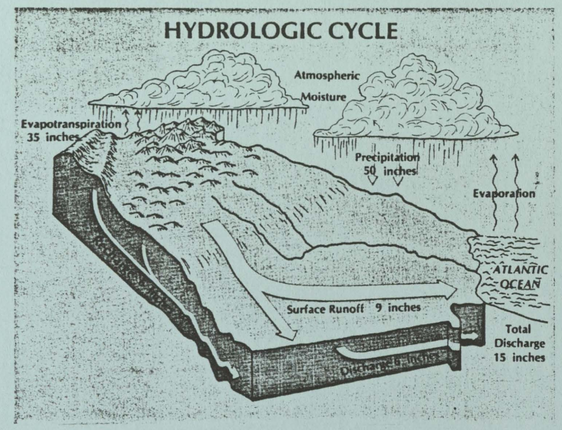
First, an understanding of the basic hydrologic cycle is necessary to fully comprehend the sources of water and their potential problems. Water exists is all four realms. These are the atmosphere, lithosphere, biosphere, and of course, the hydrosphere. The relative abundance of water is as follows:

OCEANS	97%	AVAILABLE TO PLANTS	0.005%
GLACIERS	2%	SURFACE WATER	0.02%
DEEP STORAGE	0.6%	ATMOSPHERE	0.001%

(1)

The hydrologic cycle is a relatively perfect cycle in that we can account accurately for volumes of water involved. Not only does the hydrologic cycle present an understanding of how

water moves in our environment, it illustrates the renewable nature of water as a resource through evaporation and condensation. Being a renewable resource, water is in all practicality an inexhaustible resource. The quantity of water reaching the surface is more than enough to adequately meet the requirements of the world demand. Not considered by this broad statement, however, is the fact that water distribution is not spread equally throughout all needy areas. Thus, the demand for water resources in some areas of the world far outweighs the demand in other areas.

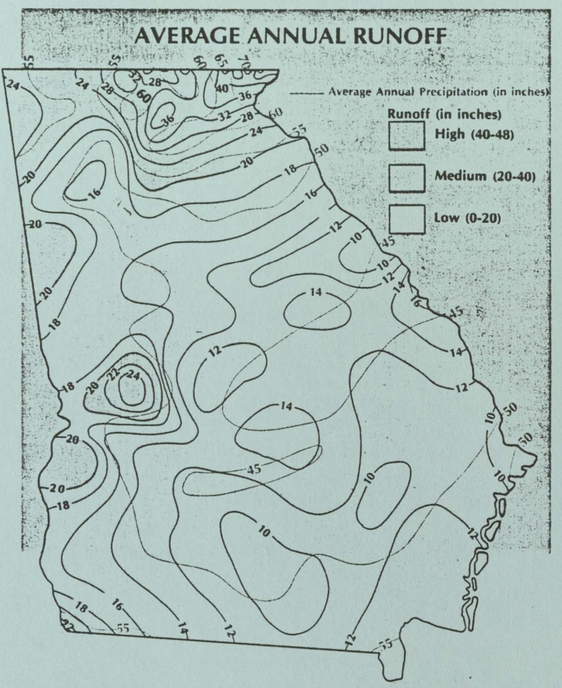


(2)

Water resource problems in Georgia are categorized and discussed below as they relate to six existing physical domains, 1) land surface, 2) river channel systems and flood plains, 3) lakes and reservoirs, 4) coastline and marshes, 5) underground, and 6) atmosphere.

At one time, erosion and sedimentation problems on agricultural lands in Georgia were prevalent but now those

dilemmas have been suppressed greatly. Feasible techniques have been utilized to control erosion, but increased urban development in localized areas has effected cases of extreme problems. Accelerated filling of small and medium-sized reservoirs and stream channels, as well as decimation of wildlife, rivers, and lakes has resulted. With the loss of stream channel capacities, floods become more frequent.



(3)

Mountains and lakes have become the sites for intense problem areas due to the increased demand for second homes. During construction of such sites, erosion is often the reason

for ensuing damage on other properties. Local governments have usually not had the resources needed to handle such problems.

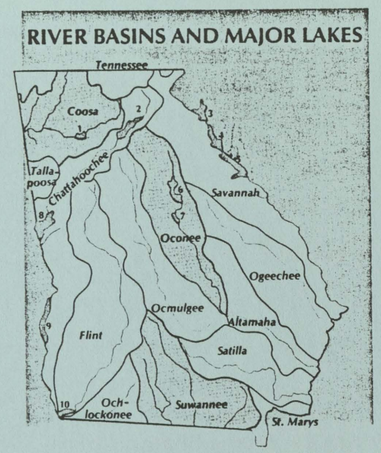
In order to better develop the capabilities of dealing with the problem, research must be conducted to estimate the amount of erosion of land from the surface and the channel systems. More efficient methods for collecting sediment data would aid considerably as well as research directed toward urban areas and the management of sediment during project constructions.

Estimation of storm runoff for highway culvert design; forecasting of flooding conditions on smaller streams, particularly in urban areas; and the design of dams on small watersheds for retention of excess urban runoff, recreation or water supply continue to be major problems in surface water hydrology. Requirement of storm runoff estimations both before and after potential developments such as commercial, industrial, and residential uses.

Water resource planning demands accurate hydraulic data on future runoff quantities. Estimation of runoff volumes for small watersheds is difficult to assess. The accuracy of such measurements when conducted are often unreliable. Evapotranspiration, groundwater recharge, and infiltration of precipitation are related concerns, although in many cases, the estimations are not blemished by substantial errors.

Flood plains and stream channels can be utilized for reservoir storage, lake recreation, flood conveyance, pasture, parks, urban development, and water supply. Most of the problems in this domain relate to the above mentioned.

The surface hydrology of Georgia is unique. The northern mountains and the upper Piedmont produce runoff which feed most of the rivers flowing through the state. All rivers in the state of Georgia, excluding the Savannah, originate within the borders. Surface water is the source of most of the domestic supply for areas north of the Fall Line. Depicted in the stream hydrographs are the average annual discharges at select gauging sites on the principal river systems. A major continental divide existing between the Ocmulgee and Flint rivers separates the Atlantic Ocean and the Gulf of Mexico drainage.



	Normal Summer Level Elevation (Feet MSL)	Area (Acres)	Length of Shoreline (Miles)
1. Allatoona Lake	840	11,860	270
2. Lake Sidney Lanier	1,070	38,000	540
3. Hartwell Lake	660	61,400	962
4. Richard B. Russell Lake	475	44,114	546
5. Clark Hill Lake	330	78,500	1,140
6. Lake Oconee	436	19,050	374
7. Lake Sinclair	340	15,330	417
8. West Point Lake	635	29,500	500
9. Walter F. George Lake	190	45,000	515
10. Lake Seminole	77	37,500	250

The majority of the water supply in the northern half of Georgia originates from streams having little or no reservoir during drought periods. The effects of severe droughts in Georgia have great effects on these small streams and the communities that depend on them.

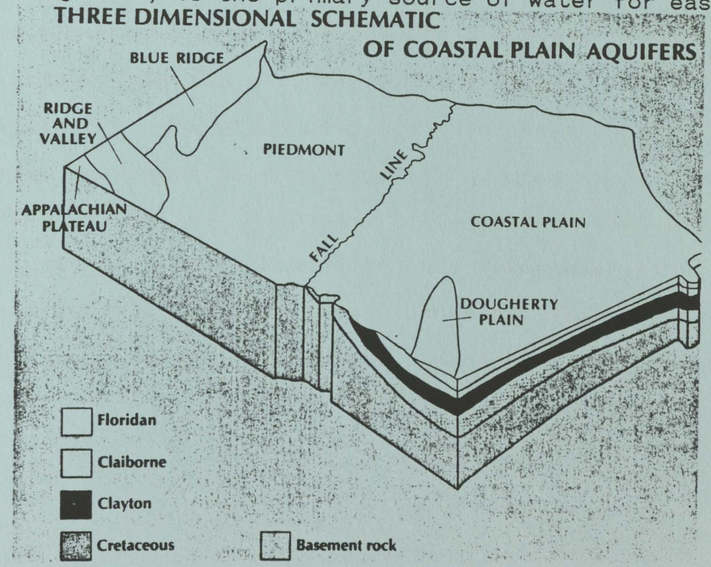
All the major lakes in the state of Georgia are man-made. They were constructed primarily for the purpose of cooling hydroelectric power plant equipment. A secondary usage for these lakes is water reservoirs, and thirdly for recreation. It is easy to see how these uses conflict with one another. During periods of drought, water levels decrease thus making public use minimal. At the same time the public is restrained from using normal quantities of water due to the lack of necessary supply. However, enough water is available to cool the power facilities due to the fact that these bodies of water were constructed for this specific use.

Approximately 120 miles of Georgia ocean frontage exists facing the Atlantic. Extensive island ranges cover a majority of the coastline, many of which are legally protected and preserved. One prominent dilemma from which the coastal shores and these islands suffer from is the erosion of the primary sand dunes which protect the inland soils and vegetation. This problem is caused by developments being constructed too close to the immediate shores. The swamps adjacent to the shoreline are also in danger because of erosion resulting from poor management of agricultural and industrial developments.

The ground water of Georgia exists in aquifers. The Coastal Plain is composed of alternating layers of sand, clay, and limestone. Productive aquifers are confined by overlying strata. Aquifers found near the Fall Line, however, are exposed or lie near the surface. The four major aquifers are the Floridian, Claiborne, Clayton, and Cretaceous.

The Floridian aquifer is composed of confined limestone, dolostone, and calcarious sand. Supplying nearly 50% of the state's groundwater supply, it feeds the Savannah, Brunswick, St. Marys, Albany, and the Dougherty Plain area. With the increase of aquifer use in the last 100 years, a 110-foot drop in the potentiometric surface near Savannah and an 80-foot drop near St. Marys. The decline at Brunswick has led to the intrusion of brackish water from the deeper zones.

Both the Clayton and the Claiborne aquifers consist of confined sand and limestone. They supply large sources of water for southwestern Georgia. The Cretacious aquifer, composed of sand and gravel, is the primary source of water for east Georgia.



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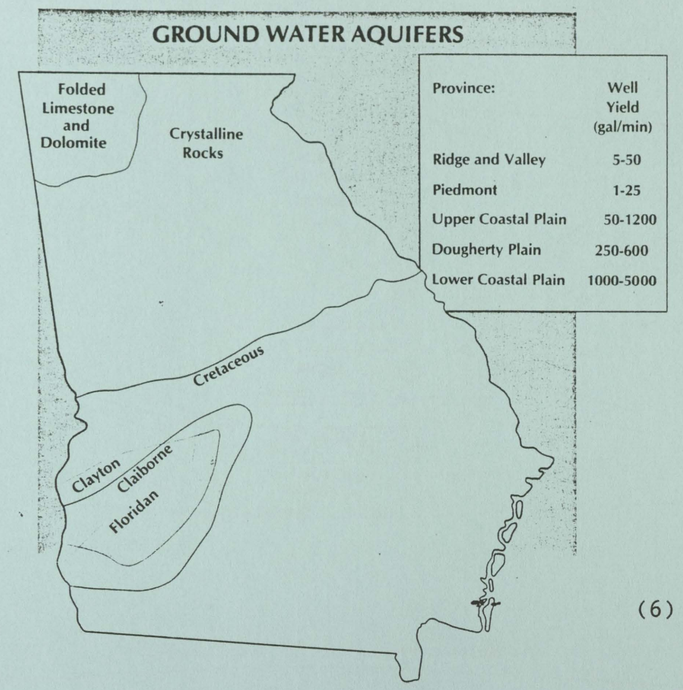
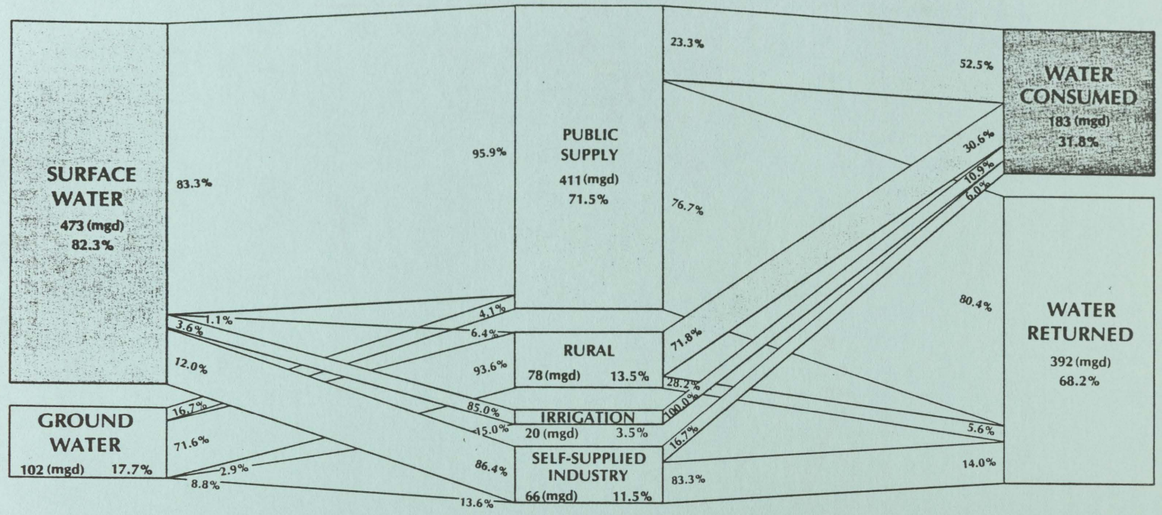


(6)

The major source of recharge for groundwater supply is precipitation from the atmosphere. The average annual precipitation in the state of Georgia varies according to area elevation. Northern Georgia receives as much as 70 inches of precipitation per year because of its higher elevation. The Piedmont region, having a considerably lower elevation, has an average precipitation rate of 45 inches per year. Finally, the Coastal Plains have an average of approximately 50 inches of precipitation per year due to the influence of the Atlantic Ocean.

WATER USE IN BLUE RIDGE AND PIEDMONT



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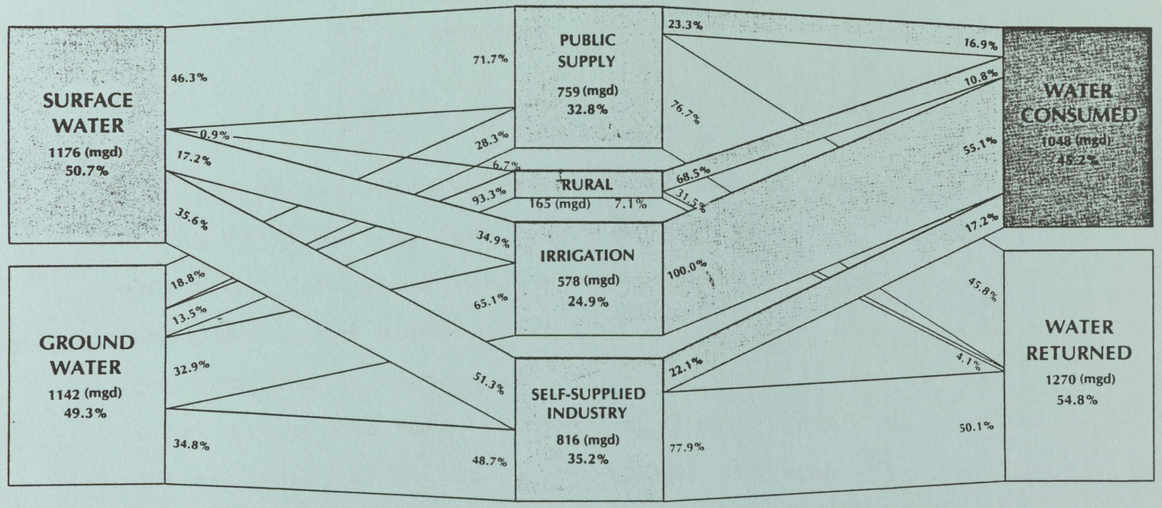
TOTAL WATER USE IN GEORGIA



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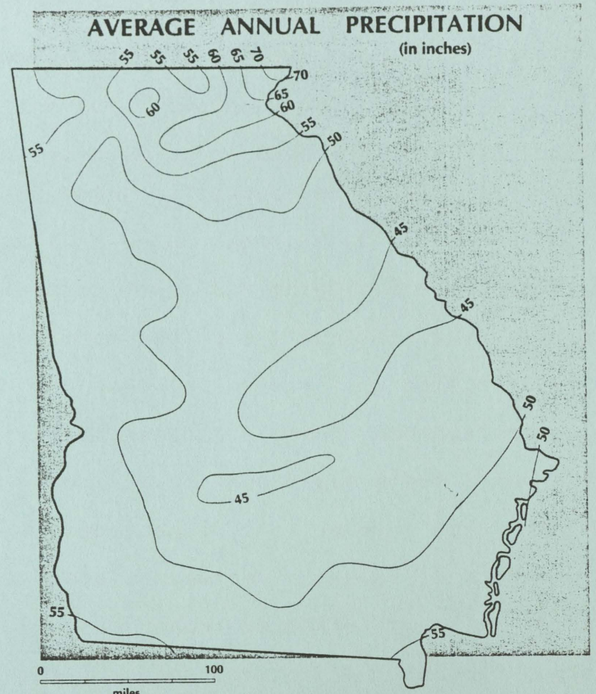

MEAN ANNUAL AND MONTHLY MAXIMUM SNOWFALL

City	Mean Annual (in.)	Maximum Monthly (in.)	Date of Occurrence
Athens	2.0	8.7	March 1983
Atlanta	1.7	8.3	January 1940
Augusta	1.3	14.0	February 1973
Columbus	0.5	14.0	February 1973
Macon	1.0	16.5	February 1973
Rome	2.0	8.3	March 1960
Savannah	0.4	3.6	February 1968

(7)

The available water resources of the state of Georgia are widely utilized. In 1980 over 7 billion gallons of fresh water were drawn from the rivers, streams, lakes, and underground resources in the state. This vast quantity of water was derived from both public systems and privately owned wells. Of this amount 2/3 of the total is used for thermoelectric cooling and then returned to the source. The remaining supply is used for public and private purposes. Of this 2.3 billion gallons of water used daily, just over 1/2 is returned to the original supply.

Of the water used statewide, excluding individual private well supply, the total amount acquired and distributed is then retrieved and recycled to be used again. Thus the supply follows a circle and in doing so assures an always available supply. Other ways exist in which water is utilized when dormant. Dormant supplies in lakes and streams are used for reservoir supply, recreational use, and visual pleasure. People use this water to fish and boat in while at the same time it is appreciated for its aesthetic beauty and qualities. This makes it extremely important to keep these areas clean and unpolluted.

The water resources in the Piedmont vary little from the resources available statewide. However, the percentage breakdown of the uses of these resources differ greatly. Because of the crystalline rock covering most of the Piedmont region, groundwater is difficult to acquire; therefore, 83% of the water supply for the region originates from surface water. A majority of this water, 71.5%, is used by the public. This is because the majority of the state's population resides in the Piedmont region. One advantage of this high percentage of public use is that 68% of the total water usage in the Piedmont is returned to its original source.

As before stated, water is a high in demand despite its vast quantity. Being a renewable resource assures us of a continuous supply for years to come. The primary reason for concern in demand is our care for this most valuable item. With the constant possibility of damaging pollution and mismanagement, great care must be taken to insure the quality of one of our most precious natural resources from which all life depends, water.

FOOTNOTES

(1) Westmacott, Richard, Notes on Ecology from LAR 323, p. 82.

(2) Hendricks, Stephen Elliot, Handbook on Site Selection, Analysis Design and Development Within the Georgia Mountains and the Upper Piedmont, The Georgia Mountains Planning and Development Commission, pg. 4.

(3) Ibid., p. 6.

(4) Ibid., p. 9.

(5) Ibid., p. 10.

(6) Ibid., p. 4.

(7) Ibid., p. 5.

(8) Ibid., p. 13.

(9) Ibid., p. 2.

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Soils

by

Rich Mandell
and
Jim Reilly

LAR 316
Roger Moore
Spring '89

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Soils are the loose mineral or organic matter surface of the earths crust that are capable of supporting plant growth. Mineral soils are stone and rock, sand is also included. Organic soil is full of peat, wood decay, leaves and grasses.

Soils contain sixteen essential elements which are broken down into micronutrients and macronutrients. The macronutrients are needed in higher quantities.[1]

Micronutrients:	Macronutrients:
1-hydrogen	11-nitrogen
2-carbon	*12-calcium
3-oxygen	*13-magnesium
*4-chlorine	*14-phosphorus
*5-copper	*15-potassium
*6-iron	*16-sulfur
*7-manganese	
*8-molybdenum	
*9-zinc	
*10-boron	

* Mineral portion of the soil.

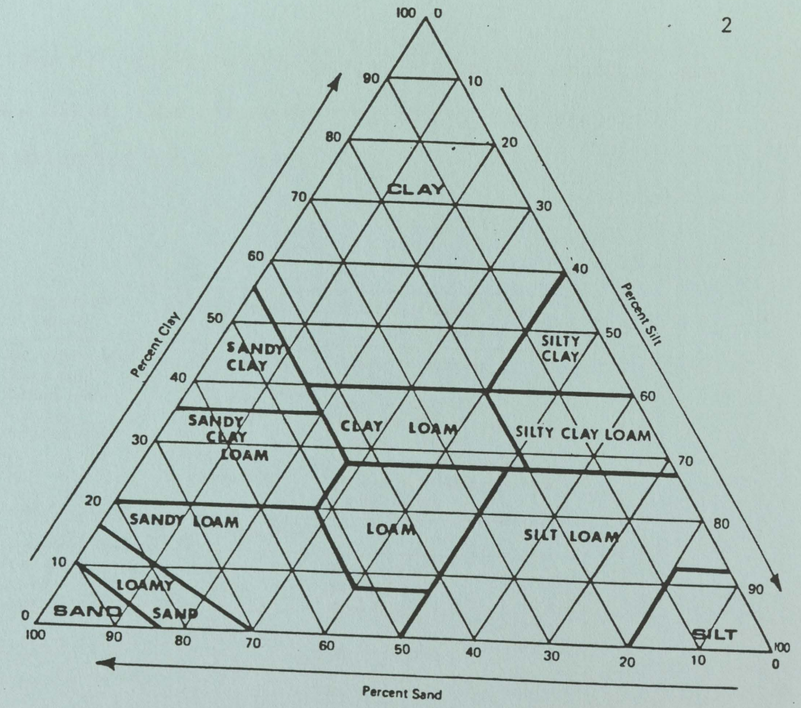
Most soils are predominately composed of minerals, usually formed by weathering of rocks. The minerals include quartz, feldspar, micas, hornblende, calcite, and gypsum. When combinations of these minerals occur in nature, the substances are called rocks. Rocks constantly break down into smaller pieces and make up the soils. This is why rock is known as the parent material to soil.

Physical Properties

Physical properties of soils include texture, structures, density, porosity, consistency, temperature, color, and water.

Texture indicates the proportions of sands, silts, and clays. Sands, silts, and clays are known as the primary particles. Sands average particle diameter is 2- 0.05 mm, silts range between 0.05-0.002 mm, and clays are anything less than 0.002 mm in diameter. There are twelve textural classifications of soils. The first triangle shows the three basic groups, the second triangle is the textural triangle which breaks down the primary particles.

2



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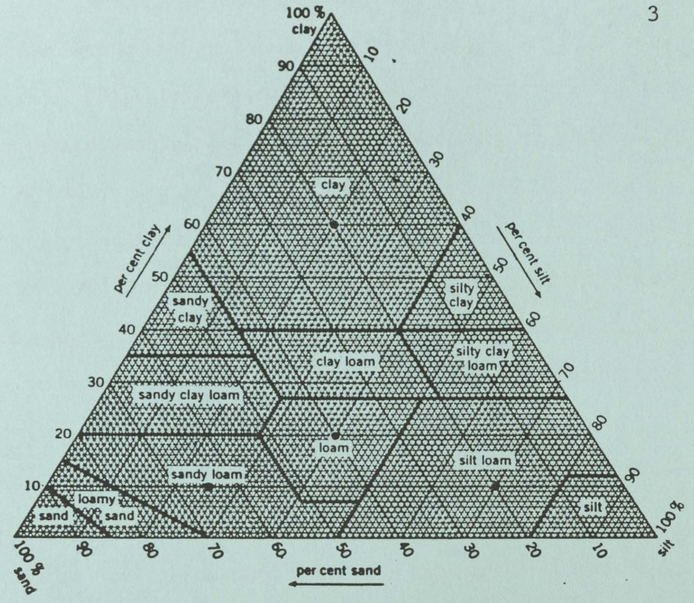

The soil particle size groups, are called separates, are sands, silts, and clays. The relative proportions of separates in a particular soil determine its soil texture.

4

Soil separate name	*Diameter range (mm)*	*Visual size comparison of maximum size*
Very coarse sand	2.0–1.0	House key thickness
Coarse sand	1.0–0.5	Small pin head
Medium sand	0.5–0.25	Sugar or salt crystals
Fine sand	0.25–0.10	Thickness of book page
Very fine sand	0.10–0.05	Invisible to the eye
Silt	0.05–0.002	Visible under microscope
Clay	Less than 0.002	Most are not visible even with a microscope
	Coarse fragments	
Gravels	2–75	2 mm to 3 in.
Cobbles	75–254	3–10 in.
Stones	Greater than	Over 10 in.

Texture is an important soil characteristic because it will determine water intake rates, and water storage in the soil.

Soil structure is the combination of primary particles into larger units, called peds if formed naturally or clods if formed artifically, as by plowing.

Soil structure influences many important properties of the soil such as the rate of infiltration of water. Both granular and single grain soils have rapid infiltration rates, blocky and prismatic soils have moderate rates, and platy and massive soil conditions have slow infiltration rates.

Two soil density measurements are particle density and bulk density. Particle density is the density of the solid soil particles only, the measurement does not include water weight or pore spaces. Bulk density for a volume of soil as it exists naturally, it includes only air spaces and organic materials in the soil volume. Particle density is for each individual mineral, where as bulk density will tell if the soil is suitable for plant growth.

Soil porosity and permeability are related to the amount of pore spaces or voids in the soil. Pore spaces are the portions of the soil not occupied by solids, neither mineral nor organic. Under normal conditions, pore spaces are occupied by air and water. Soil pores have irregular shapes due to soil particles and thus leave the pores between them very irregular in shape, size, and direction. Sands have large and continuous pores. Where as clays have very small pores, which transmit water slowly. The air and water movement through the soil is very important to the soil uses.

Soil consistency describes how well a soil sticks together or resists fragmentation. Also, how the soil holds up under stress. Soil consistency is useful in estimating the soils flow or support strength under applied force. Such as: building weights, and vibrations of road traffic.

Soil color is useful in distinguishing boundaries of differing soils, in indicating internal wetness and water logged conditions. Darker soils usually contain a higher humus content and have a water holding capacity than lighter soils. Also, the change in color of adjacent soils indicates a difference in the soils mineral origin.

Soil Formation

Soil formation comprises two different processes. First, the changes from a consolidated mass (rock) not capable of growing plants to the development of a unconsolidated loose layer of material that can support plants if the climate is suitable and water is available. The second process is the change within the loose material as time passes, called soil development.

Changes during soil formation deal with the process of weathering and of change within the soil mass, caused by many factors: additions, losses, transformations, and translocations.
Additions are made by water, nitrogen from bacterial fixation, energy as sunlight, sediment from the wind and water, salts, organic residues, and fertilizers.

Losses result from chemicals soluble in soil water, eroded small-sized fractions, nutrients in grazed and harvested plants, water losses, carbon losses as carbon-dioxide, and dentrification loss of nitrogen.

Transformations happen because of many chemical and biological reactions that decompose organic matter, from insoluble materials from soluble substances, and alter or dissolve some minerals.

As water and organisms move within the soil, many substances are translocated to different depths.

Soil formation begins with the process of physical weathering of rocks and minerals. Physical abrasion of particles and chemical reactions constantly cause changes in the mineral and organic soil mass. Physical disintegration is caused by the weathering of the exposed surfaces of rocks, parent material, and soil particles. disitegration is caused by these three processes: freezing and thawing, grinding action, and action of organisms.

Freezing and thawing is the expansion force of water as it freezes. When water freezes it is able to split minerals or rocks. Freezing water can exert a pressure of 150lbs./ft sq.

Grinding action is the friction of moving rocks or soil particles against each other. The friction is caused by water, wind, ice, gravity, or soil-mixing action.

Actions of organisms are caused by plants, animald, and people at slow rates. Growing plant roots are capable of splitting many rocks. Constant digging by animals adds slowly to physical disintegration. Also, accelerate the slow process of physical weathering by plowing and cultivating.

Physical weathering is a slow process, which causes

change only in size, thus showing chemical action by exposing more reacting surfaces. In contrast, chemical changes are often rapid. Chemical weathering induces changes in the chemical composition of the matter itself, as by adding oxygen or water, also causing volume change.

Chemical decomposition and chemical transformation cause minerals to dissolve and make changes in thier structure, causing easier fragmentation. There are two different changes, structual and solubilty. Solubility changes are caused by solution, hydrolysis, carbonation, and oxidation-reduction. Structual changes are brought about usually by hydration and oxidation-reduction.

Solution is the dissolving of a solid in a liquid, it separates solid materials into independant soluble ions.

Hydrolysis involves the splitting of a water molecule. It is the reaction of substances with water to form hydroxides and other new substances that usually are more soluble than the original material. It is one of the most important weathering processes causing soil profile changes.

Carbonation is the reaction of a compound with carbonic acid. Carbonic acid is a weak acid produced when gasseous carbon dioxide is dissolved in water. The carbon dioxide comes partially from the atmosphere but mostly from biological respiration during organic material decomposition. Carbonic acids dissolve minerals more readily than does water alone and forms the soluble bicarbonates.

Reduction is the chemical process in which electrons are

gained, the negative charge is increased, and the positive charge is decreased. Reductions usually occurs in soils when oxygen is scarce, as in stagnant water conditions.

Oxidation is both the chemical combining of oxygen with a compound and the loss of electrons of some chemical element. Oxidized materials have a volume increase with added oxygen and are usually softer than the unoxidized material.

Hydration is the combination of a solid chemical such as a mineral or salt, with water. Hydration water combining with the mineral, changes the mineral structure, increasing its volume and thereby making it solfter, more stressed, and easily decomposed.

Parent materials influence soil formation by their different rates of weathering, the nutrients they contain for plant use and the particle sizes they contain. The less developed a soil is, the greater will be the effect of parent material on the properties of the soil. All soils at the lowest category of soil classification are placed into separate series if parent materials are different. This is caused by the leaching of soils through water movement.

Climate is an increasingly dominant factor in soil formation with increased tiem, mainly because of the effects of precipitation and temperature. Some direct effects of the climate on soil formation include the following:[5]

1-A shallow accumulation or retention of lime in areas having low rainfall occurs because calcium bicarbonates are not leached

if sufficient water is not present. Such soils are usually alkaline.

2- Acid soils form in humid areas due to intense weathering and leaching out of basic cations.

3- Erosion of soils on sloping lands constantly removes developing soil layers.

4- Deposition of soil materials downslope covers developing soils.

5- Weathering, leaching, and erosion are more intense and are of longer duration in warm and humid regions where the soil does not freeze. The reverse is true in cold climates.

Climate also influences soil formation through its action on vegetation. Semi-arid climates encourage only scattered shrubs and grasses. Arid climates supply only enough moisture for sparse, short grasses or shrubs, which may not be dense enough to protect the soil against wind and water erosion.

The biosphere is the living environment. The activities of living plants and animals and the decomposition of their organic wastes and residues have marked influences on soil development. Differences in soils that have resulted primarily from differences in vegetation are especially noticeable in the transition where trees and grasses meet. Many western states are places where such differences can be readily observed.

Burrowing animals, such as moles, gophers, prairie dogs, earthworms, ants, and termites, are highly important in soil formation where they exist in large numbers. Soils that have many burrowing animals have fewer but deeper horizons because of the constant mixing within the profile, which nullifies the

organic colloid and clay movements downward.

Topography influences soil formation primarily through its associated water and temperature relations. Soils within the same general climate develop from similar parent material and on steep hillsides typically have a thin A and B horizons because less water moves down through the profile as a result of rapid surface runoff and because the surface erodes quite rapidly. Similar materials on gently sloping hillsides have more water passing vertically through them than do materials on steeper slopes. The profile on gentle slopes generally is deeper, the vegetation is more luxuriant, and the organic matter level is higher than in similar materials on steep topography.

Soil Profile

Soil profile is a vertical cut through the soil to show all of the soil's horizons, extending into the parent material. The profile is shown as five different horizons.

The first is the organic material on the surface of the soil, called the O horizon. it consists mainly of decaying plant residue. Below the O horizon is the A horizon, which usually contains the best soil. The A horizon is where the living organisms are most active. The organisms help bring the O layer into the A layer. Another way this happens is through rainfall. In areas where there are forest conditions, much of the O layer and nutrients are lost because of the rain. In grassland areas the nutrients will stay in the O and A layer. The A horizon can then leach into the B horizon. In forest areas, the B horizon can be very well developed, where as in the grass-land there isn't much of a B horizon. The B horizon is where

the change takes place, from the best soil of the A horizon to the underlying C horizon which is made up of weathered rock. Below the C horizon is the R horizon which is filled with consolidated rock.

Infiltration and Percolation

Infiltration and percolation deal with the way water enters and passes through soil. Infiltration is the water movement into the soil when rain or irrigation water is on the surface. The factors that control the rate of water movement into the soil includes these:[6]

1- The percentage of sand, silt, and clay in the soil. Soils which have a higher concentration of sand have a higher infiltration than a clay soil would.
2- The amount of organic matter in the soil. Organic matter is helpful in keeping the infiltration rate because it protects tye soil from the impact of water hitting the ground.
3- The amount of water in the soil. Wet soils do not have a high infiltration rate because all of the pores and cracks are filled up.
4- Compaction reduces pore spaces and slows infiltration.

Percolation is the movement of water through the profile and into the ground water.

There are three other factors which affect the infiltration and percolation rates, these are: the saturation rate, field capacity, and capillary water movement. The saturation rate is when all the gravitational water is gone and the soil is holding as much as it can. Capillary water movement within soil is water activity traveling in various directions in the soil. The water moves by suction through the soil, from wet to dry areas.

Saturation and field capacity will slow down the infiltration rate, where capilllary movement can help the infiltration rate.

Soil surveys are land inventories composed of soil maps, soil description, some chemical and physical analyses, plant production potentials, engineering properties, and limitations for major land uses.

In 1899, the first surveys were simple and limited. They were intended to answer practical agronomic questions of soil differences and limitations important in improving and expanding crop production.

Today's surveys include information to make interpretations about using soils for engineering construction, locating sorces of sand and gravel, urban development, forest management, recreation development, erosion hazards, and land use planning.

In 1952, The National Cooperative Soil Survey was organized to coordinate and supply the great mass of soil survey information.

The soil conservation service uses a system of three levels of soil management, land capacity class, capability subclasses, and land capability unit

Their are eight land capability classes. Classes one through four can be used for cultivation and five through eight cannot be cultivated in their present state.[7]

Class 1 soils can be used continuously for intensive crop production with minimum attention other than good farming practices.

Class 2 soils have more limitation than Class 1 soils for intensive crop production, such as moderately steep slopes.

Class 3 soils have severe limitations and require more special conservation practices than Class 2 soils to keep them continuously productive. They have shallow soil, steep slopes of about 6-10% or shallow water tables.

Class 4 soils have severe limitations and need a greater intensity of conservation practices for cultivated crops than Class 3 soils. Most of the time these soils should be in permanent crops, such as pastures.

Class 5 soils are not likely to erode but have other limitations, such as boulders or wetness, which arte impratical to correct and thus cannot be cultivated. They should be used for pasture, range, woodland, or wildlife habitat.

Class 6 soils are suitable for the uses as Class 5 soils, but they have a greater need for good management to maintain production because of such limitatioms as steep slopes or shallow soils.

Class 7 soils have very severe limitations and require extreme care to protect the soil, even low intensity use for grazing, wildlife, or timber.

Class 8 soils have such severe limitations that they can be wisely used only for wildlife, recreation, watersheds, and esthetic appreciation.

Land capacity subclasses are soil groups within the eight classes that explain the reason for the limitations. Subclasses are designated by lower case letters:

e- erosion hazard

w- wetness

s- shallow, droughty or stony

c- climate, too cold or too dry

Land capacity units are subdivisions of the subclasses. Soils in one unit are enough alike to be suited to the same crop and

pasture plants, require similar management, and have similar productivity. These units vary from state to state.

Soil erosion is the removal of soil by water and wind. Natural or geologic erosion ranges from very little in undisturbed dense humid forests to extensive in steep and arid lands. Accelerated erosion is from the disturbance caused by people. As the population increases, erosion increases.

Soil erosion can be prevented by year round plant cover, and mulches. Plant covers and mulches protect the soil against raindrops, flowing water, and winds.

Strip cropping is altering strips of crops to keep a protective cover over the land. Windbreak is another way to protect erosion. Windbreaks are made by setting shrubs and trees perpendicular to the wind direction. The higher the trees, the better the protection.

Aquifers are underground reserviors, and are usually found in porous rock formations. Aquifers store 25% more water than the amount of water in all the worlds lakes, rivers, and streams combined.

Soil Provinces of Georgia[7]

The state of Georgia is broken down into eight soil provinces. The sand mountain province is found in the northeast corner of Georgia. This province consists of mountains and plateaus with gently sloping ridge crests at elevations of 1500-2000 feet above sea level. Side slope of the plateaus are steep with escarpments of sand stone, shale, and limestone. The average rainfall is approximately 54 inches. The average temperature is about 59° with average midsummer maximum and midwinter minimum temperatures of approximately 90 and 30°

farenheit. The frost-free season is approximately 200 days.

Southern Appalachian ridges and valleys are located in the northeast corner of Georgia, just below the Sand mountain province. This province consists of ridges of limestone, cherty limestone, sandstone and shale, and gently sloping valleys filled with material moved from the ridges. Elevation ranges approximately 600-1500' above sea level. The average rainfall is between 52-56'. The annual temperature is about 60 degrees farenheit, with the average mid-summer maximum and average mid-winter minimum temperatures of 90-32 degrees farenheit. The frost free season at lower elevations is approximately 210 days.

Blue Ridge province is in the northern center of the state. This province consists of mountain ranges with steep slopes, foothills and narrow intervening valleys underlain by acid crystalline metamorphic rock. Elevations range from about 700-4,700' above sea level. The average rainfall is between 52-90". The average annual temperature ranges from 55-61 degrees farenheit, with the average mid-summer maximum and average mid-winter minimum temperature of 85-26 degrees farenheit. The frost free season is between 170 and 220 days.

Southern Piedmont province is in the center of the state below the Blue Ridge province. This province consists of foot and broad interstream areas that are underlain by acid crystalline and metamorphic rock. Elevations range from approximately 500-1500' above sea level. Mean annual rainfall is 44-56". Mean annual temperature ranges between 59-64 degrees farenheit with mean mid-summer maximum and mean mid-winter minimum temperatures

of 88-91 and 32-36 degrees farenheit, respectively. The frost free season ranges from 210-240 days.

Sand Hills province is a diagonal strip which divides the state. This province consists of gently sloping to steep soils derived from marine sands, loams and clays that were deposited on acid crystalline and metamorphic rocks. The elevation of this province ranges from approximately 300-500 feet above sea level. Mean annual rainfall is 40-52". Mean temperature is approximately 64 degrees farenheit with mean mid-summer maximum and mid-winter minimum temperatures of 90-92 and 36-38 degrees farenheit, respectively. The frost free season is 230-240 days long.

Black Lands province is located within the Southern Coastal Plain province, specifically in the northwestern portion. This province consists of irregular out croppings of marl and clays and shallow to moderately deep soils derived from marl and clay. Elevation of this province is approximatley 400' above sea level. Mean annual rainfall is about 46". Mean annual temperature is approximately 65 degrees farenheit with mid-summer maximum and mid-winter minimum temperatures of about 92 and 37 degrees farenheit, respectively. The frost free season is approximately 240 days.

Southern Coastal Plain province is located in the southern central and southwestern portions of the state. This province consists of soils occupying broad interstream areas having gentle to moderate slopes and underlain by marine sands, loam, and/or clays. Elevation ranges from approximately 250-500' above sea level. Mean annual rainfall is between 40-50". Mean annual

temperatures range from 64-68 degrees farenheit with mid-summer maximum and mid-winter minimum temperatures of 90-92 and 38-44 degrees farenheit respectively. The frost free season ranges from 230-260 days.

Atlantic Coast province is located in the southeastern portion of the state. This province consists of nearly level soils which generally have high water tables and are underlain by marine sands, loams, and/or clays. Elevation ranges from sea level to about 300' above sea level. Mean annual rainfall ranges between 45-53". Mean annual temperatures range from 66-70 degrees farenheit, with mean mid-summer maximum and mid-winter minimum temperatures of 90-92 and 38-46 degrees farenheit, respectively. The frost free season ranges from 250-300 days.

Clarke County is in the Southern Piedmont province. The province is then broken down into eight soil series, each one making up an association. Clarke County has three soil associations within it, ranging from 0-2 percent slopes, 2-10 percent slopes, and 10-25 percent slopes. They are:

A. 0-2% slopes: Cartecay, Toccoa, Wehadkee.

B. 2-10% slopes: Cecil, Madison, Appling, Gwinnett.

C. 10-25% slopes: Pacolet, Gwinnett, Madison.

Each individual association has different suitabilities, each concerning wildlife, construction, residential, and recreational factors.

WILDLIFE

	Row Crops	Pastures	Woodland	Open Land	Wet Land
0-2%					
Cartecav	F	G	G	G	F
Toccoa	G	G	G	G	P
Wehadkee	F	F	G	F	G
2-10%					
Cecil	G	G	G	G	U
Madison	G	G	G	G	U
Appling	G	G	G	G	U
Gwinnett	G	G	G	G	U
10-25%					
Pacolet	F-P	G-F	G	P	U
Gwinnett	P	G-F	G	F	U
Madison	P	G	G	F	U

U= UNSUITED P= POOR F= FAIR G= GOOD

CONSTRUCTION

	Top Soil	Road Fill	Roads	Reservoirs	Embankments
0-2%					
Cartecay	G	F	F	F	F
Toccoa	G	G-F	F	F	F
Wehadkee	F	F	F	F	F
2-10%					
Cecil	F	F	F	F	F
Madison	F	F	F	F	F
Appling	F	F	G	F	F
Gwinnett	F	F	G	F	F
10-25%					
Pacolet	F	F	F-P	F	F
Gwinnett	P	F	F	P	F
Madison	F	P-F	F	P	F

U= UNSUITED P= POOR F= FAIR G= GOOD

RESIDENTIAL

	Residences Lt.	Industry	Septic Tks.	Sewage	Sanit. Landf
0-2%					
Cartecav	U	U	P	P	U
Toccoa	U	U	P	U	U
Wehadkee	U	U	U	P	U
2-10%					
Cecil	F-G	F-G	F	F	G
Madison	F	F	F	F	G
Appling	G	G	F	F	F
Gwinnett	G	F	F	F	G
10-25%					
Pacolet	F-P	P	F-P	P	F
Gwinnett	P	P	P	P	F
Madison	P	P	P	P	F

U= UNSUITED P= POOR F= FAIR G= GOOD

RECREATIONAL

	Play Areas	Paths and Trails	Picnic and Campsites
0-2%			
Cartecay	F	F	F-P
Toccoa	F	F	F-P
Wehadkee	F	P	P
2-10%			
Cecil	G	G	G
Madison	F	G	G
Appling	G	G	G
Gwinnett	F	G	G
10-25%			
Pacolet	P	F	P
Gwinnett	P	F-P	F
Madison	P	F	F

U= UNSUITED P= POOR F= FAIR G= GOOD

Soil is one of the most important as well as abundant organic materials on earth. Without proper functional soil, the World wouldn't exist as we know it today. We would be living in a desert , where nothing grows. The Southern Piedmont clay soil prevalent in Clarke county is a very good soil to continue the ever growing needs of expansion and developement in North Georgia as well as maintain as much of the indigenous enviroment as possible, a constant goal of landscape architects.

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VEGETATION IN THE PIEDMONT

LAR 316
Spring '89
Prof. Moore
Gib Durden - Jim McCutcheon

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VEGETATION IN THE PIEDMONT

Vegetative Regions

Plant life is affected by many different elements: temperature is an important factor, but there are others factors which affect plant survival. The different vegetative regions of the country help to determine what species of plant lives in what part of the country. There are 10 minimum temperature zones, but only 8 of these affect the United States, and just 3 affect the southeast.

All plants have maximum and minimum temperature requirements which limit their distribution as well as adaptability. Adaptability refers to the ability of the plant to enter the dormant stage and withstand a wide variety of temperature extremes. The limiting factors of temperature are as follows: "short growing seasons; unfavorable high or low temperatures for proper development during growing season; harsh winter temperatures that injure or dill dormant plants; and temperatures favorable to the development of pest problems." Since there are factors other than temperature, hardiness ratings can be deceiving and should be used only as a guide.

Tolerance range is another way plants are classified through the use of zones. This method is far more specific than hardiness ranges. "The tolerance range of an individual plant is that range of environmental conditions in which the plant can be grown and will reproduce. The more the genetic variety in a plant species, the greater the tolerance range."

Plant hardiness and tolerance are two important factors which help determine vegetation growth throughout the United States. While they are great tools of reference, each should be followed up with more specific research.

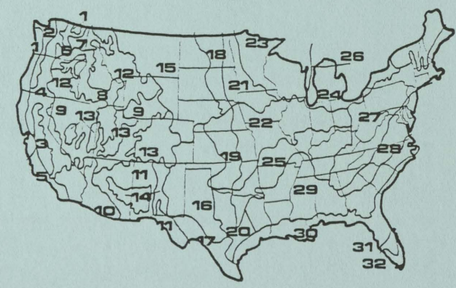


Figure 1-8. Plant Growth Regions of the United States:

1 North Pacific Coast
2 Willamette Valley - Puget Sound
3 Central California Valleys
4 Cascade Sierra Nevada
5 Southern California
6 Columbia River Valley
7 Palouse-Bitteroot Valley
8 Snake River Plain - Utah Valley
9 Great Basin-Intermontane
10 Southwestern Desert
11 Southern Plateau
12 Northern Rocky Mountains
13 Central Rocky Mountains
14 Southern Rocky Mountains
15 Northern Great Plains
16 Central Great Plains
17 Southern Plains
18 Northern Black Soils
19 Central Black Soils
20 Southern Black Soils
21 Northern Prairies
22 Central Prairies
23 Western Great Lakes
24 Central Great Lakes
25 Ozark-Ohio-Tennessee River Valleys
26 Northern Great Lakes - St. Lawrence
27 Appalachian
28 Piedmont
29 Upper Coastal Plain
30 Swampy Coastal Plain
31 South-Central Florida
32 Subtropical Florida

(From "Landscapes for Living" USDA Yearbook, 1972, P. 178.)

Piedmont Region

-Geography

The Piedmont region of the United States is a stretch of land that runs roughly 1000 miles along the east coast of the country. This area begins in the Palisades of the Hudson River and stretches southwestward to the Black Belt of central Alabama. In more general terms, the Piedmont runs from New York City to Montgomery, Alabama. In North Carolina, the maximum width of this piece of land is found at 125 miles, while its minimum width of 25 miles is found around Washington D.C.

The Piedmont region was first "discovered" by the colonists, who set sail at the mouths of the major rivers and traveled upstream until it became unnavigable because of rapids and sometimes even waterfalls. This point was termed the fall line by these colonists and it was not just a lucky guess. The fall line is the eastern boundary of the Piedmont where the generally flat Coastal Plain turns to gentle, rolling hills. The western boundary is marked by the rock-strewn Blue Ridge Mountains. "The isolated hills (monadnocks) preceding the wall of ridges in the west of the region reminded settlers of the Piedmont of foothill sections of southern Europe (the Italian Piemonte means 'foot of the mountain')." The colonists term obviously stuck.

The terrain of the Piedmont today is a "vast plain of rolling knolls and hillocks, dissected gently by minor streams more boldly by the creeks and rivers." Peneplane is the correct geologic term for this type of landscape; a plain which has not been wiped smooth through the process of erosion. Since the process of erosion has not been a great problem, the overall slope of the province is quite gentle. The Piedmont has distinct features : "the presence of rapids along the rivers at the fall line, its soil types (clayey), the monadnocks, and the mountainous scarp that looms above the western edge of the Piedmont." These features make the Piedmont a unique and distinct stretch of land.

-Climate

Day to day temperature, moisture, wind, etc. are considered to be weather. When these variables are measured over a much larger period of time, they can be considered climate. The climate has much broader implications than weather in determining the character of a physiographic province.

Temperature is one of the major variables in the determination of climate. The changing of the seasons brings varying temperatures, and in the Piedmont, a one hundred degree variation over the span of a year is not uncommon. The high temperatures in the northern part of the province are very similar to those in the southern part during the summer months. During the winter months temperatures of zero degrees or below are common. The growing season of the Piedmont is greatly enhanced by temperature. On average, the temperature throughout the Piedmont during the growing season is 70 to 80 degrees. "From

approximately the Yadkin River, in North Carolina, northward, the last frost occurs between May 1 and May 31, and the first frost of autumn halts the growing season between Oct. 1 - Oct. 31. South of the Yadkin, the last frost of spring occurs ont he average in March and the first frost in November. Consequently, no part of the Piedmont south of New Jersey enjoys less than 180 frost free days per year."

One major climate characteristic of the Piedmont, climatologists agree, is very different than most physiographic provinces. The Piedmont is roughly one thousand miles long, and is oriented generally north and south, yet this province has been basically a homogeneous climate. A number of climatic boundaries are very common in other provinces.

Another major variable that is used to determine climate is moisture. Average rainfalls of 40 to 50 inches per year, except for the 40 mile corridor along the Potomic River which receives just under 40 inches per year, are not uncommon in the Piedmont. The natural vegetation is further enhanced by the fact that there is no wet or dry season and that 55 to 60 degrees of the rainfall comes during the growing season.

A third important variable of the Piedmont's climate is the fact that this province annually averages 240 to 260 days of sunshine with 60 to 70 percent of these days during the growing season. This is one of the major reasons for the abundant vegetation in the Piedmont.

The combination of these variables have made the climate of this region very "effective". It is said to be this way because the plants and their dependent higher life forms are able to utilize the valuable climate for survival.

-Microclimate

The climate of the Piedmont is very crucial to the particular vegetation that exists there, but more importantly to their survival is the microclimate of their particular area. To further clarify, the microclimate of an individual plant "is" its climate.

A microclimate's characteristics are determined by the previous variables as well as more distinct ones such as irregularities in the terrain. These areas not only provide a place for the plant to take root, but also may help block wind, provide shade, or concentrate water. "The misted, nearly vertical banks of streams flowing through woodlands are climatically suited as a substrate for the gametophytes of ferns."

The microclimate is very important to the survival of the Piedmont. However, the most important and powerful influence on the microclimate is the plants themselves. Not only do they produce food and oxygen for the animal kingdom, but also they make the habitats of particular areas more tolerable as the sere progresses. The plants are integral in controlling temperature by providing shade and a buffer from wind. Temperature is controlled further and more significantly through transpiration, a process in which the plants take in moisture from the

soil and transpire it through the stoma in their leaves as vapor creation humidity. This vapor absorbs heat during the liquid to gas conversion and in doing so cools its surroundings. In some instances an abundance of plant materials can lower the temperature by as much as ten degrees fahrenheit.

The Loblolly Pine is a perfect example of how a certain plant will thrive in only a particular microclimate. This pine stays to the south of the Potomic because the climate is too cold to the north. The Virginia and Pitch Pines are mainstays of the northern Piedmont.

-Plant Succession

Plant succession, consisting of primary and secondary succession, are unique to the forest in that it may restore itself with just two requirements: seed and time. Primary seccession takes place on areas that have not previously supported life; secondary succession take place in areas where soil has not been destroyed or disturbed. The process of succession is "a vegetational change in which plant communities replace one another until a climax equilibriun is reached." When the climax has been reached, vegetative change stops because the different plant communities have grown to live in association with one another.

If the climax vegetation is disturbed the process of secondary plant succession begins to restore it. This process may be found throughout the Piedmont area which is nonurban and/or not under immediate cultivation. Seeds that help restore plant life are found throughout the disturbed area. "They germinate - not all at once or at random, but by a carefully orchestrated sequence which results in one dominant plant species succeeding another until, if enough time passes without additional disturbance, the original forest community is restored."

The process of primary plant succession is a "relentless pressure to invade and colonize" a piece of land with an expose surface. This exposure may come form different sources: landslides, volcanoes, erosion and bulldozers just to name a few. As with secondary succession, all that is really needed is seeds and time; however, the primary stage takes longer because the seeds found here are more likely to be spores, which are the reproductive parts of primitive plants such as ferns, mosses and lichens. Primary succession is the process which "inducts previously barren surfaces into the society of life."

The Piedmont today is either in succession, is plowed, or is paved; but more than half of the total Piedmont area is undergoing some sort of plant succession. This land is classified in one of two conditions: climax forest or some stage of forest regeneration. Over most of the province, secondary succession is the main life trend while primary succession habitats are small and isolated. The succession in the Piedmont may include the following principles: "(1) that succession is directional and predictable because (2) each species alters its environment to suppress itself and favor the requirements of its successor, and that (3) species and associations are attached to a place in the successional order. (4) That biomass and productivity increase

as succession progresses. (5) That soil is developed as a concomitant of plant succession." Succession, both primary and secondary are valuable processes to the survival of the Piedmont. Primary succession can be classified as a process of soil building while secondary succession can be seen as soil retention.

Table 4: Secondary Succession in the Piedmont

Year	*Dominant*
0	Crabgrass, *Digitaria sanguinalis*
1	Horseweed, *Erigeron canadensis*
2	*Aster* spp.
3	Broomsedge, *Andropogon* spp.

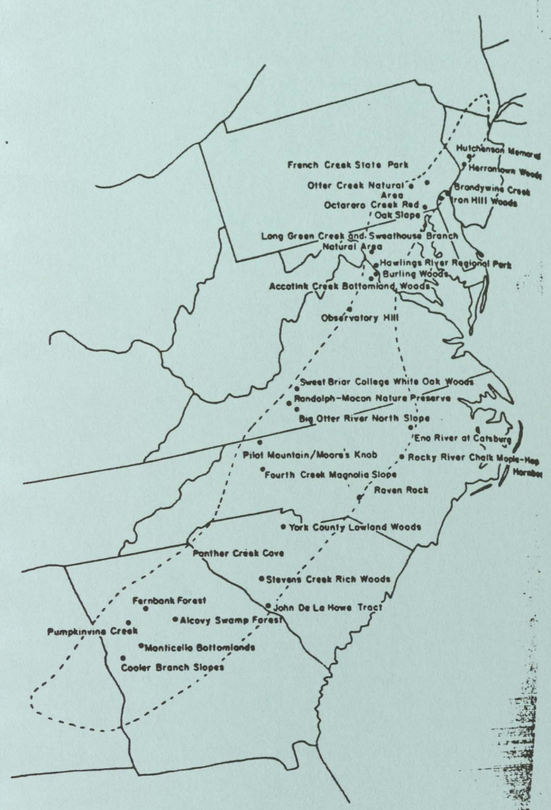
Year	*Dominant*
4	Broomsedge with emergent pine
5–50	Pine, *Pinus* spp.
50–90	Pioneer hardwoods
90–?	Climax hardwoods

Unigue Plant Specices Found in the Piedmont

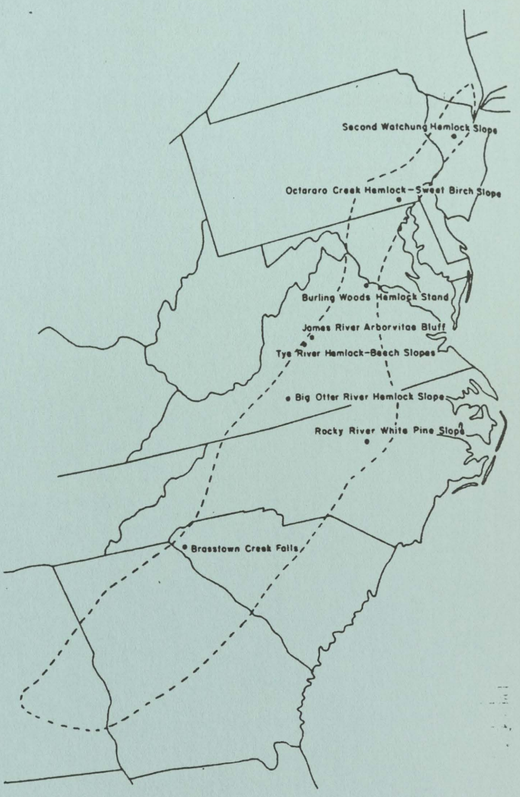
The Piedmont, like many other physiographic provinces, has many unique vegetative habitats. However, there is not a need for specific locations because these habitats are quite common throughout the province. These habitats, for the most part are in their natural setting, but the problem of access still remains in some areas. This problem arises because some of the habitats are on private property and for many reasons, such as privacy, these areas are not accessible to the general public. Some public areas have unrestricted access that makes the viewing very easy, but generally even public areas have some type of restrictions.

Abundant communities of conifers are found in many areas of the Piedmont. To pinpoint an overall theme of these communities is very difficult, in part, because of their abundance to the province. The most common, and probably the most noticed, characteristic the sites have in common is that they occupy steep, north-facing slopes along rivers (or creeks). "Because conifers are associated with Boreal climates, we may infer that the gymnosperm communities sequestered from the sun on the north facing bluffs today may be remnants of forests that lined the logging industry has not damaged these communities because of the steep terrain.

The Hemlock and the White Pine, for the most part dominate these communities. This is the rule of thumb except for the unique case of the James River site, which is dominated by the Arbor Vitae. These species may also share the site with broadleaf trees also of generally northerly affinities. The deciduous communities which inhabit the Piedmont are quite large, both in number and size. Many of the forests are near seral maturity and could be considered examples of the climax forest. Also, the presence of outstanding floral communities within the forests is not uncommon. Tulip trees, Oaks, Tupelo, Hickory and Maple are some of the many species common in the communities.



96. Unique deciduous zones



95. Unique gymnosperm communities

The Piedmont is a distinct and unique physiographic province which is defined by many different vegetative characteristics. Since the region stretches from New York to Alabama, there are many similarities to other provinces, however, the climatic and vegetative features make the area unique.

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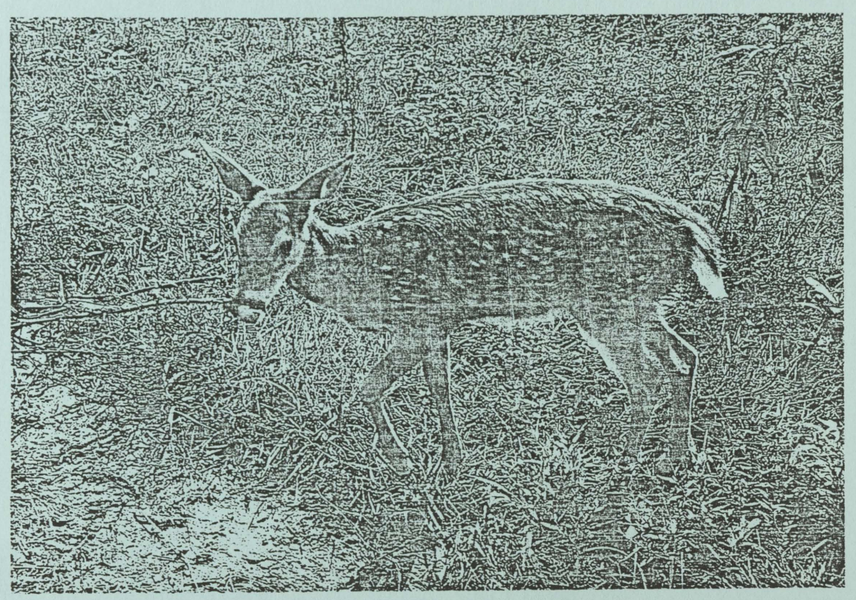

GEORGIA WILDLIFE

WES WAZNI ROBBY WADE LAR 316

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This paper is about what many people believe is America's most valuable resource. Wildlife. Specifically Georgia's. Unlike other resources, wildlife is renewable. It is renewable in the sense that if the correct type of habitat is protected or created, wildlife will thrive and reproduce.

This is something we can not ignore. Hundreds of thousands species of animals have vanished off the face of the earth. One must realize the finality of it. People will never, ever see them again except in the pages of books. It is not nearly the same to see a black and white picture of a black rhino, as it is to see that same rhino running across the dry savannahs of Africa. In a few years we might be limited to doing just that. Once numbering in the tens of thousands, they are now reduced to less than 300 individuals.

This paper however, is limited to the wildlife of Georgia. That does not mean that Georgia does not have the same problems of vanishing widlife as Africa does. They are just different problems. Just as an example, the wolf is now extinct in Georgia, as well as the mountain lion. The eagle was also once plentiful, but now it has just been sighted a few times in a very few areas.

The big danger in Georgia today is the ever increasing expansion of development. With its habitat gone, the wildlife that formerly lived there is also gone. Just as effectively as if it were killed by a bullet. This concept is hard for people to believe or accept, let alone to understand. They must however, in order for what remains of Georgia's precious resource to survive.

Before anything else is said, the term edge must be discussed. Edge is one of the most important words to describe excellent wildlife habitat. Most species, if not all, discussed hereafter hold the common attribute of requireing edge to survive. Edge means both food and shelter, and that is what wildlife habitat is all about.

TURKEY

Wild turkeys need mature forests for the food, but they also need open grassland where their young can feed on insects. Eighty percent of all ruffed grouse nests are located on the edge of old logging roads or the edge of forests. Quail venture into cropland, but they nest in the edge.

Most wildlife of Georgia will be found in the transitional stage where grassland or old farmland is being reclaimed by forest. A major problem in Georgia is that we are not creating the right type of edge. Usually where new subdivisions or industrial developments arise, the open area is met abrubtly with mature forests. No real edge is created. The species of plants used for food and shelter that are found living in edges are thus destroyed.

WHITETAIL DEER

The whitetail deer (Odocoileus virginianus virginianus) is the number one hunted game animal in Georgia. A hunter must purchase a license and deer tag to be allowed to hunt deer. Some of the money made from tags and licenses goes toward the conservation of Georgia's wildlife. Therefore, deer are a very important animal. Not only for recreational hunting but also for game conservation.

The whitetail has a wide range, and is found in a great variety of habitats. It is primarily an animal of the woodlands, frequenting the edges and openings that are created by natural conditions, fire and man. The deer is also at home in the deep swamps.

Does (female deer) have a home range of three quarters of a mile to three square miles, while the bucks (male deer) have an average range of two to five square miles. A deer's home range is never longer than it has to be in order to meet its requirements for food, water and shelter.

It can not be stressed too often that a deer is what it eats. Therefore, habitat is very important to a deer as it is to all animals. The habitat determines a deer's weight , as well as the doe's birthing habits. The gestation period is usually 200 to 205 days. The length of the gestation period is determined primarily by the food available to the mother. Does that drop their fawns in the shorter range of time are those that have received adequate food. The does living in good habitat weigh almost twice as much as does inhabiting poorer regions. The underweight herd in those areas will continue to drop in population as well as size until corrective measures are taken. Does on the poor areas will not breed as fawns and if they do breed at one and a half years of age, they will drop one fawn instead of two for a net loss of two potential deer from each doe in two years. Under normal conditions an adult doe usually has twins.

Deer are primarily browsers, feeding on tips of twigs, branches and shoots. In many areas due to a lack of browse, the deer also obtain much of their food by grazing on grasses, forbs and similar types of vegetation.

Deer quite possibly have a need for nitrogen as they have a preference for nitrogen fixing legumes such as, alfalfa, clover, peas, and soybeans. These are all springtime foods. Mushrooms when available, comprise a high percentage of a der's diet in springtime.

Deer consume much more food in autumn than at any other time of the year. Acorns are the favorite food in autumn. Deer prefer the acorns of the white oak. All acorns have a low protein content, but they are high in fats and starches, as well as being easily digestible.

Deer also like apples in fall, but their second most important source of food in the fall is falling leaves. Maple leaves are readily eaten, but dogwood leaves seem to have top priority. Red leaves have a high content of sugar, so they are eaten first. Oak, elm and hickory leaves are seldom eaten because of the tannic acid they contain.

Various types of plants have different degrees of tolerance to browsing. Many plants die if they are thirty percent browsed, while others are actually stimulated by the same degree of browsing. Maple is an excellent deer food, and it can withstand eighty percent browsing each year.

Even though deer are quite adaptable to humans and civilization, they can be crowded out. Once the habitat is reduced, the deer will be overcrowded and they will starve to death. One must also remember that the wolf and mountain lion were also once plentiful in the state of Georgia.

BEAR

In the Southern Appalachian Mountains and near the Okefenokee Swamp, Georgia's blsck bear may be found. It is a shy, elusive animal that trys to avoid people, cannot be trusted or predicted, and is highly adaptable. All of which point to its remarkable ability to survive. Estimations of its current population range from 300 to 500.

The black bear is not considered territorial since it does not rigidly designate an area as its own and defend it against other bears. It does, however, have a remarkable ability to return to its home range if it has moved, in some areas even over 100 miles away. The male home range is usually thirty square miles, while the females home rangeis considerably smaller at five to seven square miles.

A wide variety of food is eaten by the black bear, which consists of both other animals and vegetation. In fact the black bear's diet consists of ninety percent plant material such as berries and nuts. It concentrates on smaller creatures such as, worms, snakes, mice and birds when it is not eating plant materials, but it occassionally preys upon larger animals such as, fawns and calves. Bears also like to eat honey, although it contributes a very small percentage of its diet.

Black bears usually begin hibernation in November with the females generally hibernating before the males. Once they realize it is time to hibernate, the bears seem to become insensitive to danger. Dens are usually made in trees and rock shelters.

BEAVER

The Georgia beaver (Castor canadensis) once widely scattered across the state, now has its heaviest population densities along the Flint River drainage. There are beavers in other areas however. They are found slong rivers, streams and in lakes throughout Georgia. In larger rivers the beaver makes its home in burrows dug into the side of the river bank. In small streams and lakes the dens are the familiar conical shaped lodges made of sticks and mud. Beavers are hard to find in sandy areas, because mud is needed to construct their lodges and dens.

Mud is not the only thing that is needed forbeaver habitat. Specialized food is also a need that beaver cannot do without. Sweet gum is the preferred food item in most areas of Georgia. Pine trees are also eaten, but not as readily as sweet gum. Besides sweet gum and pine, willow, alder, yellow poplar, cottonwood, blue beech and grape vine may be eaten. In the summer beavers eat herbaceous foods, including Eupotorium, sedges, roots of water lilies and other aquatics.

In Colorado a study was done on the beavers food consumption. It found that a twenty five pound beaver requires one and a half pounds of aspen and almost two pounds of

willow per day during winter to survive. In the summer months the beaver must consume two and a half pounds of herbaceous food to survive.

It seems like the beaver can create a fair amount of damage with their dam building and eating habits, but they are an animal which was once common and now is not. Therefore, steps must be taken not to infringe on the beavers habitat.

FOX

The fox, both red (Vulpes fulva) and gray (Urocyon cinereoargenteus) are still found throughout Georgia. The red fox is found in the piedmont and mountain ranges with some occuring in the coastal regions as well. The red fox was introduced into Georgia for hunting purposes. The red fox prefers more open habitat than its gray cousin. The fox digs its den in sandy soil in the winter. It is common for more than one family of foxes to den together. The range for both foxes is approximately two miles in diameter. Areas supporting both farmland and woods have the greatest fox populations, with savannah pine lands the next most populated. Fox, although being very elusive, can and will adapt to a limited encroachment by man.

BOBCAT

The bobcat (Lynx rufus) is seldom seen in Georgia. Actually, the bobcat is seldom seen anywhere. It is an extremely elusive cat, which does not take kindly to any form of human intrusion. It can and will however, live near farms. Unlike other kinds of development, farming is a small intrusion for the bobcat. The bobcat is also known as the wildcat because of its ferocity when cornered. The saying, "He can whip his weight in wildcats" came from this fact.

The bobcat travels along river bottoms, swamps and heavy brush. They den in hollow logs, under rock ledges and in thickets. The bobcat does not need that big of a range to live in. The bobcat moves an average of seven air miles every two years.

ALLIGATOR

The alligator is limited to the Okefenokee Swamp area in the state of Georgia. Once on the endangered species list, it is now doing well, although it is still protected on the Okefenokee. The alligator needs a very special habitat to survive, however they can live quite close to man. Swampy areas or just plain rivers and lakes can harbor alligators. In 1987 an alligator was spotted several times in Marietta. This was obviously a pet that someone let loose, but it was none the less living very well in a small pond. Normally a female alligator needs six to forty acres of range, while the male has been known to travel up to twenty miles. This is an exception however.

Aside from the high dollar value of gator hides, the alligator is important in many other less talked about ways. Water supplies in the coastal marshes dwindle during the summer months. This leaves wildlife and plant life of the marsh without an adequate supply of water. During these periods of drought, alligators wallow large holes in the marsh. These holes provide water for the alligators as well as the other wildlife and

plant life, which provides food and shelter.

MANATEE

The manatee (Trichechus manatus) is a rather large aquatic mammal. Some say it is quite hideous, but that is a matter of opinion. The manatee is now on the endangered species list for good reason. Its numbers are dwindling. The manatee calls Florida its permanent home, however it travels to Georgia in the summer months. It swims up river to enjoy a brief extended range.

The manatee is found in sluggish, moderately turbid rivers. They are very docile. Divers and snorklers swim up to them regularly to pet and stroke them. The manatees actually adore the attention. Even though the manatees like man so much, it is actually he who is causing their extinction. The cause is the rising recreational population of man in the manatee's habitat. The number one cause of death of the manatee is boating accidents. The manatee swims just under the surface of the water wher the boat propellor cuts and kills them. The aquatic vegetation that the manatee eats is also being killed by the intrusion of man. The outlawing of all motor powered boats in the manatee's frequented waters would greatly reduce the number of deaths each year.

RIGHT WHALE

Perhaps one of Georgia's most endangered species is the North Atlantic right whale. The whales now number only two to three hundred individuals. The right whale does not remain off the coast of Georgia all year, however they do calve here. These whales can reach a length of fifty four feet and weigh as much as sixty tons.

The right whale was protected from hunting in 1937, but it has not recovered like most other species put on the endangered species list. Biologists have not discovered the reasons for this. The whale's survival is threatened by a number of risks including fishing gear entanglements, vessel collisions, offshore mineral exploration, noise and disturbance, coastal development and destruction of habitat.

This year twenty right whales were spotted. This included eight cow and calf pairs. If these whales are expected to survive, we must keep a very wide berth of any areas they frequent.

FISH

The waters of Georgia are inhabited by many different kinds of fish: there are over two hundred species of fish in fresh waters and nearly threehundred in marine waters. DEspite the many different species represented in the state, Fisheries play a relatively minor role in the economy.

The majority of the fish in Georgia's fresh waters are minnows and darters. In the state's streams and lakes, there are six species of bass and thirteen species of sunfish that grow to a reasonably catchable size. These include the largemouth bass, the black crappie, the channel catfish and the bluegill, the brook trout and the chain pickerel.

Georgia's marine fish can be found in such locations as salt marshes and along the coastline. Some common examples in this category include black sea bass, the channel bass, the spotted sea trout, the spanish mackeral, the flounder and shrimp. Down the coast and around Georgia's islands, sharks and nags may be found as well as other more exotic sea creatures.

REPTILES

Georgia's reptiles include forty species of snakes which are venomous. The eastern diamondback ratllesnake lives in woods comprised of dry pines and oaks. The timber rattlesnake prefers woody rock outcroppings and bushy areas. Pygmy rattlesnakes usually inhabit areas near water. The well camoflaged copperhead can be found in rocky outcrops in wooded areas. The cottonmouth is generally found in wet areas. The coral snake, one of the world's most venomous snakes, lives under cover in sandy areas. Although many reptiles and amphibians are protected by law, those snakes that are venomous may be killed if there appears to be a safety hazard.

Most snakes inhabiting the state of Georgia are not poisonous and relatively harmless. One example, the endangered and protected indigo snake, usually inhabits sandy uplands and finds shelter in gopher burrows. The scarlet kingsnake, which is sometimes confused with the coral snake, finds refuge in rotten logs and stumps. A third non-poisonous native Georgia snake is the black rat snake; it is noted for its ability to climb trees and can also be found in old buildings.

In addition to snakes, Georgia has many other native reptiles and amphibians including thirteen species of lizards, twenty seven species of turtles and the American alligator. The loggerhead turtle is Georgia's most plentiful sea turtle. Its home is the state's barrier islands and its distinguishing feature is its large head.

BIRDS

There are many unique types of birds inhabiting the state. Georgia boasts 170 different native species while over 200 additional species migrate through the state with the change of seasons. Due to the many diverse habitats found in the state, many varied species of birds exist between its borders.

Down the coast, one might find a wood stork, a snowy egret, or a brown pelican. The wood stork is a protected animal due to its scarcity. The snowy egret is a shy bird usually found alone or in small groups; the species is hunted for its plume. This causes a sharp decrease in numbers. Brown pelicans are usually found in groups or communities; their nests are messy and composed of earth, gravel and rubbish.

The forests of Georgia contain such birds as the red tailed hawk, the downy woodpecker and the summer tanager. The nest of the red tailed hawk can be found fifty to sixty feet high in trees and the birds are suspicious of man. The downy woodpecker is currently facing extinction due to Georgia's reliance on forest industry. the ideal habitats for the summer tanagers are the more densely forested areas of the state.

In Georgia's residential areas, the robin, the mockingbird and the brown thrasher are

found. The brown thrasher is Georgia's state bird, which nests on the ground. All of these birds are much more compatible to the land development of men, then those previously mentioned.

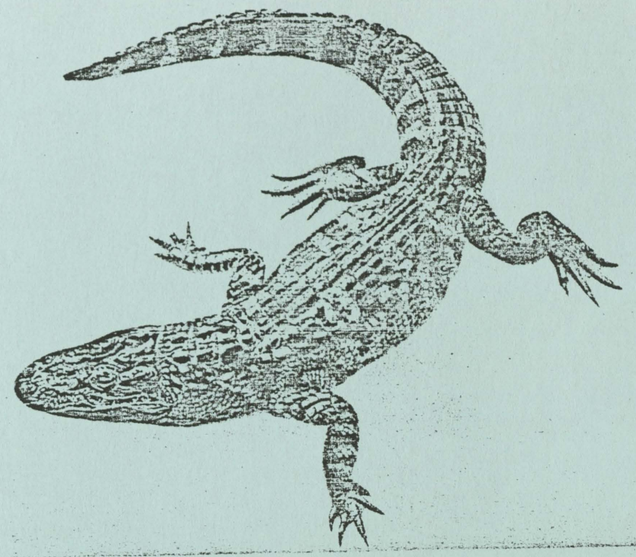
Georgia is also well known for its game birds; it has been called the quail capitol of the world. As the numbers of quail have decreased, the popularity of hunting the mourning dove has increased. Both of these birds are found across the Coastal Plain , the Piedmont and the ridge and valley.

The third most popular hunted birds of Georgia are the wild turkey and duck. During the 1950's, turkey became scarce in the woods of Georgia and has since gradually been restocked. Since the state's only native duck is the wood duck, which is found in swampy areas, most ducks arrive with other migrating waterfowl.

One bird that is classified endangered in the majority of the states including Georgia, is the bald eagle. Recreational development as well as logging are being designated as two major causes of the rapid decline in numbers of the once plentiful bird. Other cases of deatrh include poaching and the ingestion of toxic chemicals. Georgia is increasing its eagle population through a process called hacking in which young eaglets are protected and fed until they areready to be released in the wilderness.

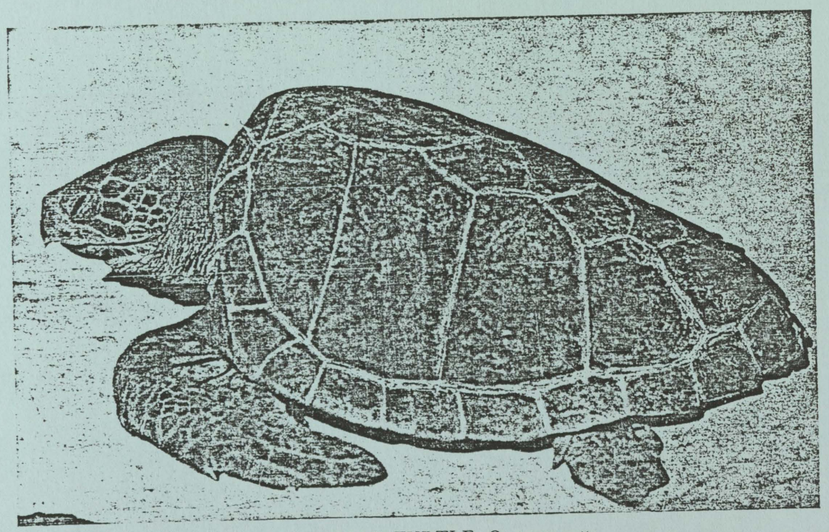
This paper touched on just a few of Georgia's precious wildlife, but it gives a good example of a dwindling resource that every citizen must take it upon themselves to save from extinction.

In spring the black bear feeds on grasses, leaves, sedges, and roots; as summer comes, it consumes berries and fruit.



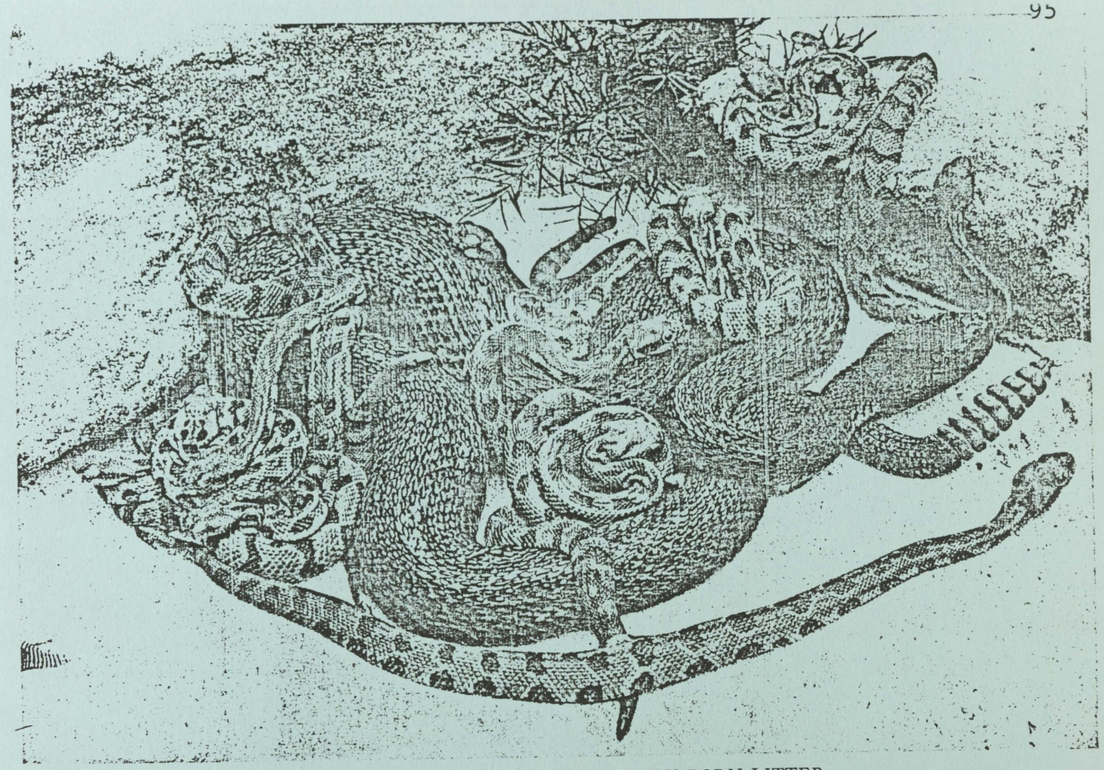
ALLIGATOR, *Alligator mississippiensis*

In most of the large rivers of the South the alligator has been nearly exterminated. It remains in moderate numbers in lakes and lagoons surrounded by heavy timber or swampy areas.



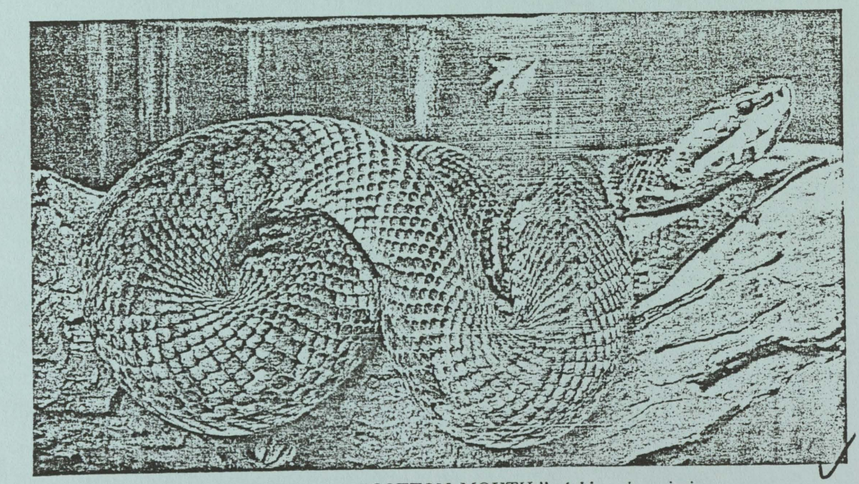
LOGGERHEAD TURTLE, *Caretta caretta*

Sometimes confused with the Green Turtle, but the head is larger. The flesh is of less value than that of the other species. Inhabits the warmer portions of the Atlantic Ocean and in summer is occasionally found as far north as Massachusetts.



TIMBER RATTLESNAKE AND NEWLY BORN LITTER

At birth the little snakes have a single "button" to represent the future rattle. They are provided with perfectly developed fangs and poison glands. Unless tempted to bask on the sunny ledge frequented by the mother, they leave her within a few hours, to shift for themselves.



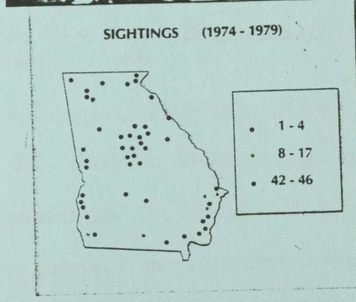
WATER MOCCASIN; "COTTON-MOUTH," *Agkistrodon piscivorus*

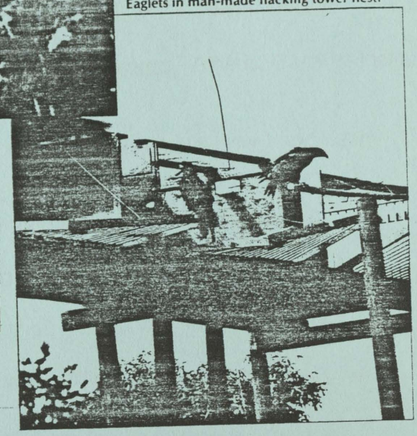
Abounds in the swamps and lagoons of the southern United States. Its hostile looks are in keeping with a vicious disposition. The species is very poisonous. It feeds upon birds, small mammals, frogs and fish, and is a much larger and stouter snake than the copperhead.

FIG. 37. — Brown Pelicans, *Pelecanus occidentalis*, nesting on Pelican Island, Indian River, Florida. (Courtesy of the American Museum of Natural History.)

FIG. 216. — American Blue Jay, *Cyanocitta cristata*.

FIG. 63.— Wood-Duck, *Aix sponsa*.





Eaglets in man-made hacking tower nest.

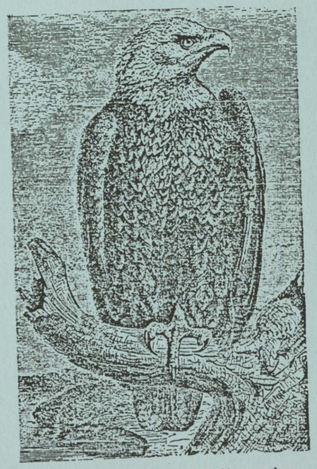


FIG. 77. — Bald Eagle, *Haliaëtus leucocephalus*.

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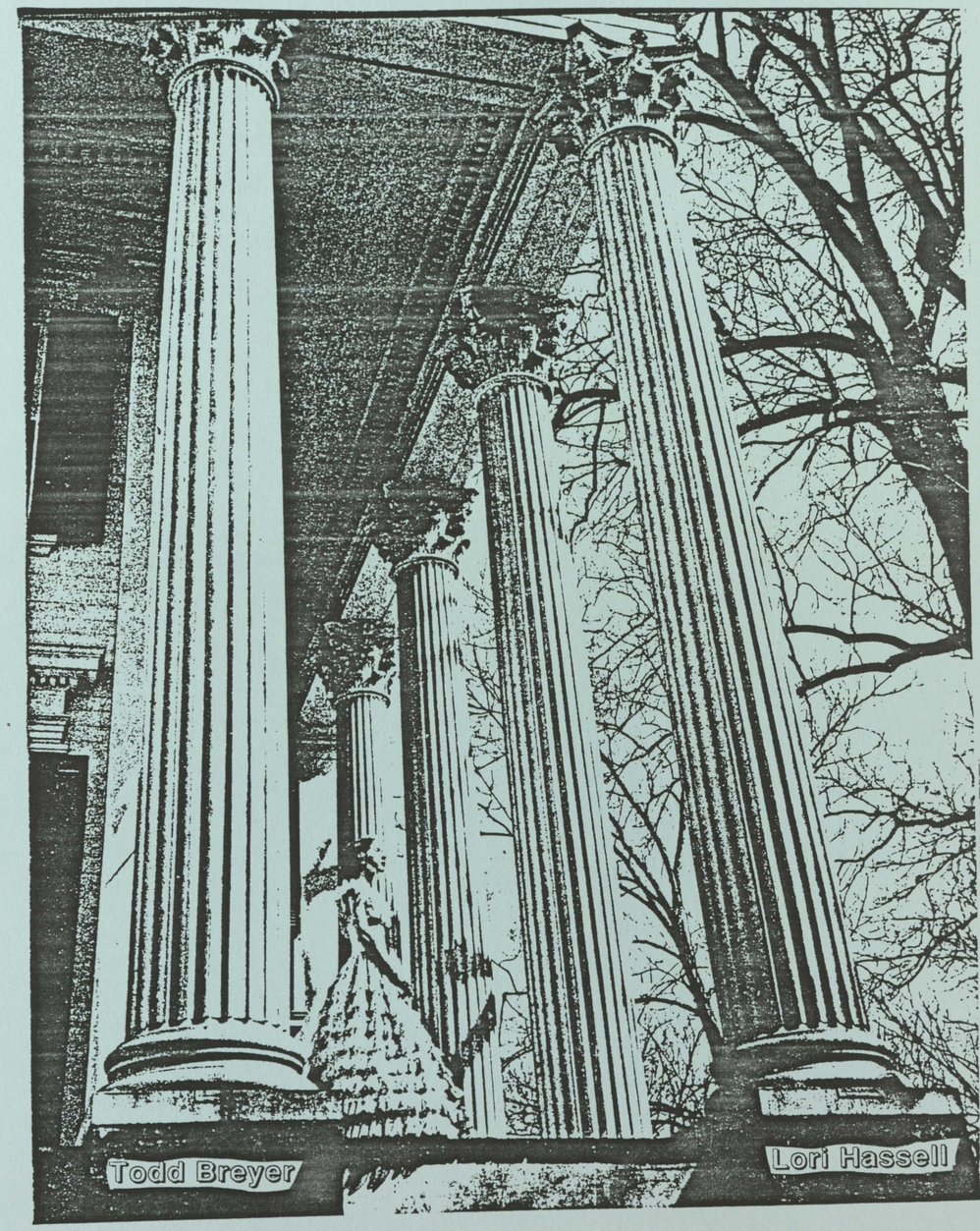
HISTORICAL AND ARCHAEOLOGICAL

RESOURCES OF GEORGIA



LAR 316, Spring 1989

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Introduction

"Over the last half century, Americans have become increasingly aware of the significance of the various historic and archaeological resources that surround them. Progress in these areas has been slow, however. Now, as expansion and development threaten to overcome community and regional identities, we must become familiar with the processes of historic preservation and archaeological research, in order to protect and measure the importance of a location's unique cultural flavor.

Legislation in these areas has made it desirable and economically feasible to achieve these goals. Resources are available to the designer and planner that make it possible for such ideas and practices to be realized, especially in the field of historic preservation. The outline, clarification and understanding of the historic preservation and archaeological processes will be given in the remainder of this report.

A basic understanding of what these two areas cover and their importance is of top priority. Historic preservation not only provides a sense of continuity with the past, it also enriches the present. Preservation of the built environment in Georgia, as elsewhere, is the highest form of conservation. It not only saves buildings and neighborhoods, but also preserves natural resources by conserving materials and energy. Besides this practical note, historic preservation in an area provides what John Waters calls 'a sense of place'. Historic preservation gives and retains an area's individual identity. Every place is different, and with careful planning to blend growth and cultural identity, we can retain this 'sense of place'.

The fields of archaeology and landscape architecture are related by the fact that both deal with the land. Landscape architects have a responsibility to be aware of archaeological resources. We must become familiar with the ways by which these resources are identified, assessed and reported."[1]

Definitions:

Archaeology- - a systematic, scientific attempt to reconstruct activities and social groups that have occurred or existed in the past, and to see how these have changed through time.[2]

Historic Preservation- - the protection, rehabilitation, restoration, and reconstruction of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, or culture.[3]

III.

A CAPSULIZED SUMMARY OF GEORGIA'S ARCHAEOLOGICAL PAST

Paleo-Indian	10,000 B.C. to 8,000 B.C.	Hunting of extinct large game	Small seasonally-occupied camps
Archaic	8,000 B.C. to 1,000 B.C.	Diversified food resources based on naturally available plants and animals	Larger seasonally-occupied camps
Woodland	1,000 B.C. to A.D. 900	Small-scale agriculture supplementing available wild foods	Small, widely-dispersed, permanently-inhabited villages
Mississippian	A.D. 900 to A.D. 1600	Intensive Agriculture	Large fortified towns with many forms of public architecture
Historic	A.D. 1600 to Present	Arrival of European agricultural techniques and industrialization	Historically known tribal entities and ultimate removal of aboriginal populations

Georgia's Historic and Archaeological Past

"Archaeologists share many of the goals of historians, but they deal with different types of data and study somewhat different aspects of the past. Historians find the greatest part of their information in written documents, while archaeologists study the material remains of vanished peoples which have escaped the destruction of time.

Archaeology can be divided into two categories: prehistoric and historic. Prehistoric archaeology is the study of that part of man's history before the use of written records. In Georgia and the rest of the United States, the Indians did not develop a system of writing. Therefore, prehistoric archaeology is the only source of information about Indian groups before the coming of Europeans. Historic archaeology deals with the remains of both Indians and non-Indians in colonial times and later. Although documents are available for these periods, archaeology can provide insight into many aspects of life not mentioned in written records."[4]

Among the earliest Georgia inhabitants were the Creek and Cherokee Indian tribes. Cherokees occupied the mountainous regions, and the Creeks occupied the south. They left behind campsites, trails, hunting stations, battlefields, burial sites and agricultural grounds. These sites are often difficult to recognize. However, the expert has developed a set of criteria for predicting where earlier peoples may or may not have lived and worked. Settlements were often located near a shoreline, on a peninsula or in river basins.

In the sixteen century European explorers first penetrated the Georgia coast. Eventually, they founded the early settlements and constructed defensive fortifications in the region. These include Fort Fredrica and Fort George in southeast Georgia. James Oglethorpe's founding of Savannah established the region as an official colony of the British Crown. Other permanent settlements followed and soon the territory began to thrive. Consequently, Indian territories began to gradually recede.

On July 4, 1776, Georgia joined with the other original thirteen colonies in the signing of the Declaration of Independence. Sentiment was divided among her inhabitants, and Georgia was soon dotted with Revolutionary War battle sites. The Battle of Kettle Creek, February 14, 1779, was one of the decisive battles of the Revolution. The Treaty of Paris of 1783 granted the American states their independence. Georgia had finally become a free and independent state, but the Spaniards were once more on her doorstep and her Indian problems were increasing.

In 1828, gold was discovered near present-day Dahlonega, well within Cherokee country. The arrival of the prospectors, whom the Cherokees regarded as intruders, further complicated the strained relationship between the Cherokee Nation and the state. Georgia had declared the Cherokees subject to her laws in 1828, and in 1831 the legislature created Cherokee County from the entire area occupied by the Indians. In 1835, the Cherokees gave up claim to all lands east of the Mississippi and began their sad journey, "The Trail of Tears."

The "King Cotton" era was ushered in by Eli Whitney's invention of the cotton gin in 1793. The slave-based society became even more ingrained since more cotton was planted and more Negroes were needed. "Like the 'gold rush' that later brought settlers to North Georgia, a 'cotton rush' carried settlers across the section. Soon it was known as the 'Cotton Belt'. "[5]

This and other factors spurred the civil struggle known as the War Between the States. Georgia was of significant political and economic importance and suffered heavily during the war. The destruction culminated in Sherman's "March to the Sea," and the end of the war soon followed.

In order to heal the war torn South, the "Reconstruction" period began, and many of the splendid antebellum homes were built to replace those lost during the war. Recovery was slow, but from this period to the present a gradual progress has made possible the present surge of Southern growth.

VI.

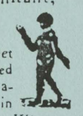
Ten Pounds Reward.

RUN AWAY,

From my plantation, the 18th inſtant,

Two Negroes:

A fellow, named JACK, about 6 feet high, with a downcaſt look, branded on his buttock S S; and a wench, about 5 feet 8 inches high, was born in New Providence, ſpeaks very good Engliſh. Whoever will bring them to my plantation on Great Ogechee, or deliver them to the gaoler in Savannah, ſhall receive the above reward.



Samuel Stiles.

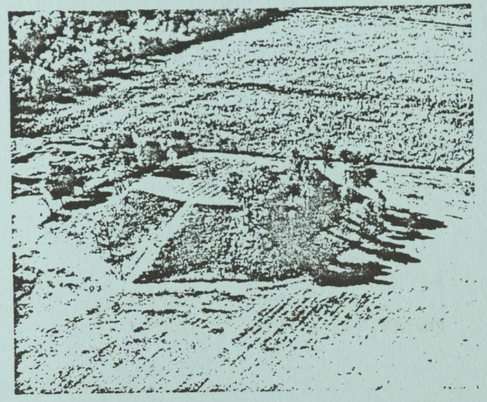
September 25 1783

Piedmont Regional Examples

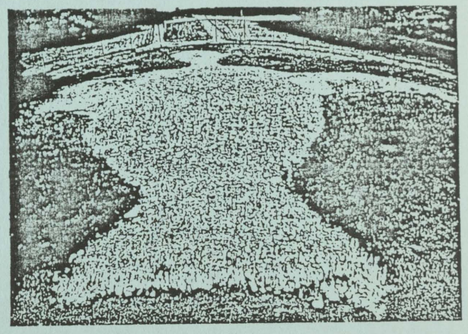
A rich diversity of archaeological and historic resources exists within the Georgia Piedmont. Fine examples include:

Indians:

etowah indian mounds



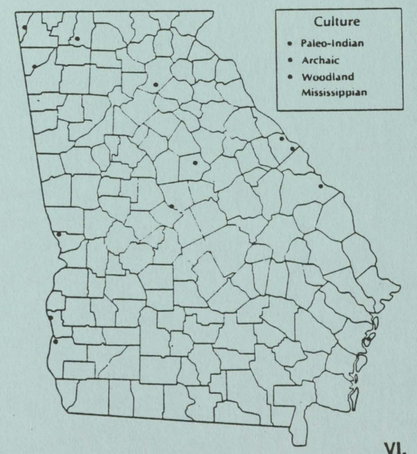
VI.



VI.

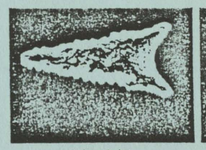
32. *Rock Eagle Effigy*, Putnam County
Of International Importance
Map no. 11-4
RH

ARCHAEOLOGICAL SITES

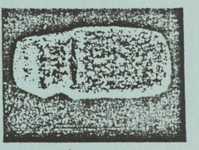


VI.

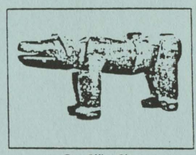
REPRESENTATIVE ARTIFACTS



Dalton Point
Approx. Length = 2 in.
Paleo-Indian



Stone Axe
Approx. Length = 6.5 in.
Archaic



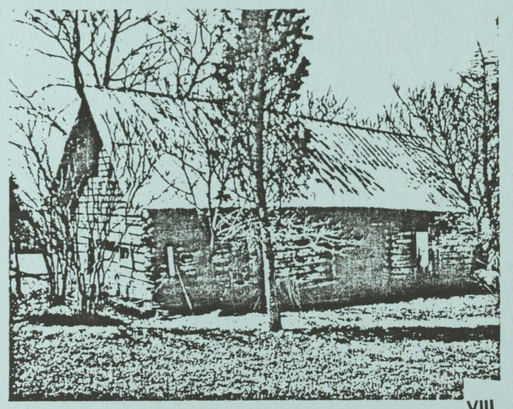
Dog Effigy Pipe
Approx. Length = 15 in.
Woodland

Etowah Statues
Approx. Height = 24 in.
Mississippian

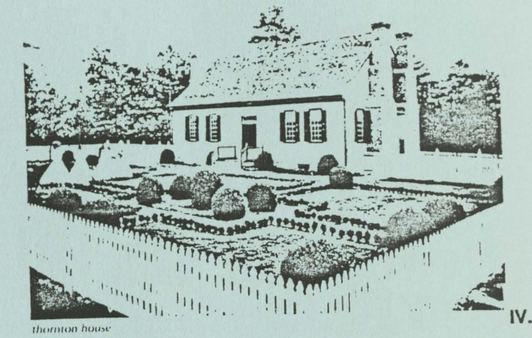
VI.

Early Settlers:

The Jordan-Pierson Log Cabin, Washington County



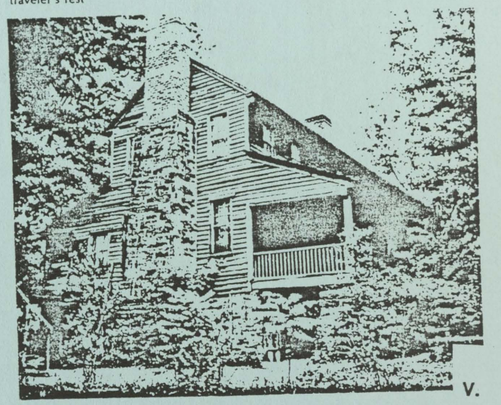
VIII.



thornton house

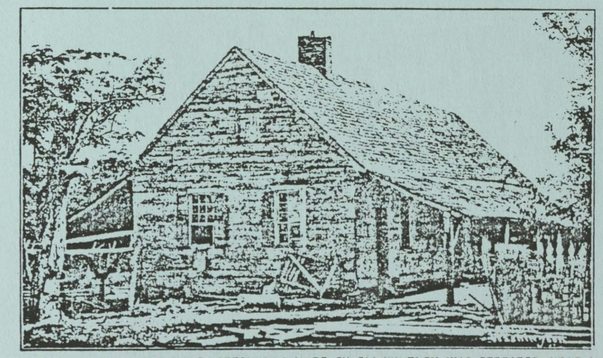
IV.

traveler's rest



V.

Cotton Gin:



I.

Grand Estates:

IV.

hay house

the superstitious owner of the hay house never finished this elaborate italian inspired structure—William B. Johnston, who built the home in Macon in 1855-60, had heard "an old man seldom lives to enjoy a new house." Though he was only 40, he refused to hang the last section of iron fencing. Apparently he beat the jinx, for he lived to 78! William Makepeace Thackeray visited the Johnstons in 1856 when he lectured at Wesleyan College. Each side of the double door in front weighs 500 pounds. The doors are hung on silver plated hinges. Johnston installed 19 Carrara marble mantels. The house contains a secret room and since Mr. Johnston was temporary treasurer of the Confederacy, it is said money and important papers were hidden there. The Hay House, located at 934 Georgia Avenue is owned by the non-profit P. L. Hay Foundation. Open year-round.

War:

BATTLE SITES

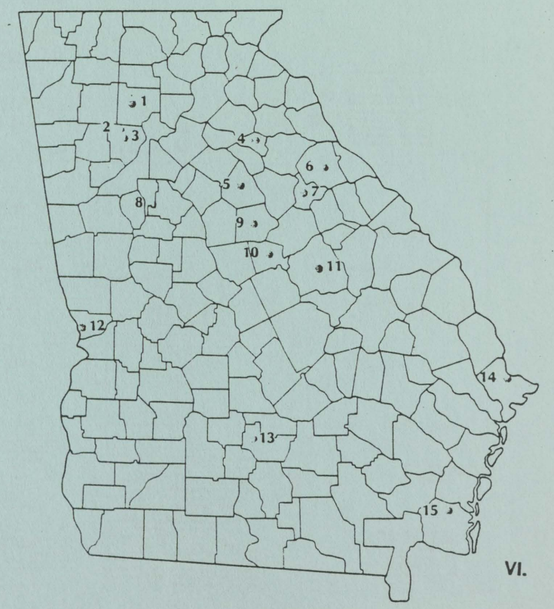
VI.

SELECT BATTLE SITES

Battle	Site	Combatants
1702 Flint Battle	near Bainbridge	Spanish vs. English*
1742 Battle of Bloody Marsh	Fort Frederica	Spanish vs. English*
1755 Battle of Taliwa	near Ball Ground	Cherokee* vs. Creeks
1776 Battle of the Rice Boats	Tybee	Georgians* vs. English
1779 Siege of Savannah	Savannah	Georgians* vs. British
1781	Augusta	Ga./S.C. militia* vs. Loyalists
1787 Battle of Jack's Creek	near Monroe	Creeks vs. Settlers*
1836 Battle of Hitchity	near Cusseta	Ga. militia* vs. Creeks
1836 Battle of Chickasawatchee Swamp	in Baker Co.	Ga. militia* vs. Creeks

* indicates victor

CONFEDERATE PLACES OF INTEREST



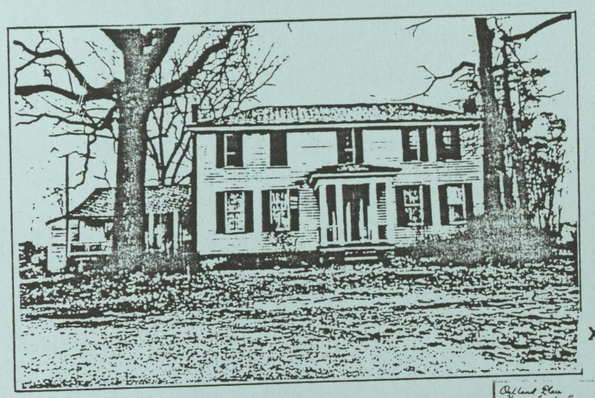
1. Canton: Home of Joseph Brown, governor from 1857-1867, serving during the years of the Civil War.
2. Big Shanty: Site of capture of Confederate locomotive "General." Starting point of the Great Locomotive Chase, April 12, 1862.
3. Marietta: Union and Confederate cemetery for those killed in the Battle of Kennesaw Mountain.
4. Athens: Location of the double-barrelled cannon, which was never functional. It was meant to fire two balls connected by a chain.
5. Madison: Site of many antebellum homes, survivors of Sherman's March to the Sea.
6. Washington: Site of the last Confederate Cabinet meeting.
7. Crawfordville: Home of Alexander Stephens, Vice President of the Confederacy throughout the Civil War.
8. Lovejoy's Station: Rendezvous point for General Hood's Confederate forces after evacuation of Atlanta, September 1, 1864.
9. Eatonton: Joel Chandler Harris, creator of Uncle Remus stories, worked on *The Countryman*, the only known plantation newspaper.
10. Milledgeville: Georgia State Capital at the time of the Civil War. Spared by Sherman.
11. Sandersville: Site of the last official transactions of the Confederate government.
12. Columbus: Last land battle of the Civil War, fought here April 16, 1865. Home of Henry Benning, Confederate Brigadier General for whom Fort Benning was named.
13. Irwinville: Site of capture of President Jefferson Davis by Union troops, May 10, 1865.
14. Savannah: Site of General Sherman's headquarters at the end of the Georgia campaign.
15. Camden County: Birthplace of General William Hardee, commander during the Atlanta campaign.

VI.

Farmsteads:

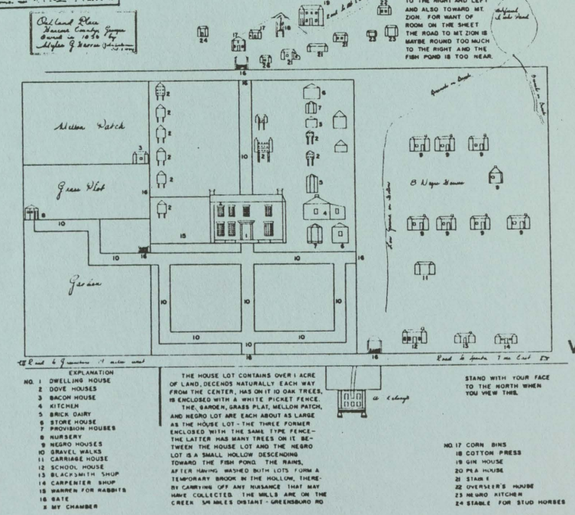
TABLE 1
The Changing Agricultural Scene‡ VII.

	1945	1950	1955	1960	1964	1969	1974	1978	1980
# of Farms	1600	1528	1201	697	518	431	365	347	
Average Size of Farms (acres)	112	127	148	178	195	210	227	211	
% of Land In Farms	64.6	70.1	64.1	45.0	36.6	32.6	29.8	26.3	
Farm Population		7032		2722					850



XI.

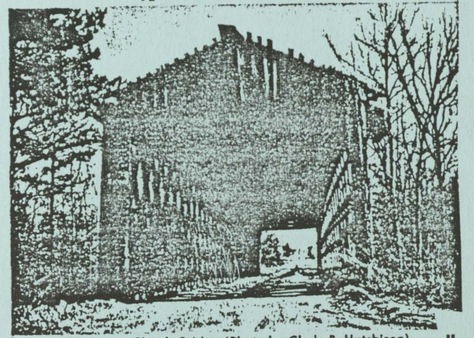
The Harris-Rives Plantation
Copied from drawing by John Waterman dated October 12, 1835; copy by Tim Hill (The original drawing belongs to George Rives, present owner of the plantation.)



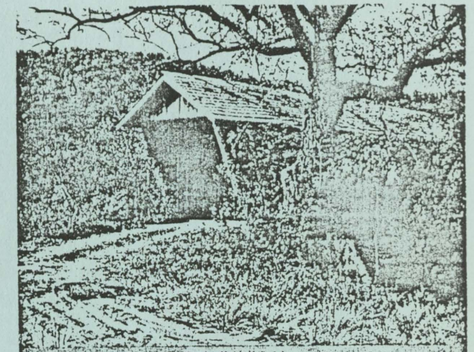
VIII.

Jackson County

HURRICANE SHOALS BRIDGE **(10-78-01)**
Location: On county road a short distance off Ga. 82 Spur, about 3 miles S. of Maysville. Bridge spans North Oconee River.
Description: Circa—Prior to 1870
Size—1 span, 127' long
Type—Town lattice



Hurricane Shoals Bridge (Photo by Clyde B. Hutchison) Il.



Stovall Mill Bridge

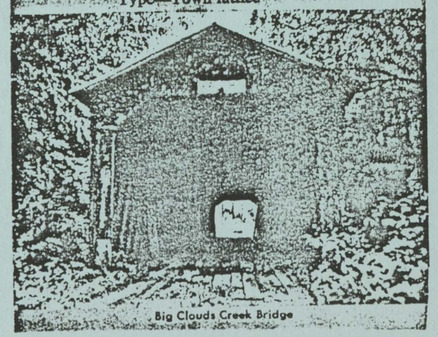
White County

STOVALL MILL BRIDGE (Helen, Sautee, Nacoochee, or Chickamauga Bridge) **(10-154-03)**
Location: 12 miles N. of Cleveland. Take Ga. 75 to Nacoochee, turn E. on Ga. 17 to Sautee, then N. on Ga. 255 for about 3 miles to bridge which spans Chickamauga Creek.
Description: Circa—1895
Size—1 span, 33' long
Type—Kingpost
History: This quaint little bridge was featured in the movie *I'd Climb the Highest Mountain* which was made in this North Georgia area in the 1950's.
Georgia's smallest covered bridge presents an idyllic picture of yesterday as it spans a sparkling mountain stream against a backdrop of North Georgia hills.
An earlier uncovered bridge was once located at this site. It had been built by Fred Doner who also once ran a mill here. When both mill and bridge were washed away, Mr. Will Pardue, a resident of White County, built the present one.

Il.

Oglethorpe County

BIG CLOUDS CREEK BRIDGE
(or Howard's Bridge) **(10-109-01)**
Location: About 3 miles S.E. of Smithsonia or 9 miles N. of Lexington, on county road S2164 over Big Clouds Creek.
Description: Circa—?
Size—2 spans, 168' long
Type—Town lattice



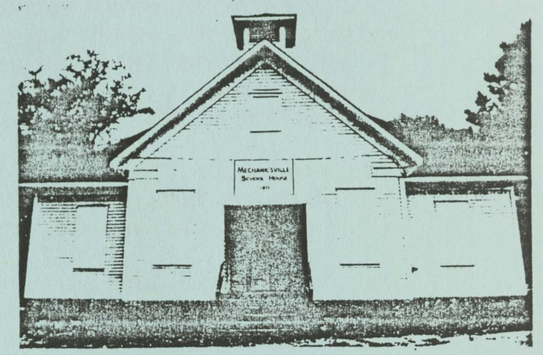
Big Clouds Creek Bridge

Il.

Municipal Buildings:

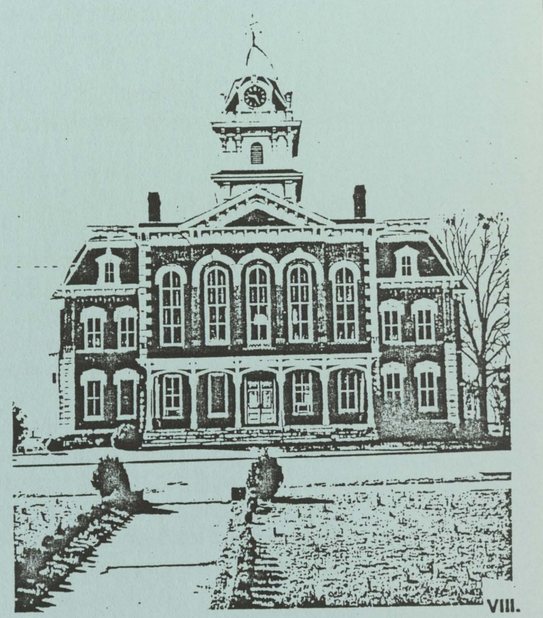
MECHANICSVILLE SCHOOL
A National Register Property in Gwinnett

The Mechanicsville School is significant in the architectural and educational history of early twentieth century rural school architecture. It is one of the oldest principal structures in the Mechanicsville community. The school served the educational needs of the elementary school children of Mechanicsville and also served as a center for the community's social activities.



I.

IX.



VIII.

228. *The Hancock County Courthouse,* Sparta. See page 144.
Built 1881-1883. Parkins and Bruce, Architects.
Of National Importance
Map no. 6-20
KK

The Nonrenewable Resource

Before this century few measures had been taken to preserve the structures and artifacts of the past within their own context. Consequently, these resources have been lost at an astonishing rate. In fact, only a fraction of one percent have been studied in even the most preliminary fashion by professionals.[6] Most distressing is the fact that many areas of archaeological and historical significance are lost or destroyed before any thought as to their value has been considered.

FACT: Between 1960 and 1985 over 50% of the rural residential structures built in Greene County prior to 1860 were destroyed.

FACT: In a 6 county area (Greene, Hancock, Taliaferra, Putnam, Warren, and Baldwin) 76 antebellum dwellings were destroyed between 1970 and 1985.

FACT: In the same 6 county area, 44 residences are standing in a deteriorated and/or vacant condition as of April, 1987.

FACT: In Burke County where, in 1985, there were 235 families who were devoted to fulltime farming. There are now, in the spring of 1987, 7 or 8.[7]

As the above figures indicate, more and more of Georgia's rural character is lost each year. The combined effects of neglect, fire, altering economies, abandonment, and the bulldozer continue to claim major portion of Georgia's rich heritage. Economic decline in the region since the Civil War Period has promoted the abandonment of many of the few rural, as well as urban, structures left intact following Sherman's "March to the Sea." Reservoirs have likewise inundated a number of historic and prehistoric sites along river valleys, where settlement tended to occur. Antique dealers have picked over much of what is left in the Piedmont region. In the process, houses are often left as mere shells if not completely demolished. Still others have been purposely destroyed as a precaution against fire in commercial timberland as well as our national forests. This included wholesale demolition of remaining pioneer sites in the northern portion of the state.

Sites in urban environments have fared better, on the whole, than their rural equivalents. This is due in part to local preservation efforts as well as local ordinances. The importance of these ordinances is amplified by the fact that most historic resources remain in the hands of local government or private citizens. The highest protection, however, is often to be found within areas owned and managed by state and federal authorities.

"The realization of the significance of historic places in America began in the 19th century. As the memory of the American Revolution faded, the importance of remembering what that period stood for and preserving the buildings that symbolized the ideals of this period began to be realized."[8] "Many people began to feel that identifying historic sites and structures related to the founding of the nation could be a way to educate citizens, children, and immigrants and to inspire them with patriotism."[9]

"Preservation, based upon historic association, continued into the twentieth century. However, the preservation concept radically changed, especially from 1910 to 1931. New England resident William Sumner Appleton recognized that many historic buildings were architecturally significant, regardless of what had occured within their walls. Thus, Appleton introduced the concept of architectural significance, unrelated to historic events, as a basis for preservation."[10]

Buildings began to be isolated and used for such sterile purposes as historical museums and headquarters of preservation societies, or as singular relics in their own right. With Rockefeller's restoration of Williamsburg, Virginia, the concept of the outdoor museum was brought to the United States. Whole sections of towns and cities began to be preserved in order to retain their contextual validity.

Appleton, however, "recognized that all historic buildings could not be preserved as museums only for exhibition purposes. To solve this problem, he introduced the idea of keeping historic structures in current use with adequate safeguards against damaging changes... The value of this approach was the opportunity of using historic structures as a part of continuing community life, instead of isolating them as objects of inspiration and veneration."[11]

The benefits that preservation provides to both individuals and society at large are enumerated in the following:

1. Preservation, enhancement, and maintenance of existing urban amenities, too costly to replace once destroyed;
2. the recycling, or adaptive re-use, of old buildings and neighborhoods for continued use and benefit;
3. the maintenance, or enhancement, of property values;
4. the retention of the indigenous character and sense of time and place which provides identity to the community and its residents;
5. enhancement of the aesthetic quality of the community and promotion of support for urban design standards; and
6. guidance of the orderly growth and development of the community.[12]

Conclusion

"Archaeology and historic preservation provide a very important link and help us to understand not only our historic past but also our prehistoric heritage. 'Together with geological and paleontological information, the study of archaeology can contribute to the understanding of past climates, of the evolution of plant and animal species, human diets and diseases, changes in magnetic forces and many other facets of scientific knowledge.'[13] This information is important not only to scientists but also to the general public.

Preserved buildings, sites, and objects, also, provide a distinct cultural flavor to the area in which they belong. Historical preservation in an area can provide a guide to future development, enabling the landscape architect to blend past and present into a coherent future in the area being planned. Historic sites can teach us of the mistakes and successes of past land use, and enable the landscape architect to utilize this information. During the analysis it is imperative that these places are found, recorded and preserved.

Without a 'sense of place' our society would be culturally and intellectually deprived. We, as landscape architects and land planners, must work closely with professionals in the fields of archaeology and historic preservation. We must develop a sense of our past as well as a knowledge of how to preserve it... to benefit our society, both now and in the future."[14]

Miss Baker in Giant Porch Chair VIII.

"Jawgia Rocker"

Appendix A

Historic Preservation FACT SHEET

Historic Preservation Section; Georgia Department of Natural Resources
Floyd Tower East, Suite 1462; 205 Butler St., S.E.; Atlanta, GA. 30334; (404) 656-2840

THE NATIONAL REGISTER OF HISTORIC PLACES

The National Register is the nation's official list of historic buildings, structures, sites, objects, and districts worthy of preservation. The list is maintained by the U. S. Department of the Interior. In Georgia, the National Register program is administered by the Historic Preservation Section (HPS) of the Department of Natural Resources (the State Historic Preservation Office).

Listing in the National Register provides recognition of a property's architectural, historical, or archaeological significance. National Register listing identifies properties for planning purposes and insures that these properties will be taken into account in the planning of federally assisted projects. National Register designation makes properties eligible for federal grant assistance for preservation purposes. Owners of National Register properties may qualify for tax benefits gained through the charitable contribution of preservation easements to nonprofit organizations. Owners of income-producing depreciable properties listed in the National Register are eligible for federal tax credits for rehabilitation work which meets preservation standards.

National Register listing does not place obligations or restrictions on the use or disposition of property. National Register listing is not the same as local historic district zoning or local landmark designation. National Register listing does not encourage public acquisition or access to property.

In Georgia, properties are listed in the National Register through the HPS. The HPS encourages National Register proposals from the public for a wide range of properties; however, properties are nominated to the National Register according to priorities and procedures established by the state's comprehensive historic preservation plan. A 17-step process involving research, evaluation, and planning must be followed to list properties in the National Register; persons, organizations, or agencies requesting National Register listing carry out much of this work according to guidelines established by the HPS. Requests for National Register listings are reviewed by the HPS and, if approved, by the Georgia National Register Review Board. Approved proposals are then submitted by the Georgia State Historic Preservation Officer to the U. S. Department of the Interior in Washington, D. C., for final review and, if approved, listing in the National Register.

To be listed in the National Register, a property must meet the National Register Criteria for Evaluation. These criteria state that "the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures. and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and (a) are associated with events that have made a significant contribution to the broad patterns of our history, or (b) are associated with the lives of persons significant in our past, or (c) embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or (d) have yielded, or may be likely to yield, information important in prehistory or history."

THE NATIONAL REGISTER OF HISTORIC PLACES

The National Register DOES:	The National Register DOES NOT:
1. Identify significant buildings, structures, sites, objects, and districts according to the National Register Criteria for Evaluation.	1. Provide a marker or plaque for registered properties (property owners may obtain markers or plaques at their own expense).
2. Encourage the preservation of historic properties by documenting their significance.	2. Restrict the rights of private property owners in the use, development, or sale of private historic property, or require that properties be maintained, repaired, or restored.
3. Provide information about historic resources for planning purposes.	3. Automatically invoke local historic district zoning or local landmark designation.
4. Enable federal, state, and local governments to consider historic properties in their planning.	4. Require review of state, local, or privately funded projects which may affect historic properties.
5. Facilitate federally mandated review of federally funded, licensed, or sponsored projects for their effect on historic properties.	5. Stop federally assisted development projects.
6. Make owners of historic properties eligible to apply for federal grants for preservation projects.	6. Guarantee that grant funds will be available for all properties or projects.
7. Provide federal tax benefits to owners of income-producing depreciable properties who rehabilitate their properties according to preservation standards.	7. Provide state or local tax benefits, or federal tax benefits to owners of owner-occupied housing.
8. List properties only if they meet the National Register Criteria for Evaluation.	8. List individual properties if the owner objects or historic districts if a majority of property owners objects.

??????????????????????????????

QUESTION: How long does it take to get a property listed in the National Register?

ANSWER: From beginning to end--if all goes well--the National Register nomination process generally takes at least a year. Often it requires more than a year to plan a National Register nomination, document the property to National Register standards, and receive the necessary state and federal reviews and approvals. Single property nominations usually require less time; historic district and other multiple-property nominations may require more time.

****

For more information about the National Register, or to obtain application materials to request that a property be considered for nomination to the National Register, contact the Historic Preservation Section.

6/1986

Historic Preservation FACT SHEET

Historic Preservation Section; Georgia Department of Natural Resources

Floyd Tower East, Suite 1462; 205 Butler St., S.E.; Atlanta, GA. 30334; (404) 656-2840

THE HISTORIC PRESERVATION SECTION

The Historic Preservation Section of the Georgia Department of Natural Resources serves as the State Historic Preservation Office in Georgia. By working in partnership with the U.S. Department of the Interior and local communities, the Historic Preservation Section carries out the mandates of the National Historic Preservation Act of 1966 as amended and works to preserve the historical, architectural and archaeological resources of Georgia. In administering the National Register of Historic Places and the programs associated with it, the Historic Preservation Section provides the following services in Georgia:

Identifying and Evaluating Significant Properties. The Historic Preservation Section is charged with the responsibility of funding and/or carrying out surveys to locate cultural resources. Resources are identified through county-wide and site-specific surveys or through local citizens. The office is also responsible for nominating eligible properties to the National Register of Historic Places. By recognizing significant cultural properties, the National Register program serves as a planning tool to aid federal and state agencies, as well as local governments and citizens. The identification of significant properties encourages the development of projects which considers the importance of these properties and allows for their continued preservation and/or reuse.

Administering the Federal Tax Programs and Identifying Funding Sources. The Economic Recovery Tax Act of 1981 provides a 25% Investment Tax Credit for the sensitive rehabilitation of income-producing historic properties, and the Tax Treatment Extension Act of 1980 provides a tax deduction for owners of both income-producing structures and owner-occupied residences who have contributed a preservation easement on their building to a qualified non-profit organization. The Historic Preservation Section provides professional opinion on a property's eligibility for these programs, assists applicants by reviewing applications for tax certification to determine whether work undertaken meets the Secretary of the Interior's Standards for Rehabilitation, and forwards applications to the National Park Service with the State Historic Preservation Officer's recommendations. The office also administers a matching grant-in-aid program for survey and planning projects with funding provided by the U.S. Department of the Interior, and maintains information on other sources of funding available for preservation projects.

Providing Review and Planning Services. The Historic Preservation Section is responsible for reviewing and commenting on federally-funded projects to insure that significant cultural resources are identified and considered. The office also assists local communities with planning for the protection of significant properties by providing information on a variety of preservation plannnig tools, such as historic district zoning, legislation, and community preservation plans. In addition, the office works with many of the state's Area Planning and Development Commissions (APDCs) by providing funding for preservation planning assistance through the services of Regional Preservation Planners.

Offering Technical Assistance and Information. Through the services of a professional staff, the Historic Preservation Section offers assistance and direction for the development of sound preservation projects and programs in Georgia. The office serves as an informational clearinghouse directing inquiries for assistance to available resources and developing publications, programs, and workshops to address topics of interest to preservationists throughout the state.

Providing Archaeological Services. The Office of the State Archaeologist provides advice and assistance to the Historic Preservation Section in carrying out the responsibilities of the Georgia Antiquities Act which encourages the identification, documentation, and protection of archaeological sites in Georgia, especially those on state-owned lands.

CRITERIA FOR HISTORICAL AREAS

1. National significance is ascribed to buildings, sites, objects, or districts which possess exceptional value of quality in illustrating or interpreting the historical(history and archeology) heritage or our nation.
2. A historic or prehistoric structure, district, site or object must possess integrity. For a historic or prehistoric site, integrity requires original location and intangible elements of feeling and association.
3. Structures or sites which are primarily of significance in the field of religion or to religious bodies but are not of national importance in other fields of the history if the United States, such as political, military, or architectural history, will not be eligible for consideration.
4. Birthplaces, graves, burials, and cemeteries, as a general rule, are not eligible for consideration and recognition except in cases of historical figures of transcendent importance.
5. Structures, sites, and objects achieving historical importance within the past 50 years will not as a rule be considered unless associated with persons or events of transcendent significance.

Historic Landmarks

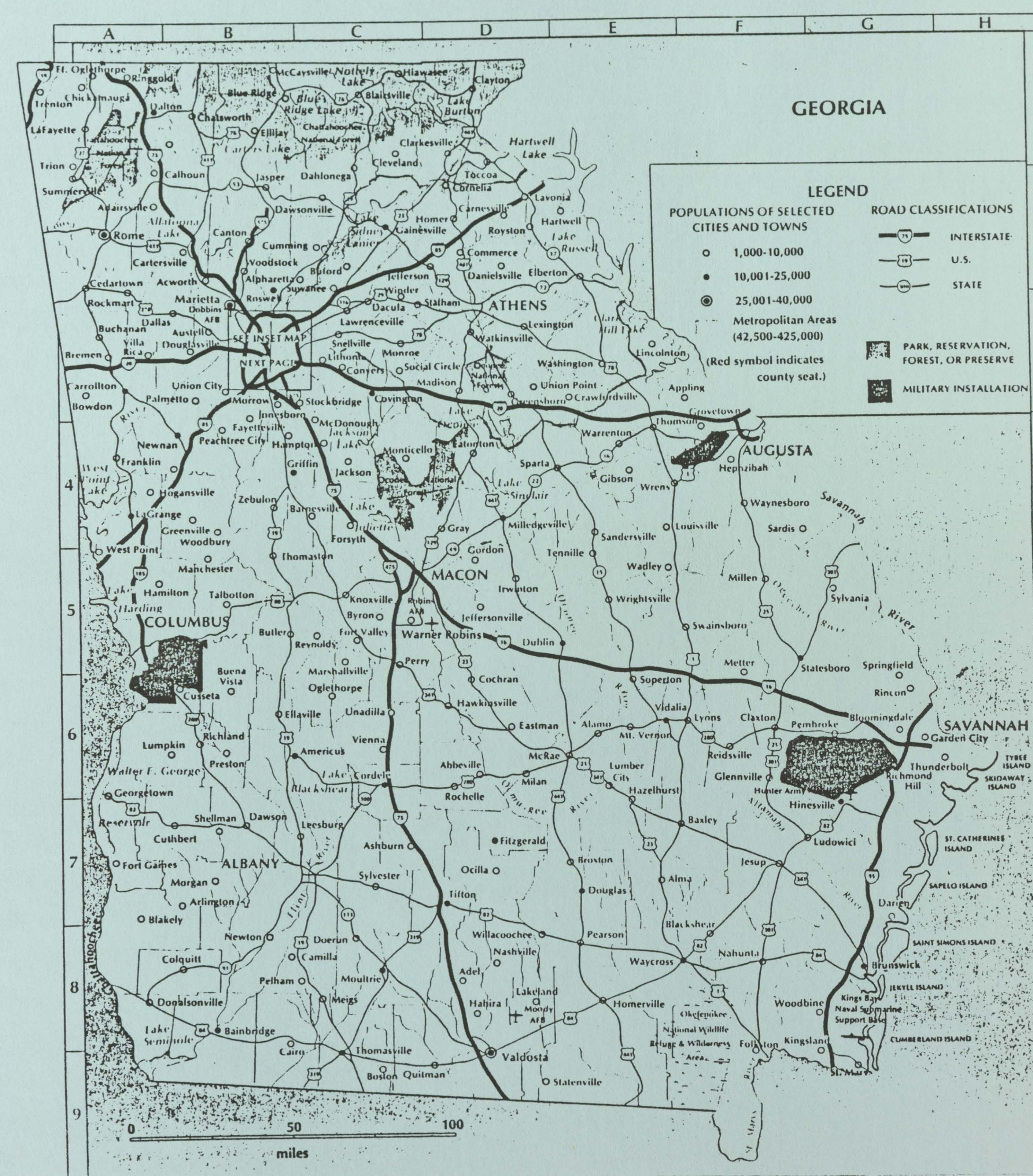
Andersonville Prison site-Macon County
Etowah mounds-Bartow County
Harris House-Fulton County
Kolomoke mounds-Early County
Low Birthplace-Chatham County
Savannah Historic District-Chatham County
Stallings Island-Columbia County
Traveler's Rest-Stephens County

Natural Landmarks

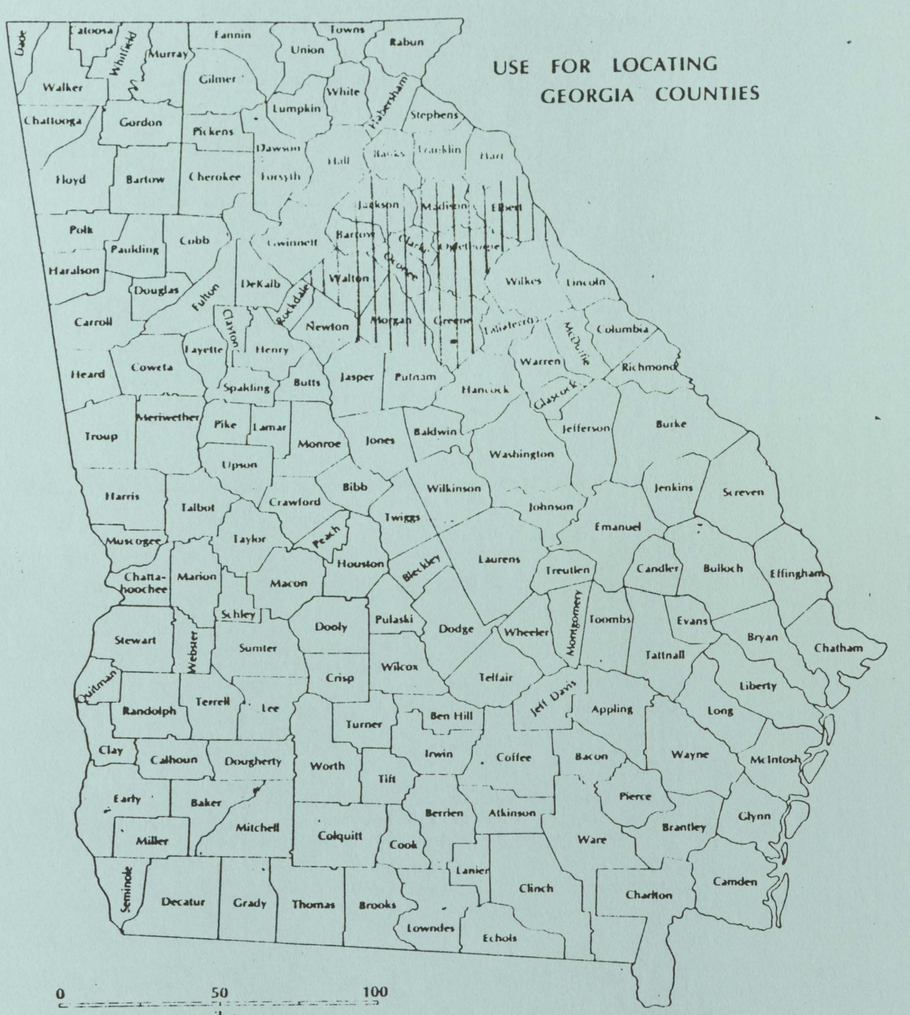
Marshall Forest-Floyd County
Wassaw Island-Chatham County in Atlantic Ocean

National Park

Fort Frederica National Monoment
Fort Pulaski National Monument
Kennesaw Maountain National Battlefield Park
Ocmulgee National Monument


GEORGIA
LEGEND
POPULATIONS OF SELECTED CITIES AND TOWNS
1,000-10,000
10,001-25,000
25,001-40,000
Metropolitan Areas (42,500-425,000)
(Red symbol indicates county seat.)
ROAD CLASSIFICATIONS
INTERSTATE
U.S.
STATE
PARK, RESERVATION, FOREST, OR PRESERVE
MILITARY INSTALLATION
A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
8
9
ATHENS
AUGUSTA
MACON
COLUMBUS
SAVANNAH
ALBANY
SEE INSET MAP NEXT PAGE
Rome
Dalton
Gainesville
Marietta
Warner Robins
Valdosta
Brunswick
Waycross
Dublin
Thomasville
Tifton
Americus
LaGrange
Griffin
Newnan
Carrollton
Milledgeville
Statesboro
Hinesville
Bainbridge
Moultrie
Douglas
Fitzgerald
Hartwell Lake
0
50
100
miles

Appendix B


USE FOR LOCATING
GEORGIA COUNTIES
Union
Towns
Rabun
Fannin
Murray
Whitfield
Gilmer
Walker
White
Lumpkin
Stephens
Chattooga
Gordon
Pickens
Dawson
Hall
Franklin
Hart
Floyd
Bartow
Cherokee
Forsyth
Jackson
Madison
Elbert
Polk
Paulding
Cobb
Gwinnett
Barrow
Clarke
Oglethorpe
Haralson
Douglas
Fulton
DeKalb
Walton
Wilkes
Lincoln
Carroll
Clayton
Rockdale
Newton
Morgan
Greene
Taliaferro
McDuffie
Columbia
Heard
Coweta
Fayette
Henry
Spalding
Butts
Jasper
Putnam
Hancock
Warren
Richmond
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Glascock
Jefferson
Burke
Troup
Upson
Washington
Harris
Talbot
Crawford
Bibb
Wilkinson
Jenkins
Screven
Twiggs
Johnson
Emanuel
Muscogee
Taylor
Peach
Houston
Laurens
Treutlen
Candler
Bulloch
Effingham
Chatta-
hoochee
Marion
Macon
Bleckley
Schley
Dooly
Pulaski
Dodge
Wheeler
Montgomery
Toombs
Evans
Bryan
Chatham
Stewart
Webster
Sumter
Wilcox
Telfair
Tattnall
Quitman
Terrell
Lee
Crisp
Jeff Davis
Appling
Liberty
Long
Randolph
Turner
Ben Hill
Clay
Calhoun
Dougherty
Worth
Irwin
Coffee
Bacon
Wayne
McIntosh
Tift
Early
Baker
Pierce
Berrien
Atkinson
Brantley
Glynn
Miller
Mitchell
Colquitt
Cook
Ware
Seminole
Decatur
Grady
Thomas
Brooks
Lanier
Clinch
Charlton
Camden
Lowndes
Echols
0
50
100
miles

BARROW COUNTY

Reference No: 86000799
Resource Name: Athens--Chandler--Church Street Historic District
Other Names: See Also:Jackson--Johns House
Address: Roughly bounded by Athens, Betts, Church, and Chandler Sts.
City: Winder, GA

Status: Listed in the National Register (04/17/86)

xxx

Reference No: 80000970
Resource Name: Barrow County Courthouse
Address: Courthouse Sq.
City: Winder, GA

Status: Listed in the National Register (09/18/80)

xxx

Reference No: 84000884
Resource Name: Broad Street Commercial Historic District
Address: Broad and Athens Sts.
City: Winder, GA

Status: Listed in the National Register (07/26/84)

xxx

Reference No: 84000885
Resource Name: Jackson Street Commercial Historic District
Address: Roughly bounded by Jackson, Athens, Chandler, and Broad Sts
City: Winder, GA

Status: Listed in the National Register (07/26/84)

xxx

Reference No: 85000847
Resource Name: Jackson-Johns House
Address: 116 Candler St.
City: Winder, GA

Status: Listed in the National Register (04/18/85)

xxx

Reference No: 75000572
Resource Name: Kilgore Mill Covered Bridge and Mill Site
Other Names: Bethlehem Bridge;Apalachee River Bridge;Briscoe Mill Bridge
Address: 3.5 mi. SW of Bethlehem across Apalachee River/county line
City: Bethlehem, GA

Status: Listed in the National Register (04/14/75)

BARROW COUNTY

Reference No: 84000888
Resource Name: North Broad Street Residential Historic District
Address: Roughly bounded by Woodlawn Ave., Center, Broad, and Stephens Sts.
City: Winder, GA

Status: Listed in the National Register (07/26/84)

xxx

Reference No: 85000933
Resource Name: Rockwell Universalist Church
Address: GA 53 & Rockwell Church Rd.
City: Winder, GA

Status: Listed in the National Register (05/02/85)

xxx

Reference No: 84000890
Resource Name: Russell Homeplace Historic District
Address: US 29
City: Russell, GA

Status: Listed in the National Register (09/07/84)

xxx

Reference No: 79000696
Resource Name: Winder Depot
Address: Broad and Porter Sts.
City: Winder, GA

Status: Listed in the National Register (05/08/79)

xxx

CLARKE COUNTY

Reference No: 80000989
Resource Name: Athens Factory
Other Names: Old Mill, The
Address: Baldwin and Williams Sts.
City: Athens, GA

Status: Listed in the National Register (07/31/80)

xxx

Reference No: 72000375
Resource Name: Bishop House
Address: Jackson St., University of Georgia campus
City: Athens, GA

Status: Listed in the National Register (03/16/72)

xxx

Reference No: 85000850
Resource Name: Bloomfield Street Historic District
Other Names: See Also:Calvin W. Parr House
Address: Roughly bounded by Bloomfield and Peabody Sts., U of G campus, Rutherford St and Milledge Ave.
City: Athens, GA

Status: Listed in the National Register (04/18/85)

xxx

Reference No: 85000851
Resource Name: Boulevard Historic District
Other Names: See Also:President's House, University of Georgia;Grady, Henry W., House
Address: Roughly bounded by the Seaboard Coastline RR tracks, Pulaski St., Prince Ave., and Hiawassee St.
City: Athens, GA

Status: Listed in the National Register (04/18/85)

xxx

Reference No: 75000576
Resource Name: Camak House
Address: 279 Meigs St.
City: Athens, GA

Status: Listed in the National Register (07/07/75)

xxx

CLARKE COUNTY

Reference No: 75000577
Resource Name: Carnegie Library Building
Other Names: Navy Supply Corps Museum
Address: 1401 Prince Ave.
City: Athens, GA

Status: Listed in the National Register (11/11/75)

xxx

Reference No: 74002255
Resource Name: Chase, Albon, House
Other Names: Old Presbyterian Manse;Reed House
Address: 185 N. Hull St.
City: Athens, GA

Status: Listed in the National Register (08/19/74)

xxx

Reference No: 84003873
Resource Name: Chestnut Grove School
Address: 610 Epps Bridge Rd.
City: Athens, GA

Status: Listed in the National Register (06/28/84)

xxx

Reference No: 75000578
Resource Name: Church-Waddel-Brumby House
Address: 280 E. Dougherty St.
City: Athens, GA

Status: Listed in the National Register (02/20/75)

xxx

Reference No: 80000990
Resource Name: Clarke County Jail
Other Names: Old Clarke County Jail
Address: Courthouse Sq.
City: Athens, GA

Status: Listed in the National Register (05/29/80)

xxx

Reference No: 75000579
Resource Name: Cobb, T. R. R., House
Address: 194 Prince Ave.
City: Athens, GA

Status: Listed in the National Register (06/30/75)

CLARKE COUNTY

Reference No: 79000705
Resource Name: Cobb-Treanor House
Other Names: Treanor House
Address: 1234 S. Lumpkin St.
City: Athens, GA

Status: Listed in the National Register (05/08/79)

xxx

Reference No: 78000973
Resource Name: Cobbham Historic District
Other Names: See Also:Sledge-Cobb House;Seney-Stovall Chapel
Address: Roughly bounded by Prince Ave., Hill, Reese, and Pope Sts.
City: Athens, GA

Status: Listed in the National Register (08/24/78)

xxx

Reference No: 79000706
Resource Name: Crane, Ross, House
Other Names: Sigma Alpha Epsilon Fraternity House
Address: 247 Pulaski St.
City: Athens, GA

Status: Listed in the National Register (06/18/79)

xxx

Reference No: 79000707
Resource Name: Dearing, Albin P., House
Other Names: Kappa Alpha Theta Sorority House
Address: 338 S. Milledge Ave.
City: Athens, GA

Status: Listed in the National Register (05/08/79)

xxx

Reference No: 75000580
Resource Name: Dearing Street Historic District
Other Names: See Also:Crane,Ross,House;Chase,Albon,House;Wilkins House;Hamilton,Dr. James S.,House
Address: Roughly bounded by Broad and Baxter Sts., Milledge Ave., and includes both sides of Finley St. and Henderson Ave.
City: Athens, GA

Status: Listed in the National Register (09/05/75)

xxx

CLARKE COUNTY

Reference No: 84000965
Resource Name: Downtown Athens Historic District (Boundary Increase)
Other Names: See Also:Downtown Athens Historic District
Address: Roughly bounded by Hancock Ave., Foundry, Mitchell, Broad, and Lumpkin sts.
City: Athens, GA

Status: Listed in the National Register (05/31/84)

xxx

Reference No: 78000974
Resource Name: Downtown Athens Historic District
Other Names: See Also:Franklin House;Clarke County Courthouse;Downtown Athens H.D. (Boundary Increase)
Address: Roughly bounded by Hancock Ave., Foundly, Mitchell
City: Athens, GA

Status: Listed in the National Register (08/10/78)

xxx

Reference No: 80000991
Resource Name: First A.M.E. Church
Other Names: First African Methodist Episcopal Church
Address: 521 N. Hull St.
City: Athens, GA

Status: Listed in the National Register (03/10/80)

xxx

Reference No: 74000667
Resource Name: Franklin House
Other Names: Old Athens Hotel;Athens Hardware Company
Address: 464--480 E. Broad St.
City: Athens, GA

Status: Listed in the National Register (12/11/74)

xxx

Reference No: 72000376
Resource Name: Garden Club of Georgia Museum-Headquarters House,Founder's Memorial Garden
Address: Lumpkin St., University of Georgia campus
City: Athens, GA

Status: Listed in the National Register (04/26/72)

xxx

CLARKE COUNTY

Reference No: 76000613
Resource Name: Grady, Henry W., House
Address: 634 Prince Ave.
City: Athens, GA

Status: Listed in the National Register (05/11/76)

xxx

Reference No: 79000708
Resource Name: Hamilton, Dr. James S., House
Other Names: Alpha Delta Pi Sorority House
Address: 150 S. Milledge Ave.
City: Athens, GA

Status: Listed in the National Register (04/24/79)

xxx

Reference No: 72000377
Resource Name: Lucy Cobb Institute Campus
Address: 200 N. Milledge Ave., University of Georgia campus
City: Athens, GA

Status: Listed in the National Register (03/16/72)

xxx

Reference No: 75000581
Resource Name: Lumpkin, Joseph Henry, House
Other Names: Athens Women's Club House
Address: 248 Prince Ave.
City: Athens, GA

Status: Listed in the National Register (06/27/75)

xxx

Reference No: 72000378
Resource Name: Lumpkin, Gov. Wilson, House
Other Names: Rock House
Address: Cedar St., University of Georgia campus
City: Athens, GA

Status: Listed in the National Register (03/16/72)

xxx

Reference No: 85000859
Resource Name: Milledge Circle Historic District
Address: Milledge Park, Lumpkin St., Milledge Circle and Milledge Ave.
City: Athens, GA

Status: Listed in the National Register (04/18/85)

CLARKE COUNTY

Reference No: 85000852
Resource Name: Milledge Avenue Historic District
Other Names: See Also:Albin P. Dearing House;Thomas-Carithers House;Dr. James Hamilton House
Address: Milledge Ave. from Broad St. to Five Points
City: Athens, GA

Status: Listed in the National Register (04/18/85)

***

Reference No: 79000709
Resource Name: Morton Building
Other Names: Morton Theater
Address: 199 W. Washington St.
City: Athens, GA

Status: Listed in the National Register (10/22/79)

***

Reference No: 72000379
Resource Name: Old North Campus, University of Georgia
Address: Bounded by Broad, Lumpkin, and Jackson Sts.
City: Athens, GA

Status: Listed in the National Register (03/16/72)

***

Reference No: 82002394
Resource Name: Parr, Calvin W., House
Address: 277 Bloomfield St.
City: Athens, GA

Status: Listed in the National Register (09/09/82)

***

Reference No: 77000416
Resource Name: Parrott Insurance Building
Address: 283 E. Broad St.
City: Athens, GA

Status: Listed in the National Register (10/07/77)

***

Reference No: 72000380
Resource Name: President's House, University of Georgia
Other Names: Hill, Benjamin H., House
Address: 570 Prince Ave.
City: Athens, GA

Status: Listed in the National Register (03/16/72)

CLARKE COUNTY

Reference No: 74000668
Resource Name: Sledge, James A., House
Other Names: See Also:Cobbham Historic District
Address: 749 Cobb St.
City: Athens, GA

Status: Listed in the National Register (02/12/74)

xxx

Reference No: 79000710
Resource Name: Thomas-Carithers House
Other Names: Alpha Gamma Delta Sorority House
Address: 530 S. Milledge Ave.
City: Athens, GA

Status: Listed in the National Register (05/08/79)

xxx

Reference No: 73000616
Resource Name: Upson House
Other Names: Franklin-Gazaway-Long-Upson House
Address: 1022 Prince Ave.
City: Athens, GA

Status: Listed in the National Register (11/15/73)

xxx

Reference No: 76000614
Resource Name: Ware-Lyndon House
Other Names: Lyndon House
Address: 293 Hoyt St.
City: Athens, GA

Status: Listed in the National Register (03/16/76)

xxx

Reference No: 79000711
Resource Name: White Hall
Other Names: Whitehall House
Address: Whitehall and Simonton Bridge Rds.
City: Whitehall, GA

Status: Listed in the National Register (06/18/79)

xxx

Reference No: 70000202
Resource Name: Wilkins House
Address: 387 S. Milledge Ave.
City: Athens, GA

Status: Listed in the National Register (05/19/70)

ELBERT COUNTY

Reference No: 77000423
Resource Name: Alexander-Cleveland House
Other Names: Cleveland House
Address: 3.5 mi. NE of Ruckersville
City: Ruckersville, GA

Status: Listed in the National Register (09/15/77)

xxx

Reference No: 75000591
Resource Name: Allen, William, House
Other Names: Beverly Plantation
Address: 9 mi. E of Elberton on SR 6
City: Elberton, GA

Status: Listed in the National Register (06/05/75)

xxx

Reference No: 78000978
Resource Name: Banks, Ralph, Place
Other Names: Coldwater Plantation
Address: N of Elberton off GA 77
City: Elberton, GA

Status: Listed in the National Register (05/22/78)

xxx

Reference No: 82002409
Resource Name: Chandler, Asa, House
Address: 1003 Old Petersburg Rd.
City: Elberton, GA

Status: Listed in the National Register (06/22/82)

xxx

Reference No: 82002410
Resource Name: Elberton Commercial Historic District
Other Names: See Also:Elbert County Courthouse
Address: Church, Elbert, Oliver, and McIntosh Sts., and Public Sq.
City: Elberton, GA

Status: Listed in the National Register (05/20/82)

xxx

Reference No: 80001017
Resource Name: Elbert County Courthouse
Address: Courthouse Sq.
City: Elberton, GA

Status: Listed in the National Register (09/18/80)

ELBERT COUNTY

Reference No: 82002411
Resource Name: Elberton Residential Historic District
Address: Roughly bounded by Elbert, Oliver, Adams, Thomas, Edwards, and Heard Sts.
City: Elberton, GA

Status: Listed in the National Register (08/11/82)

xxx

Reference No: 77000422
Resource Name: Gaines, Ralph, House
Address: N of Elberton on GA 368
City: Elberton, GA

Status: Listed in the National Register (10/05/77)

xxx

Reference No: 78000979
Resource Name: Rucker House
Other Names: Cedar Grove
Address: GA 985
City: Ruckersville, GA

Status: Listed in the National Register (06/23/78)

xxx

GREENE COUNTY

Reference No: 80001083
Resource Name: Greene County Courthouse
Address: GA 12
City: Greensboro, GA

Status: Listed in the National Register (09/18/80)

xxx

Reference No: 76000637
Resource Name: Penfield Historic District
Address: 7 mi. N of Greensboro on GA 5925
City: Greensboro, GA

Status: Listed in the National Register (01/20/76)

xxx

Reference No: 85001977
Resource Name: Printup, Peter W., Plantation
Address: GA 44
City: Union Point, GA

Status: Listed in the National Register (09/05/85)

xxx

JACKSON COUNTY

Reference No: 85000936
Resource Name: Hillcrest-Allen Clinic and Hospital
Address: GA 53 & Peachtree Rd.
City: Hoschton, GA

Status: Listed in the National Register (05/02/85)

***

Reference No: 80001096
Resource Name: Jackson County Courthouse
Address: GA 1
City: Jefferson, GA

Status: Listed in the National Register (09/18/80)

***

Reference No: 79000732
Resource Name: Shankle, Seaborn M., House
Address: 125 Cherry St
City: Commerce, GA

Status: Listed in the National Register (11/29/79)

***

MADISON COUNTY

Reference No: 84001154
Resource Name: Colbert Historic District
Address: Roughly bounded by 4th and 5th Sts., 4th and 8th Aves.
City: Colbert, GA

Status: Listed in the National Register (05/31/84)

xxx

Reference No: 77000438
Resource Name: Long, Crawford W., Childhood Home
Address: Old Ila Rd.
City: Danielsville, GA

Status: Listed in the National Register (12/06/77)

xxx

Reference No: 80001114
Resource Name: Madison County Courthouse
Address: Courthouse Sq.
City: Danielsville, GA

Status: Listed in the National Register (09/18/80)

xxx

MORGAN COUNTY

Reference No: 74000695
Resource Name: Bennett, Nathan, House
Address: Dixie Ave.
City: Madison, GA

Status: Listed in the National Register (11/13/74)

***

Reference No: 72000388
Resource Name: Bonar Hall
Address: Dixie Ave.
City: Madison, GA

Status: Listed in the National Register (01/20/72)

***

Reference No: 71000281
Resource Name: Cedar Lane Farm
Other Names: Hilsabeck-Richardson House
Address: N of Madison off GA 83
City: Madison, GA

Status: Listed in the National Register (02/24/71)

***

Reference No: 74000696
Resource Name: Madison Historic District
Other Names: See Also:Bonar Hall;Felton,Rebecca Latimer,House
Address: Roughly bounded on both sides by U.S. 441
City: Madison, GA

Status: Listed in the National Register (10/29/74)

***

OCONEE COUNTY

Reference No: 70000215
Resource Name: Eagle Tavern
Address: U.S. 129
City: Watkinsville, GA

Status: Listed in the National Register (05/13/70)

xxx

Reference No: 79000739
Resource Name: South Main Street Historic District
Address: S. Main St. and Harden Hill Rd.
City: Watkinsville, GA

Status: Listed in the National Register (03/26/79)

xxx

OGLETHORPE COUNTY

Reference No: 78000997
Resource Name: Amis-Elder House
Other Names: Courtney B. Elder Place
Address: W of Crawford on Elder Rd.
City: Crawford, GA

Status: Listed in the National Register (08/02/78)

xxx

Reference No: 78000999
Resource Name: Bridges, J. L., Home Place
Other Names: Louie Bridges House
Address: N of Lexington on GA 22
City: Lexington, GA

Status: Listed in the National Register (01/31/78)

xxx

Reference No: 77000441
Resource Name: Crawford Depot
Address: U.S. 78
City: Crawford, GA

Status: Listed in the National Register (05/27/77)

xxx

Reference No: 80001217
Resource Name: Faust Houses and Outbuildings
Address: NE of Lexington off GA 77
City: Lexington, GA

Status: Listed in the National Register (02/12/80)

xxx

Reference No: 75000604
Resource Name: Howard's Covered Bridge
Address: 3 mi. SE of Smithsonia on SR S2164 over Big Clouds Creek
City: Smithsonia, GA

Status: Listed in the National Register (07/01/75)

xxx

Reference No: 78000998
Resource Name: Langston-Daniel House
Other Names: Amaziah Daniel Place
Address: 5 mi. (8 km) W of Crawford on U.S. 78
City: Crawford, GA

Status: Listed in the National Register (01/31/78)

OGLETHORPE COUNTY

Reference No: 77000442
Resource Name: Lexington Historic District
Address: U.S. 78
City: Lexington, GA

Status: Listed in the National Register (04/13/77)

xxx

Reference No: 79000740
Resource Name: Philomath Historic District
Address: GA 22
City: Philomath, GA

Status: Listed in the National Register (07/06/79)

xxx

Reference No: 84001213
Resource Name: Smithonia
Address: Address Restricted
City: Comer, GA

Status: Listed in the National Register (06/21/84)

xxx

Reference No: 85001620
Resource Name: Smith-Harris House
Address: CR 207
City: Vesta, GA

Status: Listed in the National Register (07/25/85)

xxx

xxx

WALTON COUNTY

Reference No: 84001269
Resource Name: Bank of Jersey
Address: Main St.
City: Jersey, GA

Status: Listed in the National Register (03/07/84)

xxx

Reference No: 83003609
Resource Name: Boss, A.J., House
Address: 324 Edwards St.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 82002496
Resource Name: Brodnax, Samuel H., House
Address: GA 81
City: Walnut Grove, GA

Status: Listed in the National Register (06/17/82)

xxx

Reference No: 75000615
Resource Name: Casulon Plantation
Address: E of Good Hope off GA 186
City: Good Hope, GA

Status: Listed in the National Register (10/10/75)

xxx

Reference No: 83003610
Resource Name: Chick, Tom, House
Other Names: Chick-Gower-Braswell House
Address: 1102 E. Church St.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 73000648
Resource Name: Davis-Edwards House
Other Names: Edwards House;Davis House
Address: 238 N. Broad St.
City: Monroe, GA

Status: Listed in the National Register (08/14/73)

WALTON COUNTY

Reference No: 83003612
Resource Name: East Church Street Historic District
Address: E. Church St. and S. Madison Ave.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 83003613
Resource Name: East Marable Street Historic District
Address: E. Marable St.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 82002494
Resource Name: Harris, William, Family Farmstead
Address: GA 11
City: Campton, GA

Status: Listed in the National Register (06/22/82)

xxx

Reference No: 83003614
Resource Name: McDaniel Street Historic District
Other Names: See Also:McDaniel-Tichenor House
Address: S. Broad and McDaniel Sts.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 80001255
Resource Name: McDaniel-Tichenor House
Address: 319 McDaniel St.
City: Monroe, GA

Status: Listed in the National Register (02/08/80)

xxx

Reference No: 83003616
Resource Name: Monland Place Historic District
Address: Alvoca St. and Blvd.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

WALTON COUNTY

Reference No: 83003617
Resource Name: Monroe and Walton Mills Historic District
Address: S. Broad St., S. Madison Ave., and Georgia RR line
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 83003618
Resource Name: Monroe City Hall
Address: 227 S. Broad St.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 83003619
Resource Name: Monroe Commercial Historic District
Other Names: See Also:Walton Hotel;Walton County Courthouse-Georgia County Courthouses TR
Address: Spring and Broad Sts.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 83003623
Resource Name: North Broad Street Historic District
Other Names: See Also:Davis Edwards House
Address: N. Broad and Walton Sts.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 80001257
Resource Name: Social Circle Historic District
Address: GA 11 and GA 229
City: Social Circle, GA

Status: Listed in the National Register (03/27/80)

xxx

Reference No: 83003620
Resource Name: South Broad Street Historic District
Address: S. Broad St.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

WALTON COUNTY

Reference No: 83003621
Resource Name: South Madison Avenue-Pannell Road Historic District
Address: S. Madison Ave. and Pannell Rd.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 86000414
Resource Name: Upshaw,James Berrien, House
Address: US 78 and GA 11
City: Between, GA

Status: Listed in the National Register (03/06/86)

xxx

Reference No: 83003624
Resource Name: Walton County Jail
Address: 203 Milledge Ave.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

xxx

Reference No: 80001256
Resource Name: Walton County Courthouse
Address: Courthouse Sq.
City: Monroe, GA

Status: Listed in the National Register (09/18/80)

xxx

Reference No: 82002495
Resource Name: Walton Hotel
Address: Broad and Court Sts.
City: Monroe, GA

Status: Listed in the National Register (07/15/82)

xxx

Reference No: 83003625
Resource Name: Williamson House
Address: 925 E. Church St.
City: Monroe, GA

Status: Listed in the National Register (12/28/83)

Footnotes

1. Stovall, Allen, Research Book of LAR 316.
   (Georgia: Spring 1986.)
2. Stovall, Allen, Guidelines for Local Surveys: A Basis for Preservation Planning, p. 48.
3. Waters, John C., Preservation Primer,
   (Kinko's- class notes, Fall 1988), p. 18.
4. Fish, Paul R., Preserving Georgia's Archaeological Past for the Future,
   (Univ. of Georgia: Institute of Community and Area Development, 1977), p. 1.
5. Suddeth, Ruth E., Empire Builders of Georgia,
   (Texas: Steck-Vaughn Co., 1966), p. 186.
6. Fish, p. 12.
7. Spalding, Phinizy, Chairman, Rural Georgia Heritage Pamphlet.
   (Georgia: Goergia Trust for Historic Preservation, 1987.)
8. Stovall, Research Book of LAR 316.
9. Waters, John C., Maintaining a Sense of Place,
   (Georgia: Institute of Community and Area Development, 1983), p. 2.
10. Waters, Maintaining a Sense of Place, p. 3.
11. Ibid.
12. Ibid., Preface.
13. Brace, Paul, "Archaeological Resources and Land Development: A Guide to Assess Impact," LATIS SERIES 7, vol. 5, no. 1 (1984), p. 25.
14. Stovall, Research Book of LAR 316.

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Georgia: Institute of Community and Area Development, 1983.

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Whitehead, Clayton. Heritage Foundation-Historic Tourist Bureau.

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Helen, Georgia: Bay Tree Groove, 1976.

II. Covered Bridges in Georgia Pamphlet. Georgia State Parks Commission.

III. Fish, Paul R. Preserving Georgia's Archaeological Past for the Future.
Univ. of Georgia: Institute of Community and Area Development, 1977.

IV. Georgia Historic Homes Pamphlet

V. Georgia Historical Sites Pamphlet

VI. Holder, Thomas W. The Atlas of Georgia. The Univ. of Georgia: Institute of Community and Area Development, 1986.

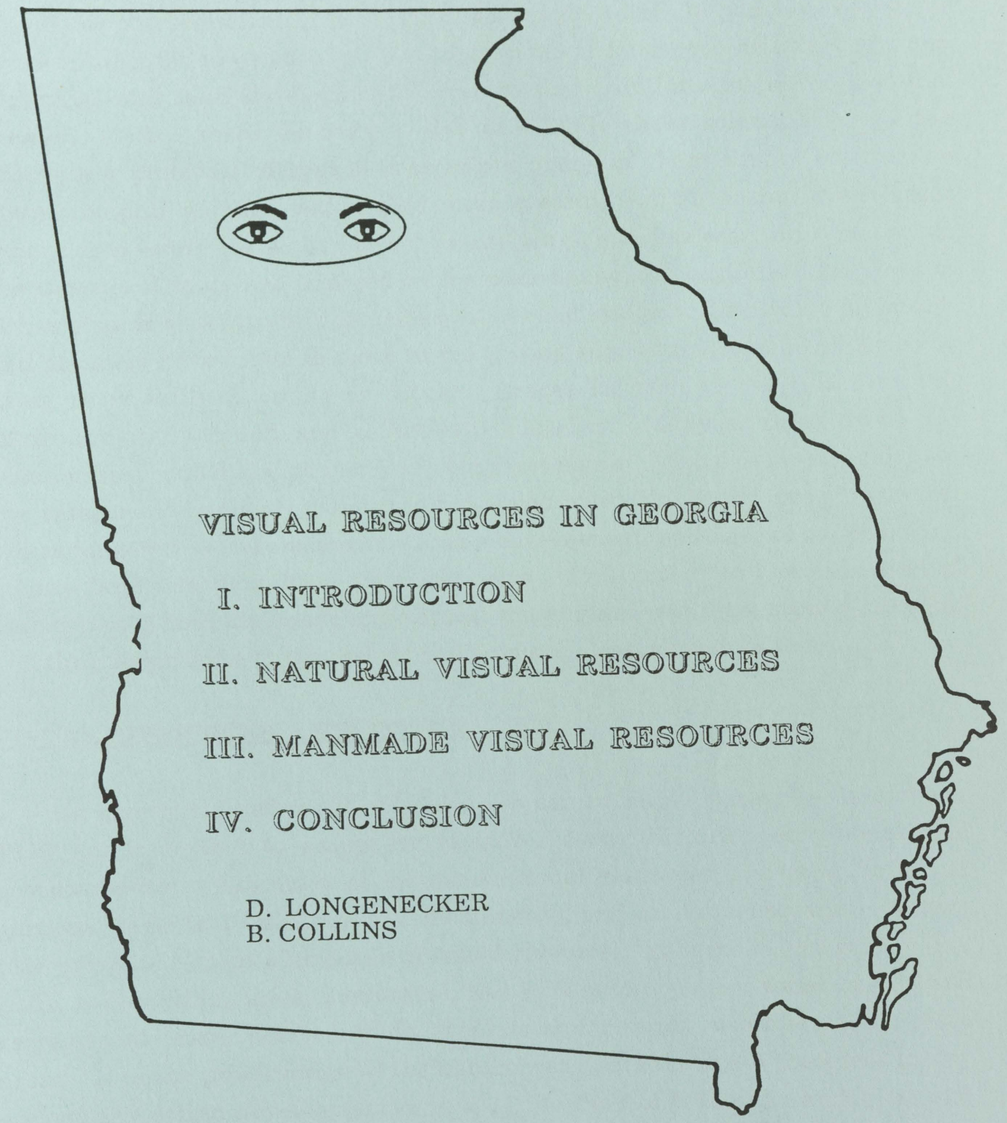
VII. Hudson, Karyn. Historic Oglethorpe: A Survey of Historic Farmsteads.
Georgia: Historic Oglethorpe County, 1986.

VIII. Linley, John. Architecture of Middle Georgia.
Georgia: The Univ. of Georgia Press, 1972.

IX. Madison Promotional Flier

X. Perkerson, Medors F. White Columns in Georgia. New York: Rinehart & Co., Inc., 1952.

XI. Waters, John C. Preservation Primer.
Kinko's- class notes, Fall 1988.



VISUAL RESOURCES IN GEORGIA

I. INTRODUCTION

II. NATURAL VISUAL RESOURCES

III. MANMADE VISUAL RESOURCES

IV. CONCLUSION

D. LONGENECKER
B. COLLINS

INTRODUCTION:

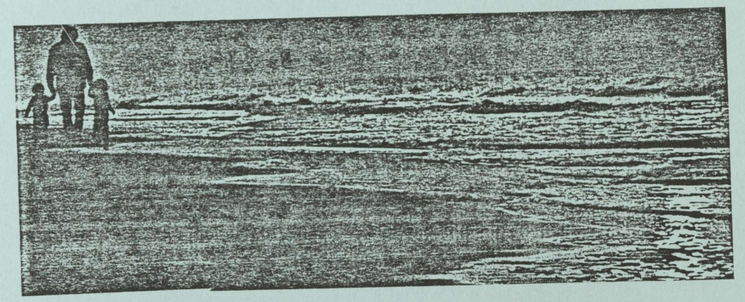
Since the beginning of time, man has sought ways in which to better his surroundings for his own use. The professions of landscape architecture, land planning, and land development arose to find solutions to the problems of creating usable space for man to live in. While these solutions solved the short-term problems of spatial constraints, many of them simply ignored the environmental damage which they were creating - thus posing even larger problems to future users. In the last twenty years, man has been awakened to see the damage that he has imposed on his planet, and has begun to take steps to either stop or greatly retard his affect on natural systems. Landscape architects and planners have began to move to the cutting edge of environmental issues by using their skills to create or preserve spaces for man to use that are both environmentally sound and esthetically pleasing. Many of these areas are encompassed under the category of visual resources. Visual resources fall into two categories: manmade resources and visual resources. Both types of resources are endangered by the onslaught of man's development, and need to be considered in any land use plan for a particular site. This report will provide a brief description of both manmade and natural visual resources in the state of Georgia, and their importance to the ecology and economic development of the state.

VISUAL RESOURCES: A DEFINITION

As mentioned before, visual resources can be either natural or manmade. They are important to people for various reasons: historic, recreational, and environmental. Examples of manmade visual resources are: zoos, botanical gardens, historical buildings and monuments, and amusement parks. Nature also provides a great abundance of visual resources: changes in topography (i.e. cliffs, rolling hills, caves, mountains, and rock outcroppings); water (scenic and recreational lakes, ponds, rapids, streams and rivers); wildlife; and forested areas. It is the preservation of the natural resources that take precedent in any ecologically sound development, and it is the duty of landscape architects and planners to note the significant natural visual resources of Georgia for planning and development in the future.

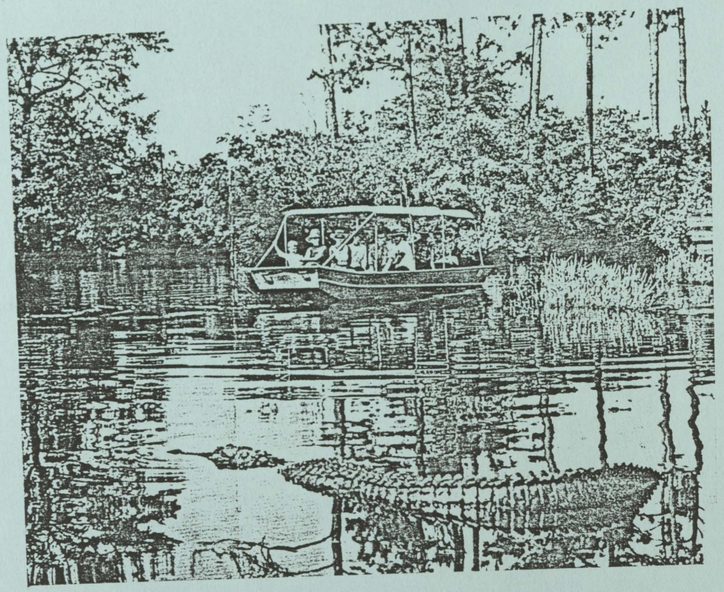
NATURAL VISUAL RESOURCES:

Along the southeastern coast of the state are the Golden Isles. These barrier islands, comprising almost eighty thousand acres of the Georgia coast form one of the major visual and ecological resources of Georgia. Arising from the shoreline over millions of years, the Golden Isles comprise a total ecosystem with their marshes and sand dunes. These ecosystems are protected and preserved by state and national law. [1]



ST SIMON'S ISLAND, ONE OF THE GOLDEN ISLES[2]

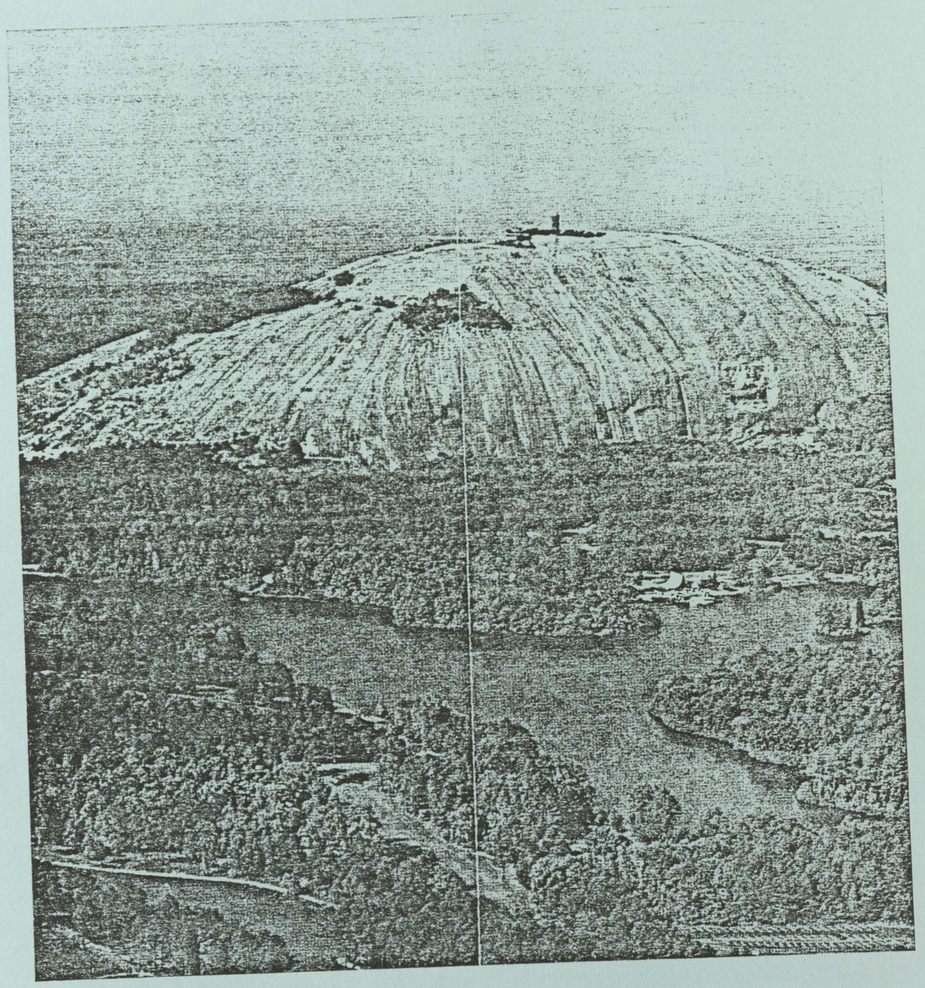
The Okefenokee swamp is another area that is a major natural visual resource to the state. A former habitat of the Seminole Indians, the swamp was settled in the late nineteenth century, and used as a major source of timber until its designation as a national wildlife preserve in 1937. The name Okefenokee is an Indian word meaning "Land of the Trembling Earth". This area contains a large array of exotic as well as native flora and fauna. Tannic acid from decaying plant material helps to color the water black, another of the unique features of this nationally famous area. [3]



THE OKEFENOKEE SWAMP [4]

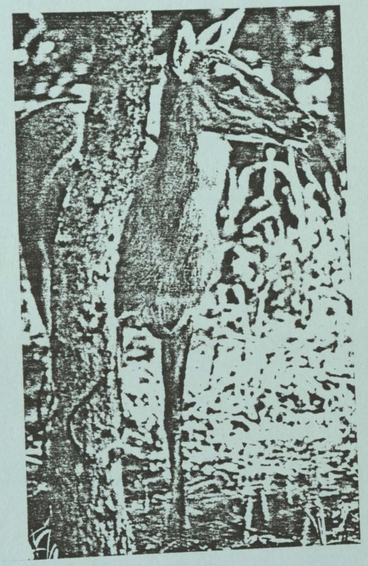
Another large natural visual resource of note is Stone Mountain. Formed millions of years ago by molten lava, Stone Mountain is a large granite outcrop measuring 750' in height by 600 acres in area. The mountain was discovered in 1567 and was quarried for its granite from 1840 until the early twentieth century. Now a park with adjacent lake and golf course, Stone Mountain is best

remembered for its carving of Confederate heroes Jefferson Davis, Stonewall Jackson, and R.E. Lee on its face.[5]



STONE MOUNTAIN [6]

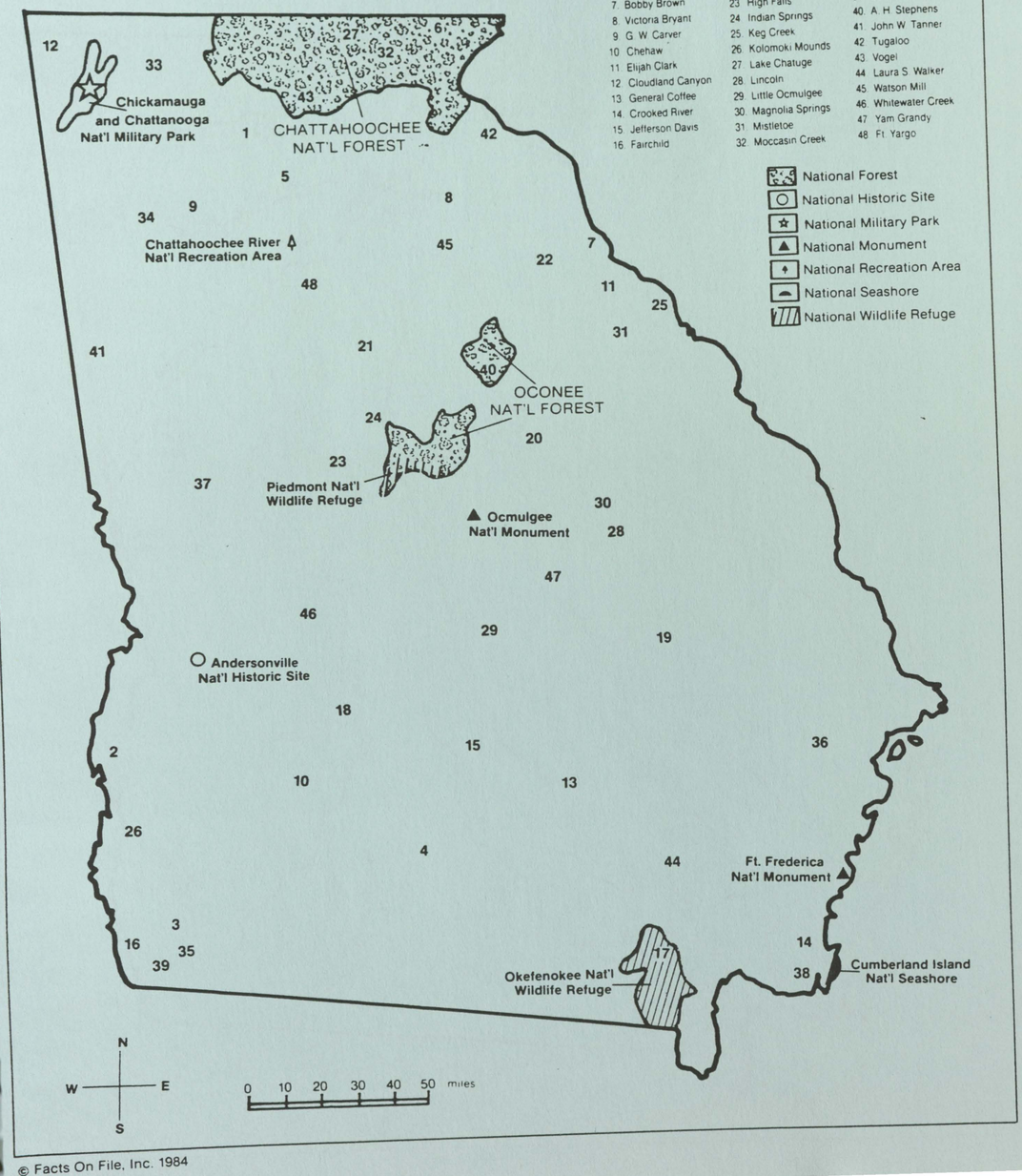
Also noteworthy is Georgia's large and widespread collection of Wildlife Management and Natural areas. These areas contain a large number of Georgia's wildlife and allow citizens of the state the ability to enjoy hunting, fishing and other outdoor recreational activities. Spread throughout the state, Georgia's wildlife areas contain Berry College in the north and Grey's reef, one of a few national marine sanctuaries , in the south.[7]



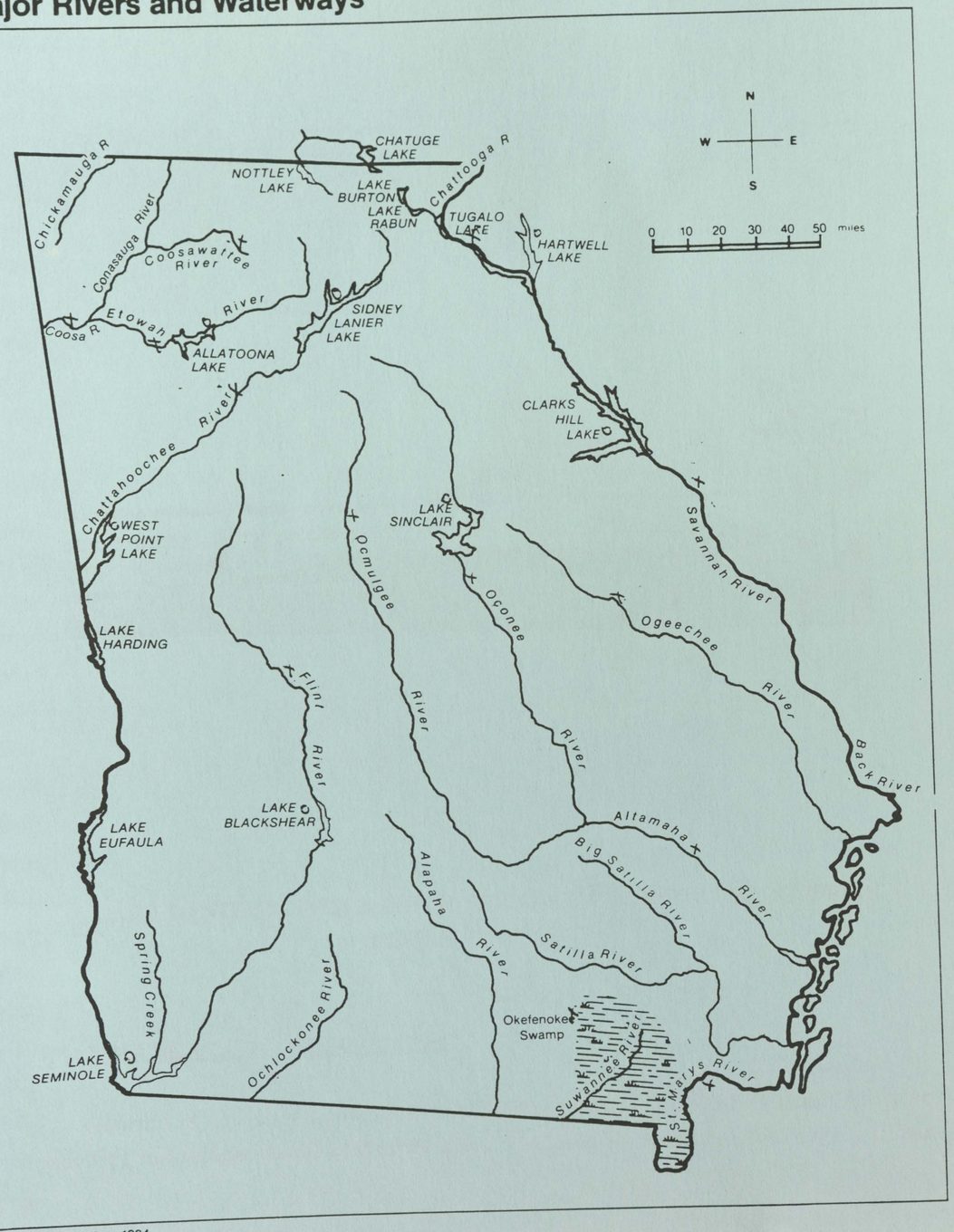
GEORGIA IS HOME TO MANY SPECIES OF WILDLIFE [9]

Georgia also contains several large water bodies in its boundaries. Lakes Lanier, Hartwell, and Alatoona are some of the largest in the state, and provide an outlet for a large number of Georgia's boating and fishing populous in the summer months. Lake Lanier accommodated over 1.25 million people in 1985.[10] Rivers include the Chatahoochee, site of a national wildlife preserve, Savannah, and other whitewater rapids and streams. The Chatooga river is known nationwide for its whitewater rafting and wildlife.

Federal Lands and State Parks[8]



Major Rivers and Waterways[11]



LAKE LANIER IS FAMOUS FOR THE GOLF COURSE AT STOUFFER'S PINEISLE RESORT 12

MANMADE VISUAL RESOURCES:

Georgia is not only known for its beautiful natural and wildlife areas, but also several manmade visual resources also. Included in these are the large number

of Mineral Springs and hotels scattered throughout the state. These hotels and springs provided areas of comfort and rest for travelers in the state. Warm Springs, one of the state's most famous mineral springs, was the summer home for Franklin Delano Roosevelt after he discovered that he had polio.[13]

THE LITTLE WHITE HOUSE, WARM SPRINGS [14]

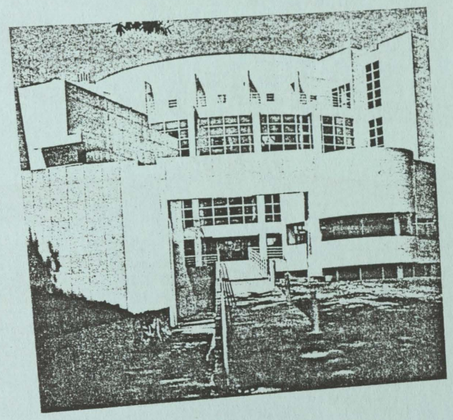
Dahlonega and Savannah are sites that are known for their historical significance. Their visual significance lies in the fact that these cities contain several of the buildings associated with their flourishing years. Dahlonega, site of the first major gold rush in the continental U.S., contains many of the reminders of the gold fever that stuck prospectors in the early nineteenth century. Savannah's historical district, with its nineteenth-century French architectural style is the site of one of the world's largest St. Patrick's day celebrations. Savannah is also noted as being one of the earliest examples of city planning, with its grid shaped town plan, designed by Oglethorpe in the late eighteenth century. Helen, Georgia is also another town known for its architecture as a tourist attraction. Built to resemble a small Swiss village, Helen is known nationally as a major tourist attraction and vacation spot.

Also contained in the visual resources of the state are several historical buildings and area. Cities and buildings such as Andersonville and Fort Fredrecia remind visitors of a Georgia long past. Several historical sites exist throughout the state in memory of the Civil and Revolutionary Wars and their impacts upon the state as a whole.

Another man made resource of the state is to be found in Georgia's recreational areas. Stone Mountain Park, as mentioned before, is a major recreational area for the northern half of the state. Golf courses such as Augusta

National, home of the Masters Golf Tournament, and Sea Island, with its courses running along the Atlantic coastline, provide outstanding beauty for golfers and spectators alike. Also included in these areas is Callaway Gardens, known for its flora and fauna throughout the world.

Atlanta contains several visual manmade resources. The Fox theater, IBM tower, and Peachtree Plaza Hotel are architectural highlights that attract tourists every year. These are but a few of the historical buildings and sites in Georgia comprising the visual resources of the state.



THE FOX THEATER AND THE HIGH MUSEUM ARE TWO OF ATLANTA'S ARCHITECTURAL RESOURCES [15]

CALLAWAY GARDENS IS KNOWN FOR ITS LARGE COLLECTION OF AZALEAS [17]

CONCLUSION:

Georgia is a state interwoven with several different types of visual resources. It is up to the planners and landscape architects of the state to plan, develop and preserve these resources as best as possible, without harming the environment surrounding them. Not only is this challenge for Georgia, but it could be extended to encompass the entire world as we move towards the twenty-first century.

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Georgia. This Way to Fun. Atlanta: Georgia Department of Industry and Trade Tourist / Communications Division.

Atlanta and Georgia Visitor's Guide, Spring and Summer 1986. Atlanta: Atlanta Convention and Visitor's Bureau.

Roosevelt's Little White House, where time stood still ... Atlanta: Georgia Department of Natural Resources. 1987.

THE FOLLOWING INFORMATIONAL PAMPHLETS WERE ALSO USED:

The Okefenokee Swamp.

Stone Mountain Park.

FOOTNOTES

[1]Thomas W. Hodler and Howard A. Schretter. **The Atlas of Georgia.** (Athens, Ga: Institute of Community and Area Development, 1986.) , pp. 27 -28.

[2]**Georgia. This Way to Fun.** (Atlanta: Georgia Department of Industry and Trade Tourist / Communications Division). , p. 45.

[3]Hodler and Schretter. , p.24.

[4]**The Okefenokee Swamp.**, p.1

[5]Hodler and Schretter. , p.25.

[6]**Stone Mountain Park**. , p.2.

[7]Hodler and Schretter. , p.243.

[8]Facts on File Publications. **State Maps on File**. 7 volumes. (New York: Facts on File publications)., 1984. vol 3: **Southeast.**, p.3.05

[9]**Georgia. This Way to Fun.**, p. 44.

[10]Hodler and Schretter., p241.

[11]Facts on File Publications., p 3.03

[12]**Atlanta and Georgia Visitor's Guide**, Spring and Summer 1986. (Atlanta: Atlanta Convention and Visitor's Bureau.). p. 109.

[13]Hodler and Schretter. , p.241.

[14]**Roosevelt's Little White House, where time stood still ....**(Atlanta: Georgia Department of Natural Resources). 1987. p.3.

[15]**Atlanta and Georgia Visitor's Guide**. pp. 93-94.

[16]**Georgia. This Way to Fun**. p.29.

[17]Ibid. p.77.