DISMAL SWAMP
MASTER PLAN

DIVISION OF STATE PARKS

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THE REGION

RECREATION NEEDS

Demand for outdoor recreation activity is increasing steadily, both in the Nation and in North Carolina. Population growth has been rapid during the past twenty years, and rising levels of education and income have permitted a wider choice of recreation possiblities for an increasing number of people. The growing demand for recreation opportunities has resulted in programs to acquire and develop outdoor recreation areas. Planning for these programs is based on study of the existing supply of resources and projection of future demand for outdoor recreation.

Estimates of demand for outdoor recreation are used in evaluating needs for opportunities and making plans to fill those needs. Recreation demand is related to population size—the more people, the more demand—and to the socio-economic characteristics of the population—people of different age, sex, and income desire different types of recreation. Between 1971 and 1986, the State's population is expected to rise 20.7 percent, which will mean an increase of around a million persons.

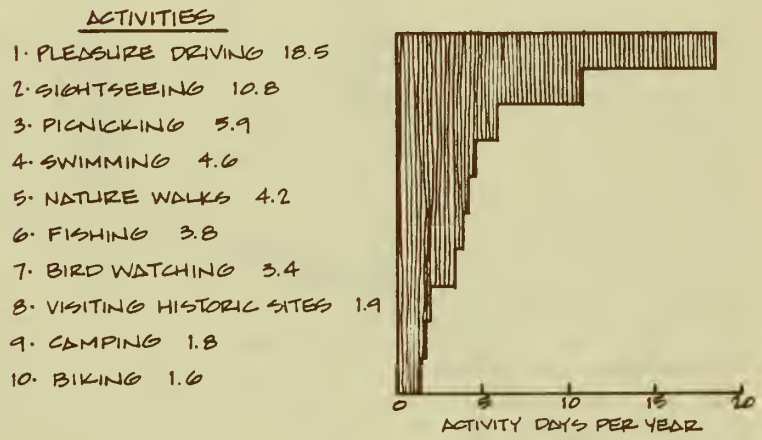
An inventory of recreation sites was made during 1974 to find out what outdoor recreation areas existed and where they were located. Only those areas functioning mainly to provide outdoor recreation were counted. In general, the location of the 2,531 recreation sites in the State reflects North Carolina population distribution and urbanization. High-density recreation areas and facilities are predominantly located in the Piedmont where the urban population is relatively large. Natural areas, resource-oriented and privately operated recreation sites are more typical of the Coastal Plan and Appalachian Regions.

REQUIREMENTS FOR THE FUTURE

By knowing the present supply of outdoor recreation areas and projecting North Carolina population growth, based on the desirable standard, present and future needs for outdoor recreation areas can be calculated. On this basis, 842,000 additional acres of land and water for recreation purposes were needed as of 1971 to raise all regions to the standards used in this plan. By the year 1986, due to projected population growth, an additional 331,000 acres of land and water will be required.

There is a present need for 718,736 acres in Class III (Natural) sites. Subtracting needed acreage in the Destination Park category—295,373—from the total needed acreage in Class III leaves a balance of 423,363 acres. The cost estimate to acquire and develop this acreage is 233 million dollars. To help interpret the nature of Class III needs, it should be pointed out that specialized outdoor recreation areas are of the nature that fee acquisition is not always necessary or desirable for them.

ADULT OUTDOOR RECREATION IN NORTH CAROLINA



The distribution of sites is as important to consider as total acreage. Unique, primitive, and historic sites must be developed where they natually exist, but location of other classes of sites should be made in response to population concentrations. **Class III, Natural Environment Areas,** presently exist primarily in Appalachia; acquisition of additional such areas in the Coastal Plain and Piedmont is needed to add to the variety of recreation opportunities available in those regions.[30]

ACQUISITION & DEVELOPMENT

The State has developed a five-year action program to meet outdoor recreation needs. Individual projects are assigned priorities for funding on the basis of their expected contribution to meeting the top priority needs identified in the State Comprehensive Outdoor Recreation Plan. From 1970 to 1974, 244,000 acres of recreation land and water are scheduled for acquisition based upon the needs described. Of this total, 28,000 acreas are to be acquired by State and local governments; the remainder is proposed by the Federal government.

Although this schedule will more than satisfy present needs in one region and land class, there will still be needs for more land in the remaining regions and classes as of 1974. Considering that land and water needs have been calculated for the first time in this plan, it is understandable that all needs cannot be fully satisfied in five years. Nevertheless, identifying needs by class and region will affect the acquisition program as it is revised in coming years.

Scheduled acquisition varies widely among regions and classes. For BOR Class I areas, acquisitions with emphasis upon urban areas are expected to meet one-sixth of identified needs with the Piedmont having the largest remaining needs. Class II area acquisitions will meet about one-half of identified needs, with the Piedmont again showing the largest amount of needs still to be met. Class III scheduled acquisitions will more than meet projected needs if Federal projects in the Coastal Plain are carried out.[30]

Due to the nature of the land itself in the Great Dismal Swamp, the area would logically fit into the Bureau of Outdoor Recreation Class III: Natural Environment Areas classification. This classification allows light facility development, access, trails and campsites, which would complement the designation of N. C. State Park. In order to comprehend the magnitude of the Great Dismal Swamp, the total areas of the Swamp and the surrounding region should be examined, keeping the Class III objectives in mind.

The 210,000 acres of the Great Dismal Swamp and the 22-mile long Dismal Swamp Canal are located twenty-five miles west of the Atlantic Ocean in southeastern Virginia and northeastern North Carolina. To the northeast of the Great Dismal lie two Standard Metropolitan Statistical Areas with a combined population of nearly one million persons. The Great Dismal itself is situated in an area of low-density rural population.[5]

NATIONAL AND REGIONAL SIGNIFICANCE

The national significance of the Great Dismal has been recognized in the establishment as a National Wildlife Refuge of 49,000 acres of the Swamp, including Lake Drummond. A major portion of this same tract (43,200 acres) has been designated a National Natural Landmark. The recreation values of the Great Dismal are derived chiefly from the natural phenomena of the Swamp. Use and development would be in terms of extensive rather than intensive recreation. This is in marked contrast to Atlantic coast resorts. It is also different from the recreation potentials and uses of the Cape Lookout, Cape Hatteras, and Assateague National Seashores, and from the appeal of such historic sites as Williamsburg, Jamestown, and the Wright Brothers Memorial at Kitty Hawk. Mackay Island, Pea Island, Mattamuskeet, and Swanquarter National Wildlife Refuges also differ from the unique Great Dismal. Croatan National Wildlife Refuges also differ from the unique Great Dismal. Croatan National Forest and nearby State parks and forests offer different recreation opportunities. The Great Dismal

may be seen as a supplementary recreation resource because it is both vulnerable and fragile and lies within easy range of a large urban center in Virginia, and a secondary urban center in North Carolina.[5]

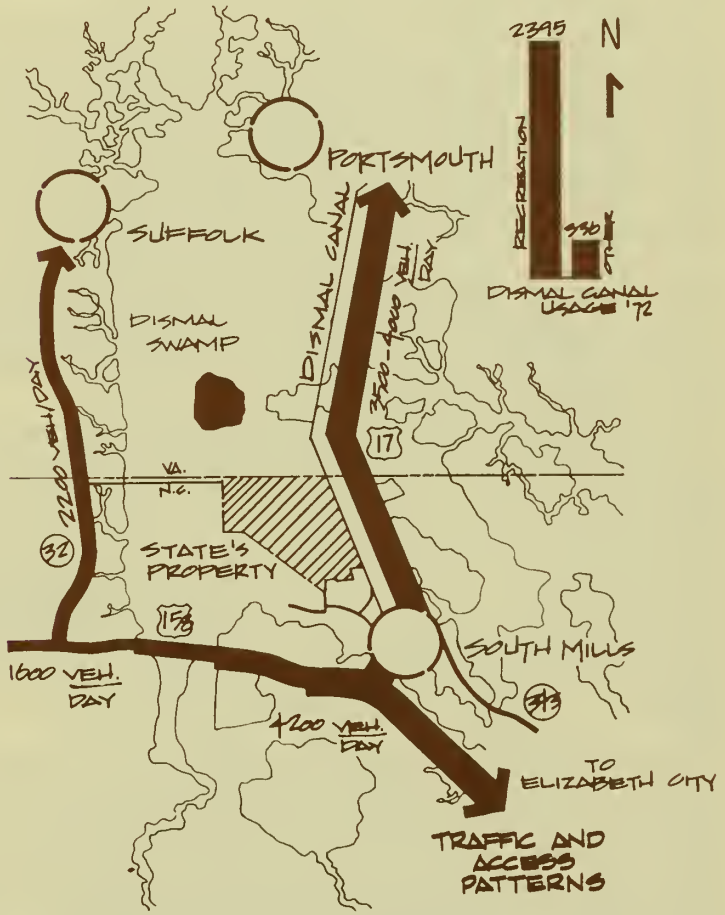
ACCESSIBILITY

The transportation network in southeastern Virginia and northeastern North Carolina conforms generally to the pattern found along the eastern seaboard. The metropolitan area of Hampton-Newport News-Norfolk is served by numerous expressways, highways, and county roads, as well as by the Chesapeake Bay Bridge Tunnel, which brings traffic coming down U.S. Route 13 the length of the Delmarva peninsula. Interstate 64, crossing the bridge-tunnel from Hampton to Norfolk, brings traffic from western Virginia and Richmond to the coast. U.S. Route 58 crosses southern Virginia from the Blue Ridge to the coast much as U.S. Route 158 crosses the southern end of the Great Dismal in northern North Carolina. U.S. Route 17, the closest highway to the Great Dismal, comes down from the Shenandoah, along the Rappahannock, and then strikes south, paralleling the Dismal Swamp Canal through the Swamp, past Elizabeth City, and on south towards Florida.

Passenger railroad service now extends only to Richmond, with passengers transferred to buses for the remainder of the journey to the Norfolk area. There is air service to Norfolk, and there are small local airports in the immediate vicinity of the Swamp and around Elizabeth City.[5]

RELATIONSHIP TO PEOPLE

The relationship of the study area to the northern and central Atlantic seaboard can be seen in terms of Megalopolis under a recent delineation which suggests Richmond rather than Washington-Arlington-Alexandria as the southern terminus. It is clear that the Great Dismal is well within the zone of influence of Megalopolis. The two Standard Metropolitan Statistical Areas (SMSA's) of Newport News-Hampton and Norfolk-Portsmouth are approximately 20 miles to the northeast of the Swamp. In the 1970 Census, they exhibited, aside from the Washington-Arlington-Alexandria area, the largest population increase in Virginia, the population of which is increasing at a rate about 30 percent greater than the national average. Northeastern North Carolina, to the south of the Great Dismal, has a rural population.[5]



The Great Dismal Swamp in North Carolina is contained in North Carolina Multi-County Planning Region R, which has sustained low density development. This planning region consists of Camden, Chowan, Currituck, Dare, Gates, Hyde, Pasquotank, Perquimans, Tyrrell, and Washington Counties. The 1970 population of these counties was 97,302 persons, or 1.91 percent of the population of North Carolina.[35] This figure represents a .4 percent decrease in population since 1960.[34]

The total employment in Region R in 1971 was 30,740 persons, with an unemployment rate of about 6.3 percent. Non-agricultural wage and salary employment was the largest category with 20,070 persons, or about 64 percent. Agricultural employment accounted for approximately 17 percent of the total, with all other categories accounting for about 19 percent.[32] The Region R per capita income for 1970 was $2,305,[33] compared with a State average of $2,492.[5]

Within a 50 mile radius of the Great Dismal Swamp site in Camden County, the 1970 Census figures show a population of 137,215 persons. Extending to a 75 mile radius adds another 129,439 persons, bringing the total population within 75 miles to 266,654.[3]

It is also clear that the Great Dismal Swamp is within the zone of influence of the population center in Wake, Durham, and Orange Counties. This area is within 150 miles of the Great Dismal Swamp itself, which is easy driving distance. The population of these three counties increased by 29.3 percent between 1960 and 1970. During this same period, the populations in North Carolina and the United States increased by 11 percent and 13 percent, respectively. Population growth for Wake, Durham, and Orange Counties is expected to increase approximately 634,000 persons by 1990.[16]

In closer proximity to the Swamp, there are two population centers. To the northwest of the Swamp is Suffolk, and to the south, on the Pasquotank River, is Elizabeth City. With these exceptions, the area immediately surrounding the Swamp has a low density rural population. The Swamp itself has relatively few inhabitants. There is, nearby on the Atlantic coast, a sizable seasonal population in the coastal resorts, and a somewhat smaller one at the National Seashores.

While the Great Dismal Swamp would only be slightly unusual and out of the ordinary to the rural population of the region, it would be extremely strange, wild, and forbidding to the surrounding urban populations. Besides offering a profound sense of isolation and remoteness, it also offers an unique base of ecological and environmental study in a state park's atmosphere.[5]

PURPOSE OF THE STATE PARK SYSTEM

The purpose of the North Carolina State Park System shall be to serve the people of North Carolina and their visitors by:

1. Preserving and protecting natural areas of unique or exceptional scenic value not only for the inspiration and benefit of the present generation, but also for generations to come.
2. Establishing and operating state parks that provide recreational use of natural resources and outdoor recreation in natural surroundings.
3. Portraying and interpreting plant and animal life, geology, and all other natural features and processes included in the various state parks.
4. Preserving, protecting and portraying scientific sites of statewide importance.

GENERAL PRINCIPLES

To assure the accomplishment of this basic purpose in accordance with the best standards, state park sites of the North Carolina State Park System shall be limited to:

1. **State parks** which evaluated on a statewide basis, possess unique or exceptional scenic value.

   By exceptional scenic value is meant rare natural scenery, which is unlikely to be preserved for the benefit and enjoyment of the public in this and future generations if the property remains in private ownership, and which is sufficiently distinctive to attract and interest people from distant parts of the State as well as local people.

2. **State parks** which possess distinctive scenic values and excellent opportunities for the development of facilities for active recreational use of natural resources and excellent opportunities for the study of natural history.

   A state park site (other than scientific sites) should possess both scenic and recreational values. In some sites exceptional scenic values may be sufficient to overcome the lack of recreational possibilities, and in other sites unusual recreational possibilities may make up for a lack of scenic values. By unusual recreational values is meant features such as topography, trees, vegetation, streams, lakes or ocean shore offering recreational possibilities which would attract and interest people of a wide surrounding area and would not be available to the public if the property remained in private ownership.

   The state parks should be sufficient in number, size, development, operation and maintenance to adequately serve the needs of all of the people of the State over and above the facilities which are or should be provided by local city, town and county parks.

SIZE REQUIREMENTS

Every state park site shall be of sufficient size to:

1. In the case of state parks possessing unique or exceptional scenic value:
   (a) completely include the scenic or natural features the area is established to protect and preserve;
   (b) provide sufficient buffer area to protect the scenic or natural features from outside influences or encroachments;
   (c) provide a reasonably satisfactory habitat for indigenous wildlife; and

(d) permit the development of recreational and public use areas if these can be provided without damage to or impairment of the primary purpose of preserving the scenic or natural features, and if geographic location or public need justify development of such areas. Under normal conditions, 400 acres of land well adapted to state park use and development shall be considered as a minimum size for each state park site possessing unique or exceptional value.

2. In the case of state parks possessing distinctive scenic values and excellent recreational opportunities:

   (a) completely include the distinctive scenic features of the area and, if possible, one or more complete landscape units;
   (b) provide sufficient buffer area to protect the distinctive scenic features from outside influences or encroachments;
   (c) provide a reasonably satisfactory habitat for indigenous wildlife;
   (d) amply accommodate the recreational and public use developments required to meet present and future public needs and to accommodate these developments in such a way that various types of public use will not interfere with each other or destroy the effect of a natural environment; and
   (e) provide extensive use amid unspoiled and relatively unmodified natural surroundings. Under normal conditions, 400 acres of land well adapted to state park use and development shall be considered as a minimum size for each state park site possessing distinctive scenic values and excellent recreational opportunities.

DEVELOPMENT

State parks possessing unique or exceptional scenic value shall receive only such development as is necessary to protect and preserve the scenic and natural values, provide public access, protect public health and provide adequate interpretive programs, and the development of such other recreational and public use facilities as can be provided to meet justifiable public needs without damage to or impairment of the scenic and natural values. All developments shall be planned and executed so as to in no way impair, damage or detract from the scenic or natural values which the areas were established to preserve and protect.

State parks possessing distinctive scenic values and excellent opportunities for the development of facilities for active recreational use of natural resources shall receive all development required to protect and preserve the distinctive scenic values, provide public access, protect public health, provide recreational use of natural resources and provide adequate interpretive programs. Development for public use of natural resources shall primarily include facilities for such outdoor activities as picnicking, swimming, boating, fishing, hiking, nature study and camping, and for vacation use when desirable. Facilities for such recreational activities as organized sports, playgrounds and athletic contests are better suited to municipal and other parks, and shall not be provided in state park areas except for simple playfields incident to picnicking and organized camping. All development shall be so planned and constructed as to deep disturbance of natural conditions at a minimum and to leave a liberal portion of each state park completely undisturbed and completely free from all man-made improvements and structures, except trails, so as to permit maximum preservation of natural conditions.

A state park should be developed in a dignified and substantial manner and all development and construction should be

carefully planned in advance. Construction should be with durable materials and shall be of a type that will require minimum maintenance and operating costs.

Each state park must eventually have, as a bare minimum of development, access and other roads, parking areas, safe drinking water, sanitary facilities, employee housing, maintenance buildings and other fundamentals. A site which necessitates unusually large expenditures to provide for basic developments should ordinarily be avoided.[13]

HISTORY OF THE
DISMAL SWAMP

ORIGIN OF THE DISMAL SWAMP

The Dismal Swamp, on the border between eastern Virginia and North Carolina is one of the few remaining large (approximately 210,000 acres) areas of wet wilderness in the eastern United States. The flora and fauna of the swamp are predominantly southern, yet a large number of northern plants and animals are present.

The surface of the Dismal Swamp slopes gently eastward at about 1 foot per mile from an altitude of 25 feet near the toe of the Suffolk Scarp to 15 feet near the Deep Creek Swale. At the west edge of the swamp the Suffolk Scarp rises abruptly to an altitude of 60 to 70 feet on its undissected crest. The face of the scarp slopes eastward as much as 130 feet to the mile.

The Suffolk Scarp can be traced continuously for at least 210 miles from the Potomac River in northern Virginia to the Neuse River in North Carolina. It was formed as a shoreline feature during the Pleistocene Epoch when sea level was approximately 45 feet higher than it is at present.

Deep Creek Swale bounds the Dismal Swamp on the east. The axis of the swale trends north-south, and the land surface rises from the center westward to the Dismal Swamp and eastward to the Fentress Rise. The altitude of the swale ranges from about 10 feet near the center to about 15 feet near the swamp and the Fentress Rise.

The Fentress Rise consists of five large remnants of a gently westward-sloping surface that rises eastward from the Deep Creek Swale to a flat crest with an altitude between 20 and 25 feet. The rise extends from Norfolk, Virginia on the north almost to Albemarle Sound in North Carolina. It is broken by four east-west trending valleys—Eastern Branch of Elizabeth River, Southern Branch of Elizabeth River, Northwest River, and Indiantown Creek,. The east boundary of the Fentress Rise is the Hickory Scarp. Therefore, the oldest known peat in the Dismal Swamp began forming while the sea level was 60 to 70 feet or more below its present level. Sea level probably has not been significantly higher since that time than it is at present.

THEORIES ON THE ORIGIN AND DEVELOPMENT OF DISMAL SWAMP AND LAKE DRUMMOND

The basic hydrologic requirements for the formation and development of large peat swamps are a humid climate with reasonably uniform rainfall throughout the year and restricted drainage, both surface and subsurface. The Dismal Swamp has a warm humid climate, an average annual rainfall of 45 to 50 inches, and an average annual temperature of 59° to 60° F. Average monthly rainfall ranges from 3.20 inches in October to 6.73 inches in July. Average monthly temperature ranges from 41.2°F. in January to 78.8° in July.

The thick, rather impervious clay of the Yorktown Formation which underlies the entire area, is an effective seal preventing either downward or upward movement of water. The Miocene and Pliocene sediments constitute a confining bed, and water in the underlying Upper Cretaceous is under sufficient head to flow at the land surface. Therefore, if appreciable exchange of water could occur between the Upper Cretaceous aquifers and the swamp, it would be upward into the swamp rather than downward to the Upper Cretaceous aquifers.

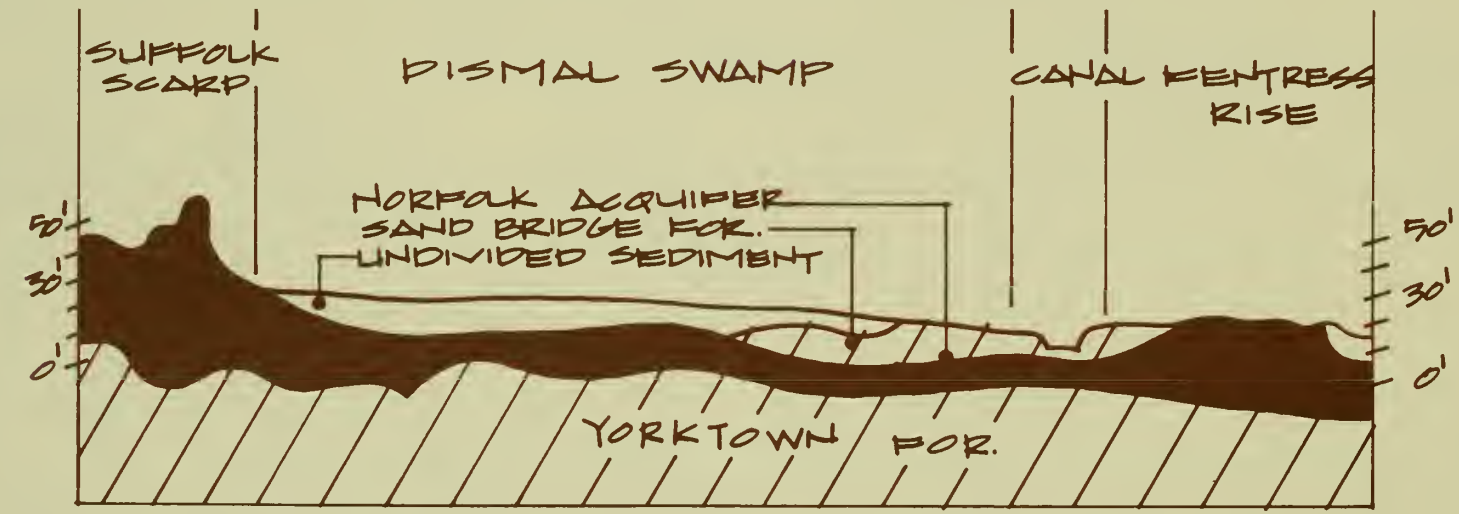
The pre-peat surface is fairly flat. Surface drainage is restricted by the sharp rise of the Suffolk scarp on the west and by the Fentress Rise on the east. To the north, the flat surface of the Churchland Flat inhibits flow. Most surface drainage from the pre-peat surface of the Dismal Swamp area was apparently to the east via the ancestral Northwest River, which flowed through a gap in the Fentress Rise, and to the southeast via the Pasquotank River.

The general hydrologic conditions necessary for the formation of a swamp existed in the Dismal Swamp area before peat began to form. However, normal dendritic stream drainage patterns were incised on the Sand Bridge Formation before the peat began to form about 9,000 years ago. Studies show that the peat began to form in topographic lows along the stream channels. This, plus the fact that the stream channels had formed, indicates that there was not area-wide ponding in the Dismal Swamp when the peat began to form.

The geology shows that the permeable coarse to medium sand facies of the Norfolk Formation crop out on the Suffolk Scarp and dip under the Dismal Swamp. East of the swamp and under Deep Creek Swale, the Norfolk Formation grades into facies that are much less permeable and these facies act as a barrier to further eastward movement of water through the Norfolk Formation. It further indicates that the Sand Bridge Formation, which acts as a confining layer, is absent from most of the area of the swamp. However, the Sand Bridge actually overlies the Norfolk Formation except along topographic lows, such as broad stream channels.

Before development of the drainage pattern on the surface of the Sand Bridge Formation, the water in the Norfolk Formation was under artesian pressure caused by recharge in the outcrop area of top of the Suffolk Scarp. This water was trapped by the fine sand facies of the Norfolk Formation to the east and by the overlying silty clay facies of the Sand Bridge. As downcutting of the broad shallow valleys of the drainage system proceeded, the silty clay confining layer of the Sand Bridge was removed, thereby allowing upwelling of water from the medium sand facies of the Norfolk Formation. The addition of this water in an area of poor surface drainage may have been sufficient to trigger the accumulation of peat.

The ground water, although a small percentage of the total water budget of the area, would be especially significant because it would be a relatively constant quantity and would keep the area wet even during dry periods. Once started, the formation of peat would be self-perpetuating. As the peat accumulated, it would tend to block the stream channels, slow surface drainage, cause local ponding, and hold the upwelling ground water. The ground water would be distributed by artesian pressure and by capillary action, and the area of peat would gradually spread to cover the interfluve areas. (portions taken from source #19)



GEOLOGIC SECTION
DISMAL SWAMP (NO SCALE)

MAN IN THE DISMAL SWAMP

Long before the European settlements developed along the east coast, the Dismal Swamp area was well known to the native Indians. Abounding with fish and wildlife, it was a much coveted hunting ground. At the time of the first European settlement in Virginia (1607) it apparently was controlled by the Warroscoyack tribe, a member of the Powhatan Federation. Although hunting lodges were maintained around the perimeter of the area, there is no evidence that any permanent villages were ever established in the swamp.

As the colonial population grew and the settlements expanded, the swamp formed a natural barrier to the normal movement and transportation of the colonists. Thus it influenced the social and economic development of the immediate area.

With timber a valuable export item and a necessity for local development, the colonists were soon nibbling at the edges of the swamp, cutting trees. Some may have explored the entire area, but, if they did, few left any written records. One who did was William Drummond, the first Governor (1663-67) of North Carolina. He is generally credited with being the first white man to discover the lake in the center of the swamp, now called Lake Drummond. In 1728 Colonel William Byrd II of Westover, Virginia, surveyed the boundary between the colonies of Virginia and North Carolina which cut through part of the swamp, and he was one of the first to record his experiences. He was not impressed with the area, referring to it as a dismal place (from whence it got its name), but his description was exaggerated and wildly imaginative.

Despite his dislike of the area, Byrd recognized the possible commercial and agricultural values. Noting evidence of timber cutting on the borders of the swamp, he suggested draining the whole area by ditching. He also noted the possible "advantage of making a channel to transport by water-carriage goods from Albemarle Sound into Nansemond and Elizabeth River," thus making him probably the first to suggest the possibility of a canal.

In 1763 George Washington visited the area (and later surveyed much of it) and was struck by the natural beauty of the swamp and lake. He was also impressed with the commercial possibilities of the timber resources. He applied for a charter, and in 1764 the Virginia Assembly granted it to his company, "Adventures for draining the great Dismal Swamp," to authorize it "to drain a large tract of marshy grounds in the counties of Nansemond and Norfolk." This company eventually acquired approximately 40,000 acres of timber land in the swamp believed to contain "the finest cypress, juniper, and other lofty wood." To facilitate the harvesting and removal of the timber the company dug many ditches and several canals. The first canal, now called the Washington Ditch, was probably dug in the late 1760's, although the first reference to it is not until 1772. It was about 5 miles long and 12 feet wide and ran west from the edge of Lake Drummond. Another longer canal, now called the Jericho Ditch, running northwest from Lake Drummond for about 10 miles, is also generally believed to have been dug by this company about 1810. Although the Washington Ditch has been redug and its character changed in recent times, it was one of the first canals built by the colonists, and today it may possibly be the oldest still usable canal in the country.

The first formal proposal for the construction of a ship canal was made to the Virginia Assembly in 1784, with the support of Governor Patrick Henry. The commission appointed to study the proposal reported favorably, and on December 1, 1787, an Act was passed to authorize "cutting a navigable canal: through the Dismal Swamp to connect Chesapeake Bay, Virginia, and Albemarle Sound, North Carolina. The authorization, howevr, was dependent on the passage of similar legislation by the State of North Carolina. In November 1790, North Carolina passed the necessary legislation and the Dismal Swamp Canal Company was established to sell shares on the open market.[23]

The Dismal Swamp Canal was to be a "ship" canal, rather than what was called a "commercial" canal. The ship canal could take almost any kind of vessel, the only limitation being the width and depth of the channel and the size of the locks. This Dismal Swamp Canal was to be 32 feet wide and 8 feet deep with "sufficient" locks to be 90 feet long by 32 feet wide. Due to difficulties in raising the necessary funds and the lack of a complete survey of the route, construction did not begin until 1793. In that year hired slave labor was used to commence digging at both ends, south from Deep Creek, Virginia, and north from Joyce Creek or Old Lebanon (now South Mills), North Carolina, the two places approximately 22 miles apart.

The legislation authorizing the construction of the canal also authorized the construction of a stage coach road parallel to the canal. By 1804 this road was passable for foot and horse, and by 1805 a stage coach route was established with a toll. (The present U.S. 17 route generally follows this old stage coach road.)

By 1807 there were still only two locks, built of "squared juniper timbers" 75 feet long, 9 feet wide, with a 6-foot depth. Locks were still lacking at either end. The War of 1812, however, apparently supplied the impetus needed to construct these locks, in addition to deepening the canal and adding other improvements.

The colonists were very much dependent upon the wood products from the forest. Wood was cheap, easy to obtain, easy to work, and useful in making thousands of items they needed. They needed wooden buckets to hold water, measure grains, store foods and pack items for shipment. Baskets woven from bark found many uses on the plantation. Their furniture was made of wood. Wooden tubs were used for laundrying, watering animals, pickling foods, and many other purposes. Most of the homes were covered with shingles. The sides of many homes were covered with wooden clapboards. The framework of buildings was made from hewed beams. Barrels and hogsheads were standard containers in handling the tobacco crop. Juniper and cypress made the very finest charcoal used in making gunpowder. Hardwoods such as beech were used as a source of alkali for making soap and removing the hair from hides in the tanning industry. Tar, turpentine and pitch from the pines were in great demand throughout the world in ship-

building. Saw timber was needed for wagons, fences, and general building purposes.[9]

The Dismal Swamp Canal's "golden age" was generally considered to be from 1839 to 1860. Hundreds of shingle flatboats, picturesque passenger ships, and freighters plied its length. From 1857 to 1860 the yearly tolls averaged $38,000. This, of course, had a great effect on the Dismal Swamp as more and more timber was cut and shipped out via the canal and the numerous ditches cut for the purpose.

And as the canal became better known and popular, so did the Dismal Swamp. The canal and ditches made virtually every area of the swamp accessible not only to the lumberman, hunter, and trapper, but also to the tourists who desired to see the swamp, and particularly Lake Drummond.

Then in 1859 a period of decline set in for the Dismal Swamp Canal with the completion of the rival Albemarle and Chesapeake Canal over an easier route, and a little later the outbreak of the Civil War. The Confederate forces controlled the canal until April 1862 when the battle of Camden, North Carolina, was fought about three miles below South Mills at Turner's Cut. After that it was used by the Union forces, but maintenance was neglected.

In the Reconstruction period immediately following the war, the canal was neglected and boats with only a 2-foot draft could barely traverse it, whereas previously there had been adequate room for 6-foot draft vessels. By 1870 the yearly toll amounted to little more than $7,000.

Placed under new management and with new funds, the canal staged a comeback towards the end of the century after major changes that left little resemblance to the original canal. But a good passenger service was developed between Norfolk and Elizabeth City until 1881 when the Elizabeth City-Norfolk Railroad started. However, because of the improvements and changes which had been made, for awhile it surpassed the Albemarle and Chesapeake Canal in hauling freight. Schooners were loaded to the gunwhales with farm products of the trucking section around the Carolina Sounds and barges were carrying lumber for northern markets in Philadelphia and New York.[23]

This temporary advantage was short-lived, however. In 1911, a series of surveys by the United States Government were concluded by the outright purchase of the Albemarle-Chesapeake Canal, and it thus became part of the federally maintained system later known as the Intra-coastal Waterway. It was, of course, quite obvious that the operation of a toll-free canal paralleling the Dismal Swamp Canal would destroy all but an insignificant amount of local commerce and possibly even put that Company out of business.

Although federal authorities considered acquiring the Dismal Swamp Canal at the time, nothing was done about it and this injustice was not rectified until more than fifteen years later. Meanwhile, the estate of the Lake Drummond Canal and Water Company went from bad to worse and it was barely able to keep the waterway open and the controlling depth was gradually reduced to only five feet.

However, even though the Richmond Cedar Works, which had by this time acquired extensive lumbering rights in the Dismal Swamp, had built thirty odd miles of narrow gauge logging railway in the swamp, a certain amount of lumber was still shipped by barge or raft from landings on the canal banks and this almost alone kept it in operation. Likewise, in the meantime, the internal combustion engine had been perfected and more power yachts and cruisers began to use the canal as the means of going south in the fall and north again in the spring. The Dismal Swamp route had one decided advantage over the Albemarle-Chesapeake in that hospitable Elizabeth City was a comfortable day's run from Norfolk, and there yachts could get supplies and lie over for the night before proceeding on down the line.

Virtually the whole swamp has been cut over at least once, although a few tracts of virgin timber may remain here and there. The first trees to go were the tall junipers—Atlantic white cedar—which were cut for lumber, shingles, barrels, casks, and tubs, The big black gum and water gum trees were taken along with the juniper in the early days of Dismal Swamp logging. Later, the pines and some hardwoods were cut for sawtimber. For many years, the timber companies in the Swamp used narrow-gauge railroads to haul out the logs. Most of the tracks are gone, but a couple of small

logging operations in North Carolina still yard their logs by rail, although now the donkey engines are powered by truck motors rather than fire-fed boilers.

The Camp Manufacturing Company carried on regular logging operations in the Great Dismal between 1925 and the mid-1940's. For the past quarter of a century, there has been no significant cutting on the company's Dismal Swamp lands, but some timber cutting still goes on in the Swamp, particularly in North Carolina south of Union Camp's property. There the smaller, second-growth juniper is being cut for use as fencing and posts.[45]

East of Corapeake, North Carolina, Atlantic Forest Products Company's local sawmill is cutting juniper logs, which are sold as fencing.[44] During the early '60's, new canals were dug on this property along the Corapeake Road. The spoils were used to construct logging roads, thus opening much of North Carolina's land to the logging operations of Atlantic Farms, Georgia-Pacific and Weyerhaeuser. Bull Boulevard, Forest Line, Boundary, Saunder's and Myrtle roads became

part of a system designed to open new areas for timber cutting operations in Virginia as well as North Carolina. Georgia-Pacific harvested timber along the Dismal Swamp Canal, Atlantic Farms clear-cut white cedar west of Forest Line Road, and property owned by Julian Headley was selectively cut for pine.

Even more damaging than the logging was the drainage of the Swamp by ditches and canals for agricultural drainage, log floating, navigation, log roads, fire roads, and fire-breaks. As the Swamp's drying out increased the fire hazard, more canals were dug as firebreaks and to provide the spoil for construction of fire as well as logging roads.[44] This practice appears to be in direct conflict with earlier decisions concerning ownership of the water rights in the Swamp. This conflict dates back to the 1890's when the issue went to court. In its decision, the court recited the sections of the Legislative Charter vesting the water rights of the region in the proprietors of the canal, the same rights now the legal property of the current owners.

The judge remarked that 95 years of acquiescence by all parties concerned had established their individual rights beyond the point of argument.

The Court further stated that, "It shall NOT be lawful for any person whatsoever to cut off or divert the course of those waters which flow from the westward into the lake, so as to prevent their continuing to fall into it."[14]

It is clear that the legislature, as well as the court, exerted every care to assure the canal company the exclusive rights to ALL THE WATERS entering the Swamp; those that flow across its surface, as well as the artesian sources that enter the region through underground channels.

On March 30, 1929, "The canal and all appurtances thereto . . . "including the rights, privileges and franchises as vested in the original canal company was purchased by the United States Government. The canal was incorporated into the Intracoastal Waterway, made toll free, and assigned to the Army Corps of Engineers for operation"; thus making "the United States Government the sole agency vested with

authority to originate action that will protect and preserve the water rights, as well as the valuable assets of the Swamp."[14]

In the next thirty-four years, the Corps completely modernized the canal, making it 9 feet deep and 50 feet wide. The two remaining locks at Deep Creek, Virginia, and South Mills, North Carolina, were replaced with modern structures, and new highway bridges and spillways were constructed, so that today none of the original structures associated with the canal survive, and the canal itself bears little resemblance to the original.[23]

However, "drainage in the Swamp still remains a serious problem. Over 100 miles of ditches have been constructed in the Swamp with the soil being used for roads. Approximately one-half of these ditches have water control gates while the other half of these ditches permits the water to escape in very short periods after rains." A hundred miles of ravines, cut to the bottom of the Swamp's formation, severing its underground artesian resources, are draining the amber water of the Dismal into the sea.[14]

In response to these issues, public interest in the Great Dismal Swamp has been on the increase. The states of Virginia and North Carolina have acquired portions of the swamp for preservation, education, and recreation.

The State of North Carolina proposed to acquire a portion of the Dismal Swamp area for inclusion in the State Park System. The 1971 Session of the General Assembly passed an act appropriating funds for "—purchasing such lands as are necessary to acquire the Dismal Swamp and enough surrounding land to establish a State Park at the Dismal Swamp in Camden County—" (Chapter 1035, House Bill 749, July 21, 1971).

To assist in the proposal The Nature Conservancy purchased 14,343.5 acres in North Carolina at a cost of $2.2 million. Repurchase of the property by North Carolina was completed in early 1974.

Just prior to adjournment in 1972, the 92nd Congress passed, and President Nixon signed into law, a bill directing the Secretary of the Interior to undertake a year-long study of the "feasibility and desirability of preserving and protecting the Dismal Swamp Canal, Lake Drummond, and the Dismal Swamp."

The following year, February 1973, Union Camp Corporation donated 49,000 acres in the Great Dismal Swamp to the U.S. Department of the Interior through the Nature Conservancy. The land is currently being managed for preservation by the National Wildlife Refuge System. The Secretary of the Interior declared this property to be a Registered Natural Landmark and included in the National Registry of Natural Landmarks. However, under criteria established by the Secretary of the Interior's Advisory Board on National Parks, historic sites, buildings, monuments, the existing structures and canal do not possess national historical significance. Therefore, they would not qualify for admission as a

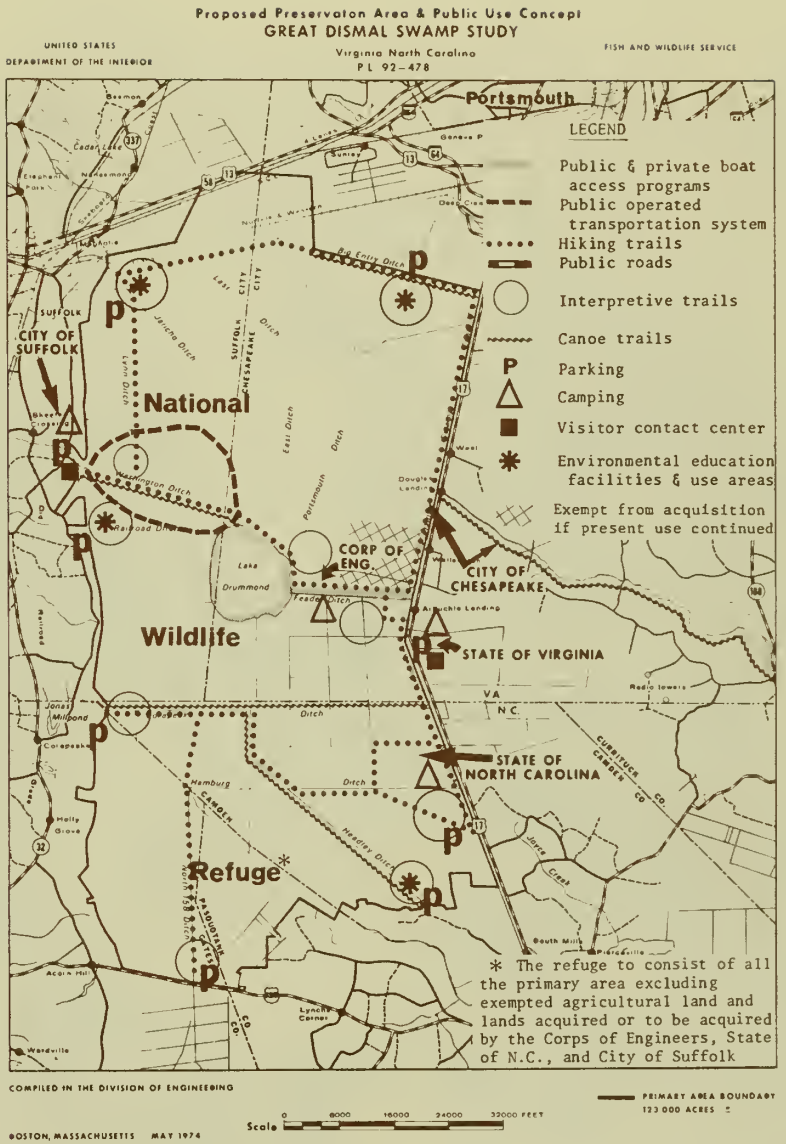
historical unit to the national Park System. The Historic Preservation Act of 1966, would afford the canal protection if it were placed on the National Register of Historic Places.

The following spring, the Department of the Interior published their study recommendations for the preservation of the Dismal Swamp. Studies indicate that the "primary area" of the Dismal Swamp, about 123,000 acres, should be preserved by public agencies. Likewise, public policy regarding use of the water draining into the Dismal Swamp Canal should be reevaluated in order to preserve the present ecological conditions. Of special mention is the need to manage the timber and manipulate water within the "primary area" of the Great Dismal Swamp. Water and timber management are definitely required to maintain the diversity of plant and animal life within the area and to arrest the encroachment of red maple and other upland tree species. Wilderness status for the area does not appear to be the answer.

A controlled day-use program for the public is envisioned for the interior of the Swamp with camping and support services to be provided around the perimeter of the "primary area." Environmental education, research, nature interpretation and wildlife-oriented recreation will be stressed.[40]

The plan recommends that the State of North Carolina develop hiking, canoeing, and interpretive trails on their 14,000+ acre site to coordinate with those provided by the Refuge. Also, the study provides camping and environmental education facilities on the site.

Hopefully, through the interest shown by the Department of the Interior, States of North Carolina and Virginia, the cities of Suffolk and Chesapeake, and the U.S. Corp of Engineers, preservation of a major part of the Dismal Swamp can be preserved for future generations.



PHYSICAL DESCRIPTION

EARLY VEGETATION

Whitehead (1972), using stratographic pollen analysis and geology, reviewed the 9,000 year vegetational succession of the Dismal Swamp by correlating the dominant vegetation with soil accumulations. He stated that fine grained organic sediments resulting from fresh water marshes began to accumulate about 9,000 B.P. (Before present, i.e., 9,000 years ago); and, by 6,000 B.P., 50% of the Swamp was mantled with peat deposits. From Whitehead's evidence it appears that the hardwood forests found on fine organic and inorganic soils laid down early in the development of the Swamp were replaced by types better adapted to an acid, coarse, peat-soil. Cypress, gum, cedar, red maple and various swamp shrubs increased at the expense of oak, hickory and sweet gum. The pre-colonial Swamp association is believed to have stabilized about 3,500 years ago.

This concise outline of vegetational succession should not be construed as a simple, uniform process. The peat first began to develop in the drainage lows and as its depth increased, it began to spread inland and laterally, mantling the interfluves. Whitehead states that a vegetational mosiac probably existed within the Swamp at any point in time.

The first complete survey of the Dismal Swamp vegetation did not occur until after the construction of the Dismal Swamp Canal, lumbering, agriculture and grazing had left their mark on the plant aggregations of the Swamp. As a result, the successional trends and forest cover prior to and during the first 200 years of colonization are not recorded. It appears that the Dismal Swamp vegetation is in an intermediate successional phase with past dominant forest types tending to be replaced primarily by red maple and sweet gum. The latest study by the United States Forest Service has shown the Dismal Swamp is comprised primarily of pine (both loblolly and pond)—25%; maple—26%; gum (water gum and black gum)—31%; juniper (Atlantic white cedar)—3%; sweetgum—5%; cypress—3%; yellow poplar—2%; and the remaining 4%—oaks, beeches, Ilex sp., etc. Whether these changes in forest types reflect an accelerated normal successional pattern or a complete change in successional direction is not known.

PLANT COMMUNITIES

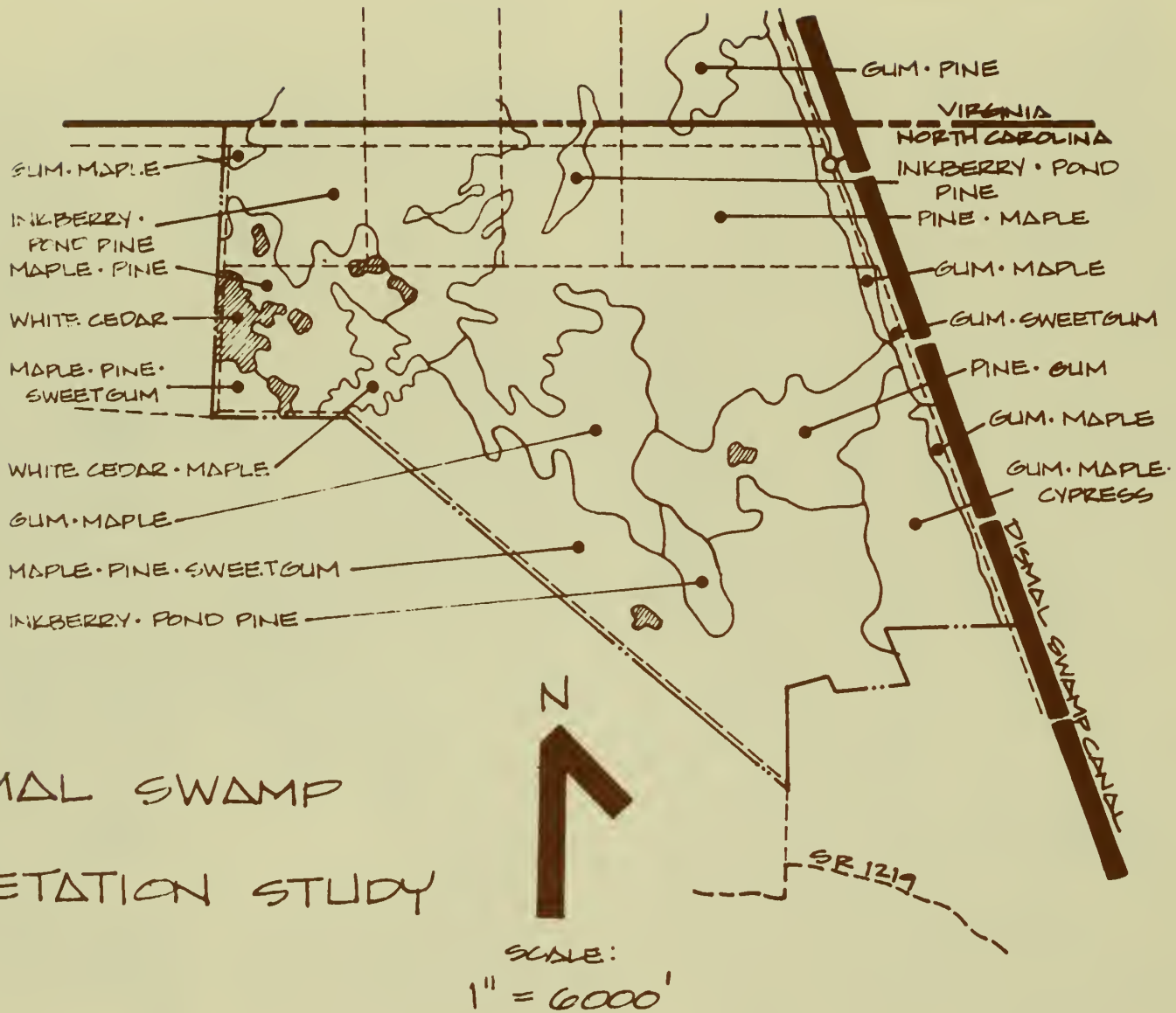
Due to its geographical location and climate, the Dismal Swamp is renowned for its intermingling of northern and southern species of plants and animals. Fire, lumbering, drainage and water table fluctuations have played a major role in shaping the present species composition. As a result of disturbances, diversity has been encouraged. The discussion that follows singles out a number of the existing plant communities that will require management if this present diversity is to be maintained.

Gum-Cypress Community

These species were dominant in the Swamp forest prior to the extensive timbering activities. Today only a few thousand acres of second growth timber represent this once abundant association.[6] This community is best characterized by bald cypress, water gum. black gum, and red maple. In a few sites bitter pecan or water hickory occurs with cypress. Extensive stands of water gum and bald cypress are rare in the Swamp today, although some water gum occurs on the wettest sites.

This is one of the wetter plant communities. In some places plants may be growing in one or two feet of water. These same plants, however, may grow on drier sites or where there is no standing water but the soil is damp or where surface water may accumulate for short periods following heavy rainfall. In these cases, the swamp forest is composed mainly of black gum, sweet gum, red maple, water oak, swamp magnolia, red bay, American holly, and sometimes pawpaw. Two vines, supplejack or rattanvine and greenbrier, occur frequently and form dense entanglements.

Less abundant species of this community are water and pumpkin ashes, swamp poplar, and black willow. Shrub strata plants—such as Virginia willow, highbush blueberry, buttonbush, and sweet pepperbush—are few, particularly



DISMAL SWAMP

VEGETATION STUDY

SCALE:
1" = 6000'

where there is standing water for long periods.[20] The area usually has little woody understory and only shade tolerant herbaceous plants and ferns are interspersed through the cypress knees and peripheral surface roots of the gum.[6] Lizard-tail is a common herbaceous plant in drier black gum stands. The polypody or resurrection fern is an interesting tree fern that is most often found growing on the trunk of the black gum.[20]

Evergreen Shrub Bog Community

The extensive open areas known in the Swamp as "lights" contain plants characteristic of the Evergreen Shrub bog community, better known in coastal North Carolina as pocosin or bay.[20] This evergreen shrub community of the Dismal Swamp is largely composed of low, broad-leafed, evergreen shrubs with an open pond pine overstory. According to a 1973 study, the peat soil is waterlogged, and there is frequently a ground cover of sphagnum moss. [6] Most of the shrubs belong to the family Ericaceae, including gallberry or inkberry, downy leucothoe, sheep laurel, and ti-ti. Myrtle is common. Two small bay trees, swamp bay or swamp magnolia and red bay, are normally present. Virginia chain-fern invades the drier sections of this community.[20]

Small maples are beginning to penetrate the dense understory in some areas, suggesting that areas of this type maintain a high productivity until the canopy begins to close and reduce the diversity. In forested parts of the Swamp, inkberry is predominantly found along the ditch edges on wet, sunlet sites.[6]

Atlantic White Cedar Community

Juniper, as it is known to the local people, occurs in the most extensive pure stands of any tree in the Swamp; at one time the white cedar forest of the Dismal was the largest of its kind. Prior to the 1930's, more than 100,000 acres had been cut there.[20] Approximately 2,400 acres of Atlantic white cedar have been set aside and are being protected outside the Dismal Swamp from Maine down the East Coast to Northwest Florida to South Mississippi. Approximately 150,000 acres exist within the same area but are not protected. Management techniques required to perpetuate and extend the acreage of Atlantic white cedar are known but are not being practiced.[40]

The dense stands of white cedar being lumbered are found in areas of acid swamp peat overlying a sandy subsoil.[20] The cedar on typical swamp sites is shallow-rooted and subject to windthrow, especially in stands that have been opened by partial cuttings.[40] In areas where extensive pure stands occur, the density of the forest usually precludes understory shrubs, but in slightly less dense stands highbush blueberry and shining inkberry or sweet gallberry occur.[20]

Pine Community

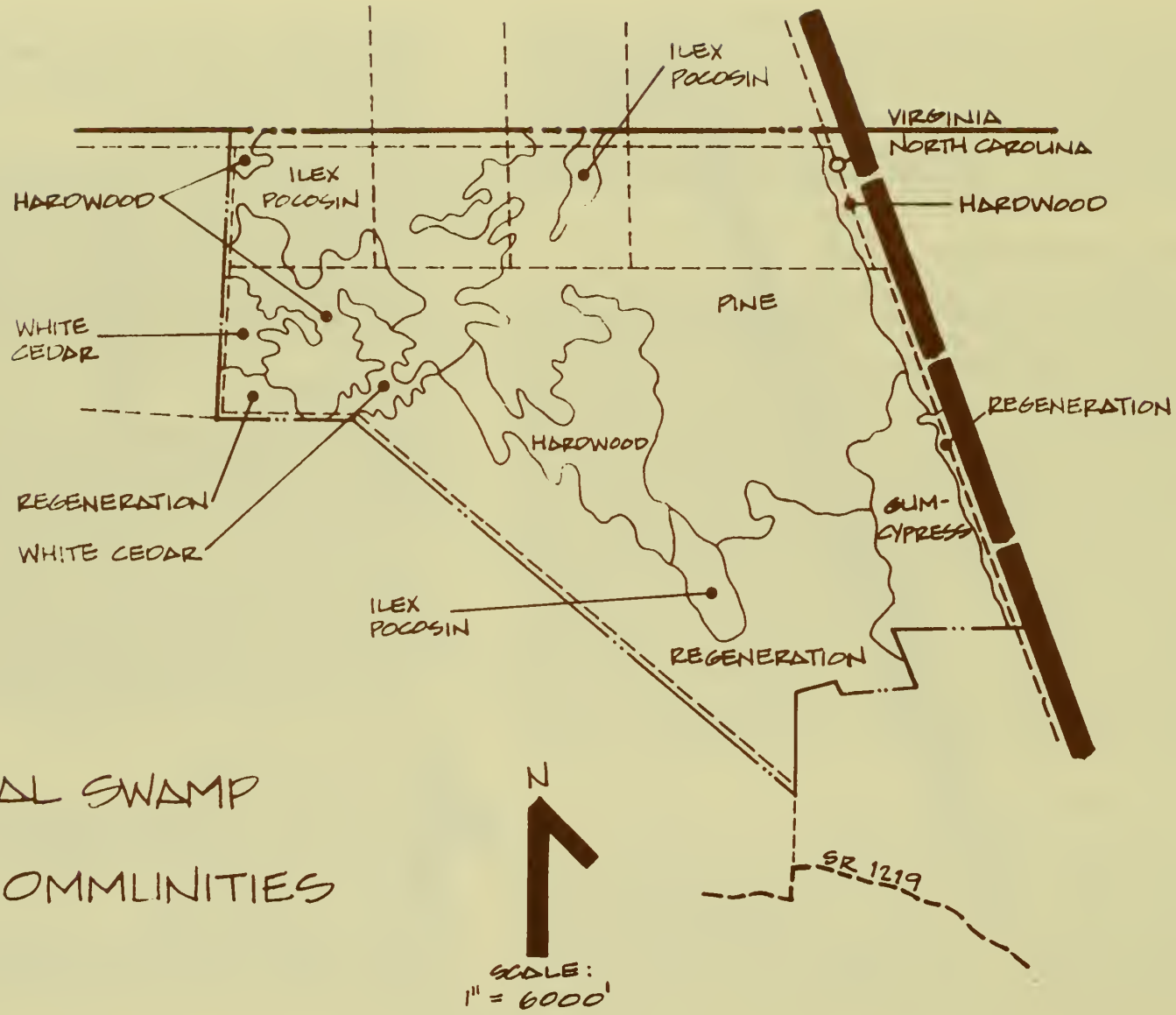
Pines are representative species of the southeastern forests and are valuable timber species. Pine is typically the first forest type to dominate in normal "old field" succession, but remains dominant for only one generation (80-120 years) unless disturbance or specific management provides a favorable environment for competition.

Pines, both loblolly and pond, are the third most abundant species in the Dismal Swamp study area and are widely distributed. The present abundance is attributed to past cutting practices which permitted pine regeneration in the openings. These pines will be replaced by hardwoods in less than a century if not managed.[6]

Hardwood Community

Mixed hardwoods species are codominants with other tree species throughout the southeastern coastal plain. They are found in climax associations with loblolly pine and Atlantic white cedar; the wet site hardwoods are associated with cypress and water tupelo.

A recent survey of the forest vegetation of the Dismal Swamp showed hardwoods comprising 65% of the tree species. Black gum and water gum, maple and sweet gum,



DISMAL SWAMP

PLANT COMMUNITIES

beech, yellow poplar, red oak and white oak are most often found in this association.

It has been stated that the Gum-Cypress association dominated the Swamp prior to colonization. These species are considered climax by many authorities and are frequently found in association with wet-site hardwoods. The loss of the cypress and the subsequent dominance of hardwoods in the Swamp can be attributed to a number of factors. The mass selective cutting of cypress, the loss of peat to fire and oxidation and the altered water levels have all contributed to the increase of hardwood density in the Swamp.[6]

Regeneration Community

The regeneration type of vegetation now occurring in the Swamp is developing in those areas that were fairly recently cut over for a particular type of timber. Both the hardwood and pine sites that have been heavily logged are now coming back in a large percentage of maple. The pine stands, for example, were cut without advanced pine regeneration being evident at the time of cutting. This has allowed the maples to gain a competitive edge over the pine regeneration in some areas. The clear cut areas are now coming back in evergreen shrubs and vines, lots of maple and some pine.[7]

The pine forests tend to regenerate to hardwoods in normal succession and in the case of the Dismal Swamp the most frequent occurence is that of maple. A gradual drying trend over the past 100 years is believed to be responsible for part of this increase in maple. Maple is the indicator species of transition, and the percentage of maple appears to be increasing at a relatively rapid rate.[48]

A large part of the Regeneration community is composed of the evergreen shrubs, vines and briars. As a matter of fact, for anyone who tries to hike through this plant community, the dominant plant species will probably appear to be the briars and other vines that impede one's progress. Thorny greenbriers, catbrier, brier berry, and swamp blackberry grow all over, in some places so thickly as to make passage virtually impossible. More benign vines like rattanvine, honeysuckle, campsis, crossvine, and wild grape may not rip and tear, but they are great a tripping one up. Even the shrubs like gall-berry, fetterbush, myrtle, and alder grow so thickly that passage requires hacking a path through the seemingly impenetrable wall.[45]

SWAMP FAUNA

Although Colonel William Byrd II, in the 1700s, claimed for the Dismal Swamp at least one form of wildlife never seen there by anyone since—the alligator—observers tend to agree with George Washington's assessment of it as a "glorious paradise" for wildlife.

The Great Dismal is a southern swamp, the northernmost of the great string of southern swamps along the Atlantic Coast that includes the best-known swamps in the country: the Everglades, Okefenokee, and Big Cypress Swamp in Florida, the Georgia coastal marshes extolled in Sidney Lanier's "The Marshes of Glynn," South Carolina's Congaree Swamp, and the coastal marshes of North Carolina.[45] It is an area where some southeastern plants and animals reach their northernmost distribution limit. The geographical location of the Great Dismal is at a point where North and South meet and this alone is enough to make it a place of unique interest.[27]

Vegetation types are determined by soil conditions, hydroperiod, light intensity, and a host of climatic factors. Local flora, reflecting prevailing conditions, define certain patterns, making it possible to distinguish swamp types by indigenous flora. It is not as precisely possible to define and classify the animal communities within the Dismal. However, the preferred habitats for specific animals can normally be identified. When the various vegetational communities within the Swamp are analyzed and compared in terms of their habitat suitability, they can be rated as primary, secondary, or tertiary. These ratings take into account the variety of fauna present, the abundance of each species, as well as the importance of the various habitats in supporting rare and unusual fauna of the Swamp.

Invertebrates

The list of invertebrates present in the Dismal Swamp is so long and the species so numerous that discussion of all of them is beyond possibility. However, the more important groups, such as the ectoparasites and butterflies bear investigation.

The most abundant ectoparasites in the Swamp are mosquitoes, biting flies: sand flies or punkies deer flies, and horse flies, especially the infamous yellow fly of the Southeast, also ticks, and certain acariform mites (chiggers and red bugs).[45] The Dismal Swamp has exceptionally high numbers of mosquitoes and deerflies, rendering the area somewhat uncomfortable between the months of June and October. Tick populations are restricted to four species, two of which are man-biting.[6]

Insects are present in practically all of the vegetation communities in the Swamp. The only possible exception occurs in the Atlantic white cedar forest, where an absence of support hosts combines with the well-known cedar scent to reduce the populations of these pests.

The Swamp has impressive populations of a number of large butterflies.[6] Most of the butterflies in the Dismal Swamp occur along the spoil bank roads or logging roads and canals and the "lights" (Evergreen Shrub Bog communities). It is along the edges of the open, well-lighted roads that a profusion of wildflowers grows, from which the butterflies obtain their nectar. In the "lights" the ericaceous shrubs produce an abundance of flowers.[20]

By comparison, few butterflies occur in the densely wooded swamp forests.[20] Several varieties of grasshoppers, crickets, katydids, cockroaches, and mantids are among the untold number of insect species in the swamp.[45]

Fish

A great variety of fishes live in the waters of Lake Drummond, the ditches and canals, and the small ponds throughout the Great Dismal.[45] Twenty-four species of fish have been reported present in Lake Drummond and the ditches of the Dismal Swamp.[6] Of these twenty-four species, only ten have been directly identified in relation to the State of North Carolina property in the Dismal. Five species of game fish and four non-game species were collected in the sample.

Yellow perch comprised the majority of the sample, with pumpkinseed, flier, black crappie and bluegill in less abundance. Golden shiner was the most abundant non-game species present, while swamp darter, blueback herring and white catfish were also counted. The American eel was seen and tentatively identified, but not collected.[28]

Herptiles

Herptile is an inclusive zoological term for the various species of amphibians and reptiles. The amphibians are represented by salamanders and frogs, while the reptiles include the lizards, turtles and snakes.

There is much conflicting information on the status and distribution of many of the species of reptiles and amphibians in the Dismal Swamp. Collection records are limited and no ecological data are available. Thirty-seven species of turtles, frogs, toads and snakes that have been observed in the Swamp have been identified. Several lizards and a number of salamanders bring the total of herptiles to approximately 45 species.[6]

An interesting assortment of frogs occurs in the Great Dismal. Of the several species at or near their northern limits, one, the little grass frog, is the tiniest of the frog tribe; another, Brimley's chorus frog, named after a prominent North Carolina naturalist, is little-known but apparently fairly common in the Swamp; and several are tree-frogs.

There are a number of other species of frogs in the Dismal. Some that have been seen and heard that are quite common are the bullfrog, the spring peeper, the southern leopard frog, and the green frog.[20]

The reptiles in the Dismal Swamp are well represented by the numerous lizards, turtles, and snakes. Doubtless, there are several varieties of skinks and lizards in the Swamp. The spotted turtle is the turtle species that has been observed most often in the swamp forest, especially in the gum-cypress swamps.

When one thinks of swamps, one of the first things that comes to mind is snakes. They are numerous in the Dismal Swamp, but the snake population densities are generally low. There are three species of poisonous snakes in the Dismal: the canebrake rattlesnake, the copperhead, and the cottonmouth or water moccasin. Nonvenomous snakes include several species of the king snake, black snakes, water snakes, and ringneck snakes.[20]

Birds

Since the Dismal Swamp is mostly solid forest, it is essentially a songbird swamp. While most of the songbirds of the Great Dismal can also be found in smaller nearby North Carolina and Virginia swamps, nowhere else can they be seen in such abundance.[20]

The Gum-Cypress community has been identified as the primary habitat for quite a few bird species. The prothonotary warbler, for example, is a summer resident of the Swamp. The Gum-Cypress forest is also shared by the parula warbler.

The wood duck and the hooded merganser take advantage of the protection available in the deep, wooded swamp. The prothonotary warbler and the red-eyed vireo are probably the most abundant breeding birds in the forest, with the hooded warbler, the Wayne's warbler and the ovenbird completing the list. On occasion, the chimney swift and the yellow-throated warbler have been noted in the Gum-Cypress vegetation community.[20]

The Evergreen Shrub Bog community, or Pocosin, is also an extremely productive habitat for quite a few aviary species. Among these, the red-cockaded woodpecker and the red-headed woodpecker are the most notable. Both of these species are listed among the endangered plant and animal species in North Carolina.[25]

The prairie warbler, a species usually found in open cutover brushland, such as "lights," or the Pocosin in the Dismal Swamp, is also found in the shrub strata of the mixed swamp forest.

Catbirds, brown thrashers, robins, and towhees are found in greatest numbers in the Evergreen Shrub Bog community

along the North Carolina-Virginia boundary on the east side of the Swamp. Blackbirds, robins, common and fish crows, for example, form huge roosts in the Pocosin. The most numerous birds in the Swamp during the winter are the blackbirds. The roost is in dense Pocosin or Evergreen Shrub Bog cover on the North Carolina-Virginia border—the largest blackbird roost in North America. It has been in use for at least 70 consecutive years.[20]

The most sterile habitat for breeding birds in the Swamp is the Atlantic white cedar or juniper forest. This is an extremely dense and dark forest where only the blue jay and the wood thrush are consistent breeding birds. The mourning dove and rufous-sided towhee sometimes nest in the less dense stands. The winter wren, a common winter resident in most sections of the Swamp, is usually the only bird seen in the understory of the dense stands of Atlantic white cedar.[20]

The yellow-throated and Wayne's warblers are the earliest migratory arrivals to the Swamp, the first individuals usually appearing by the last week in March. The yellow-throated warbler mostly frequents the loblolly pine and bald cypress, sometimes venturing into the hardwoods to feed.[20] The red-cockaded woodpecker and the red-headed woodpecker mentioned in the discussion on Pocosin fauna also occur in the Pine community.

Wayne's warbler, a southern coastal race of the widely distributed black-throated green warbler, breeds only along the Atlantic Coast between Charleston, South Carolina, and the Dismal Swamp.[45] Wayne's warbler was originally associated with the great pines in the Swamp, but with the removal of these trees, they have adapted to other forested habitats.[6] The Wayne's warbler is now more commonly found in the hardwood sections of the Dismal Swamp, along with the yellow-throated vireo and the yellow-throated warbler.

The bobolink, a migrant that is seen each spring in the swamp forest, is identified with open farmland, usually frequenting meadows and grainfields. Even though the robins roost in the Pocosin, they have been observed feeding in the Hardwoods along with cedar waxwings, hermit thrushes, mockingbirds, pileated woodpeckers, and Eastern bluebirds.[20] The red-shouldered hawk, along with the barred owl, prefers to nest in the Hardwood section of the Swamp, as does the Swainson's warbler.

As of 1969, the Swainson's warbler could be considered a fairly common breeding bird in the Dismal Swamp, especially in the best stands of hardwood. These warblers are found mostly in openings between clumps of sweet pepperbush and greenbrier and in small, pure stands of sweet pepperbush in the best swamp forests.[20]

The Regeneration community in the Dismal Swamp is more difficult to analyze in terms of its bird life. This vegetation type is by definition in a state of change, because it is developing in areas that were fairly recently logged. This varied combination of vegetation quite understandably draws the fauna from their original habitats to a certain extent.

For example, both the robin and the prairie warbler are known to frequent the Pocosin as a habitat. But the regenerating areas provide many of the same food sources as are found in the Evergreen Shrub Bog community. Therefore, as would be expected, these two species have also been identified in the Regeneration community, along with the rufous-sided towhee and the brown thrasher, also Pocosin dwellers.

The Regeneration community provides, along with the evergreen bushes and shrubs, hardwoods of sufficient size and number to draw species associated with the hardwood forest, such as the cedar waxwing and Swainson's warbler.[20]

The canals and ditches within the swamp are used by various kinds of waterbirds, and while quite a few species are evident, the numbers of individuals are low.[21] Some of the birds identified using the ditches are the green-winged teal, blue-winged teal, and hooded mergansers. Herons, egrets, and mallards have been spotted, along with the ring-

necked duck.[20] The Dismal Swamp supports two species of nesting waterfowl, the wood duck and the black duck.[6]

There are a few species which tend to be found either in practically all of the plant communities, or flying over them. The yellow-billed cuckoo, cardinal, hooded warbler, Carolina wren, and red-eyed vireo all seem to be non-selective in this respect. Joining them are the black vulture and turkey vulture, the sharp-shinned hawk, and the Cooper hawk,[45] all of which are listed as possibly endangered in North Carolina.[25]

Mammals

For a relatively undisturbed forest of its size, the Dismal Swamp has a surprisingly low mannal population, although it has twice as many mammal species as the much larger Everglades. Parts of the Swamp, especially in North Carolina, are veritable jungles of undergrowth.[45]

The Regeneration vegetation community is one such area that seems like a jungle. The thick shrubs, vines and briars provide good habitat for the smaller mammals. The cotton mouse inhabits the regions of thick brush and cover that surround the wetter portions of the Swamp. The golden mouse is also present, along with the lemming mouse and the meadow vole or field mouse.

The southern bog lemming, or lemming mouse, is an endemic species in the Dismal Swamp, and is classified as "endangered" species along with the southeastern shrew and the Dismal Swamp short-tailed shrew.[25] The red and silver-haired bats, the evening bat, and LeConte's big-eared bat have all been identified swooping after and feeding on the myriad insects.[45]

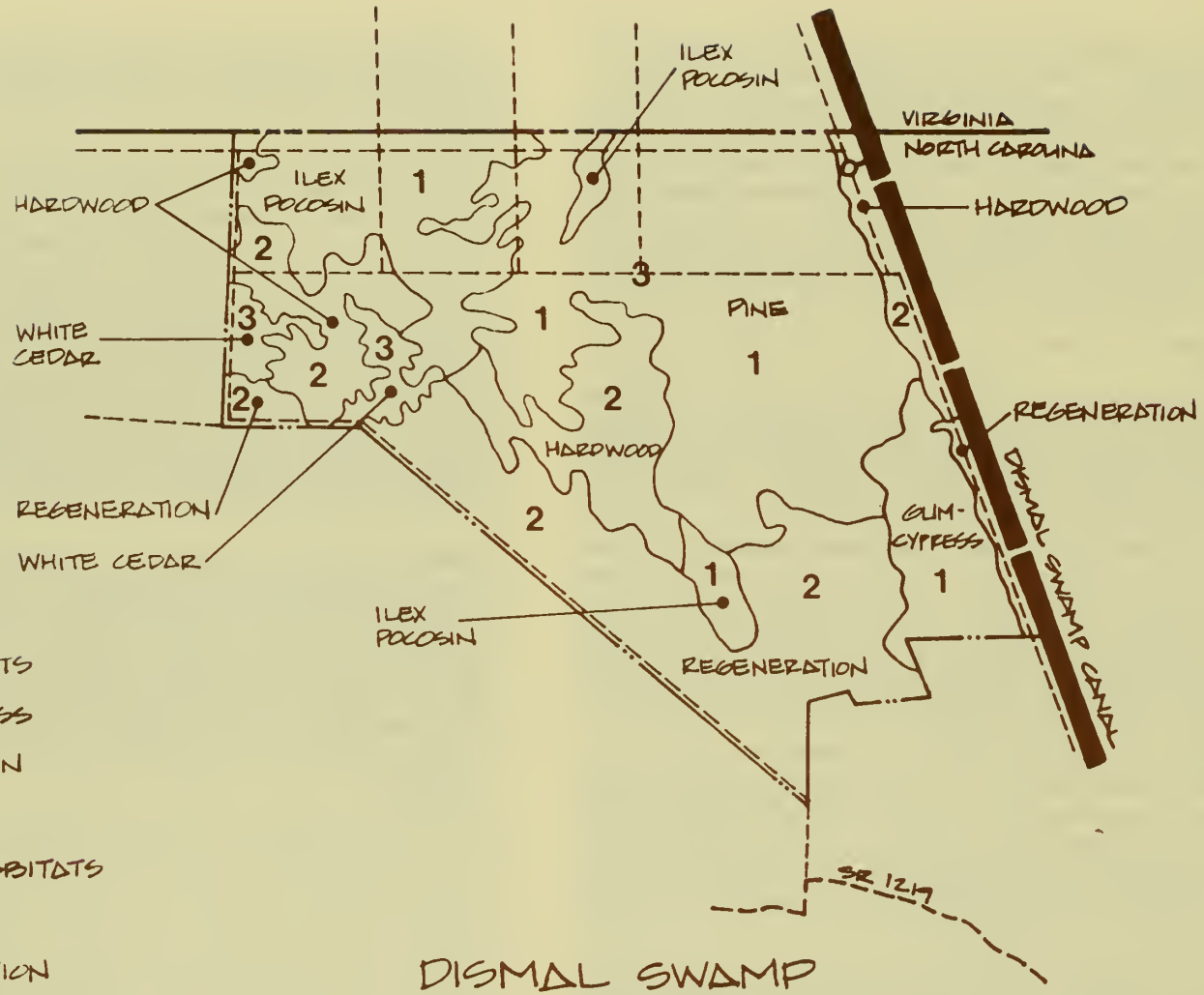
Well-known mammals that are rare or absent in the Dismal Swamp are the larger burrowing animals—the striped skink, woodchuck, and foxes. The gray fox is common around the upland edge of the Swamp and may hunt in the Swamp at night. The chipmunk is uncommon, and is only seen in the best forests in the Swamp. Beaver have been extirpated.[20] The fox squirrel is either rare or extirpated, but the gray squirrel and the southern flying squirrel are relatively common.[45]

The Dismal Swamp is the northern limit of the marsh rabbit. This rabbit is related to the cottontail rabbit, which is also present in the Swamp, but the marsh rabbit is stockier and darker.[20]

The furbearers in the Dismal Swamp appear to be mainly limited to river otter, mink, raccoon, opossum, and bobcat.[21] The raccoon and opossum are common inhabitants of the Swamp, and are widespread throughout the Pine, Hardwood, Regeneration and Gum-Cypress communities. The muskrat is common along the southern edge of the Swamp, and the nutria has established itself in parts of the Swamp according to some reports.[45]

The white-tailed deer is an important game species in both Virginia and North Carolina and, historically, sport hunting in the Dismal Swamp has concentrated on the deer.[6] The bobcat is the only known member of the cat family residing in the Dismal Swamp.

Black bears occur in all plant communities in the Swamp, but the numbers of this large mammal have been dwindling considerably during recent years.[45] The bear depend upon inkberries found in the Evergreen-Shrub Bog community, blackberries found on road edges, and fruit of the tupelo gum in the Gum-Cypress community.[6] The animals have also been observed feeding on blueberries and blackberries in the recently cut-over sections of the Atlantic white cedar forest.[20]



1 PRIMARY HABITATS

GUM-CYPRESS

ILEX POCOSIN

PINE

2 SECONDARY HABITATS

HARDWOOD

REGENERATION

3 TERTIARY HABITATS

ATLANTIC WHITE CEDAR

DITCHES AND CANALS

DISMAL SWAMP

PLANT COMMUNITIES AND HABITATS

N

SCALE: 1" = 6000'

Habitat Ratings

As was stated earlier, the varying vegetational communities within the Swamp can be examined for their suitability as faunal habitats. After careful study, the vegetation communities can be rated and classified as primary, secondary, or tertiary habitats.

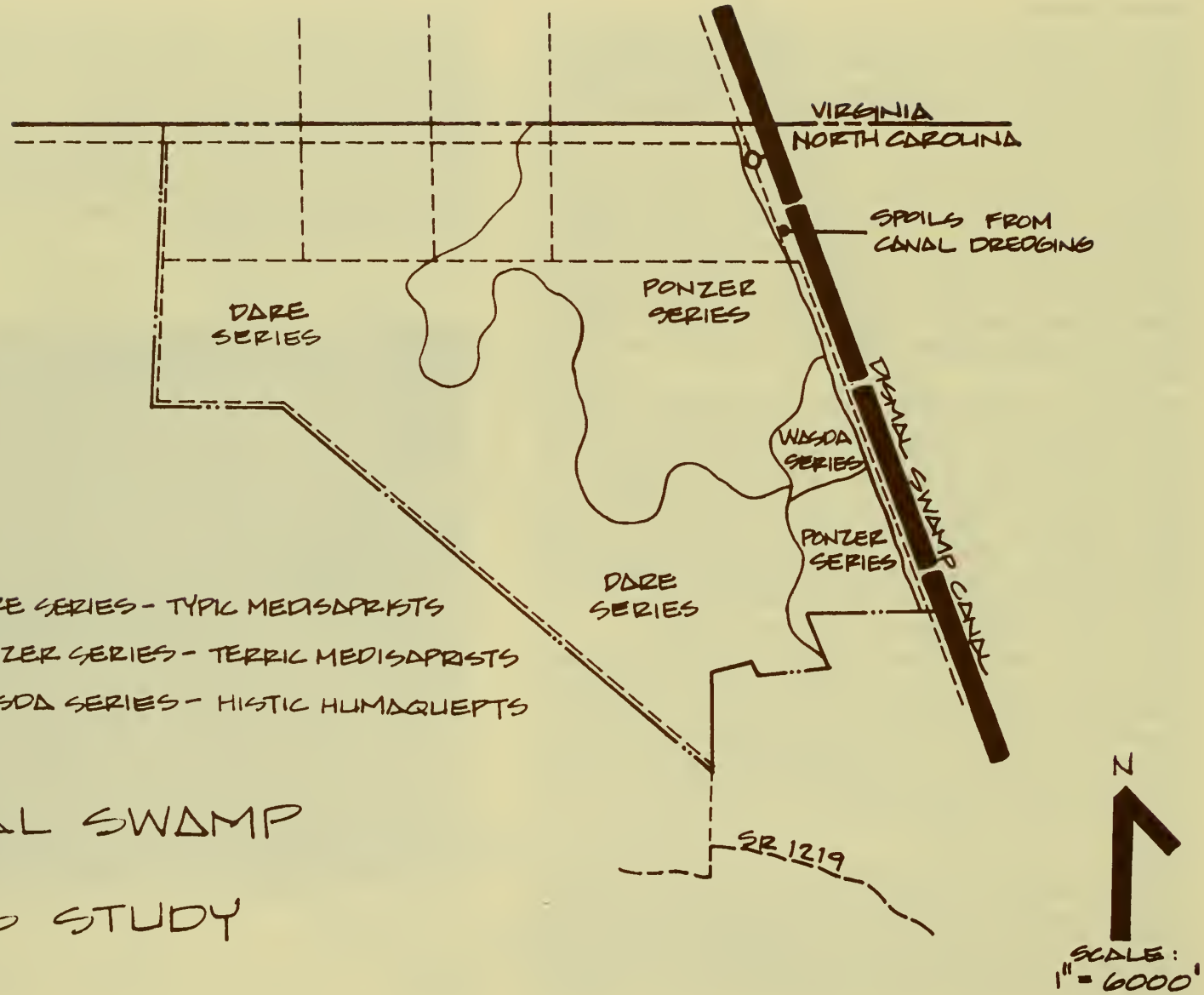
The rating system depends on a number of factors which have to be examined in the context of their relationships to each other. The different species present and their numbers, as well as the overall density of inhabitation and the ability of the vegetation to support the various species, must all be studied and then ranked. In all cases, the entire range of faunal species must be considered; this range covers everything from the invertebrate insects through the vertebrate mammals.

The ranking of these habitats has been divided into three distinct steps. The first of these is primary habitat. A primary habitat in the Dismal Swamp would have large numbers and types of species, and a great diversity of faunal species. The secondary habitats would still have large numbers of inhabitants, but the diversity of species would not be as great as that of the primary habitats. The tertiary habitats would have even poorer diversity and more than likely, less overall numbers of inhabitants, but would probably be excellent habitat for certain species.

Using these criteria, three vegetation communities have been rated as primary habitat. These communities have the greatest numbers of individuals and the greatest diversity of species that have been found in the Swamp. The Gum-Cypress community, the Ilex Pocosin or Evergreen Shrub Bog community, and the Pine community all have the wide variety of faunal species and the floral abundance to be rated as primary habitats.

Two other vegetation communities fit the criteria for classification as secondary habitats. Even though they supported large numbers of species, the overall diversity of those species was not as great as that in the primary habitats. The Hardwood community and the Regeneration community were therefore rated secondary habitats.

Two final vegetational communities were rated as tertiary habitats. These were judged to have even poorer diversity than that of the secondary habitats, but it must be remembered that these communities may still provide excellent habitat for certain species residing in them. The Atlantic White Cedar community was placed in the tertiary category for exactly those reasons. The Ditches and Canals, on the other hand, have been rated poor habitats by the North Carolina Wildlife Resources Commission, and have been classified tertiary habitats.



DARE SERIES - TYPIC MEDISAPRISTS

PONZER SERIES - TERRIC MEDISAPRISTS

WASDA SERIES - HISTIC HUMAQUEPTS

DISMAL SWAMP

SOILS STUDY

SOILS

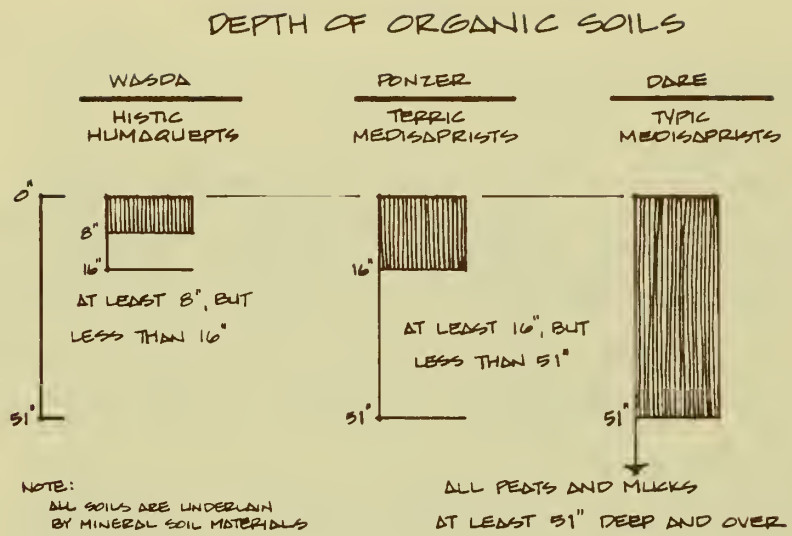
The Dismal Swamp is not a swamp in the conventional sense; rather, it is considered to be a forested peat bog, comprised of peat and muck. The thickness of these organic materials is quite variable, and is a reflection of the undulating character of the surface of the underlying sedimentary deposits. In addition, the thickness is also a reflection of man's activity in the Swamp; this is of significance in those places where the peat and muck, in an undisturbed situation, is relatively thin.

The soils of the study area and their patterns of occurrence are in five soil associations. These associations are: (1) Typic Medisaprists, (2) Terric Medisaprists, (3) Histic Humaquepts, (4) Typic Umbraquults, and (5) Typic Ochraquults.[43]

By studying the soils map, it has been determined that the North Carolina site contains three of the five known soils in the Dismal Swamp. These three soil associations are the Typic Medisaprists, the Terric Medisaprists, and the Histic Humaquepts. The United States Department of Agriculture, Soil Conservation Service, has identified these soils by generalized local names; in respective order, they are the Dare series, the Ponzer series, and the Wasda series.

All three of these associations are very similar in their composition. They are all organic soils, and all are underlain by mineral soil. The major differences between them occur in the depth of the peat and muck over this mineral soil base. The Dare series has the deepest peats and mucks, with the Ponzer association having less depth, and the Wasda series having the shallowest depths of peats and mucks of the three series. These depth comparisons are more evident on examination of the illustration.

Most peat bogs are not the good water storage reservoirs that they are often thought to be. While capable of holding large amounts of water, most types of peat yield relatively little water to gravity drainage. This is particularly true of bogs of well-decomposed peat such as the Dismal Swamp.



The hydrologic characteristics of peat are irreversibly modified if the soil is allowed to become air-dry. The soil will not re-wet to the original moisture content and the peat deposits drain more quickly due to the shrinkage cracks formed during drying.

A very important characteristic of organic soil materials is that they undergo continuing subsidence under conditions of sustained drainage. To minimize the subsidence and to prolong the useful life of organic soils as an agronomic resource, the ground water level should be maintained as high as practicable.

In general, the soils of the Dismal Swamp are characterized by:

1. Organic soil materials (peats and mucks) underlain at variable depths by mineral soil materials.
2. Poor or very poor internal drainage.

SOIL LIMITATIONS

SOIL	ENGINEERING USES				RECREATION USES			
	SEPTIC FIELDS	SEWAGE LAGOONS	ROADS AND STREETS	DWELLINGS	CAMPSITES	PICNIC AREAS	PLAYGROUNDS	PATHS AND TRAILS
PONZER	S: W, F	S: W, F	S: W, F	S: D, W, F	S: W, F	S: W, F	S: W, F	S: W
DARE	S: W, F	S: W, F	S: W, F	S: W, F	S: W	S: W	S: W	S: W
WASOA	S: W	S: W	S: W	S: W	S: W	S: W	S: W	S: W

NOTES:

S	SEVERE
W	WETNESS
F	FLOODING
D	SOIL DRAINAGE CLASS

SOIL	FLOODING HAZARD RATING	WETNESS RATING
PONZER	VERY FREQUENT PONDING FOR VERY LONG PERIODS	WATER TABLE AT OR NEAR THE SURFACE FOR 6 TO 12 MONTHS
DARE	FREQUENT PONDING FOR VERY LONG PERIODS	WATER TABLE AT OR NEAR THE SURFACE FOR 6 TO 12 MONTHS
WASOA	FREQUENT PONDING FOR LONG PERIODS	WATER TABLE AT OR NEAR THE SURFACE FOR LONG PERIODS

3. Soil reaction that is very strongly acid or extremely acid.
4. Soil temperature regime with a mean annual soil temperature between 59° and 72° F and a mean summer and mean winter soil temperatures which differ by 9° or more.
5. Slow or very slow to ponded surface runoff.

These characteristics and the thickness of the organic soil materials(peats and mucks) and the degree of decomposition of the plant materials are of significance to the classification of the soils and are of importance to their use and management.[43]

COMMUNITY GENERALIZATIONS

So far, this study has been examining, and cataloging the various factors which must be understood in order to determine recreation development potential. The background information gathered thus far must now be combined so that both the positive factors and the limitations which will affect the type, amount, and location of any development can be utilized in designing. The fragility and vulnerability of the Dismal Swamp demands this careful study in order to preserve and protect the resource and still allow for recreation potential.

The site belonging to the State of North Carolina has been studied from the viewpoint of soils information, vegetation information, and the resident and transient fauna.

These three information packages form the backbone of the design criteria. Everything to be considered for this property must take into allowance the limitations placed on the environment by these major factors. Each category mentioned has both positive and negative relationships with the others as well as any development being considered. This type of consideration must be recognized, analyzed, and weighed to determine any possible effects before a design is proposed.

The three soil associations present on the North Carolina site exhibit characteristics which strictly limit the activities which may take place upon them. The United States Department of Agriculture, Soil Conservation Service, has rated each of these soil types according to their ability to withstand or be used for certain activities. A compilation of these activities which apply to the use of the Dismal Swamp land as a state park is in the soil matrix. As is evident from a study of this composition, all of the soils show severe limitations for all of the activities because of depth to water table and flooding problems.

The Ponzer association displays the most restrictive traits for any type of development, with the Dare association slightly less restrictive, and the Wasda association slightly

less restrictive than the Dare association. This is only evident because the ratings show less flooding probability for the Wasda association, but it still demonstrates severe limitations for state park activities because of depth to water table. The Wasda association has the thinnest layer of organic soil materials, peats and mucks, of the three associations. The Ponzer series shows a thicker layer of this organic soil, and the Dare series shows the thickest of the three. The Dare series includes all peats and mucks over fifty-one inches thick, and is the most extensive soil on the property; it includes the Atlantic White cedar, the Pocosin, and the Hardwood and Regeneration communities.

The Atlantic white cedar forest is a beautiful and unique swamp growth that would provide good state park atmosphere, but the peat upon which this forest exists limits passage or development opportunities because of its sheer depth. Likewise, the Evergreen Shrub Bog or Pocosin community depends on the deepest peat deposits for its existence.

The Atlantic white cedar provides good habitat for quite a few songbirds, and even though it was rated as a tertiary habitat, it still provides excellent habitat for certain species. The Pocosin was rated as a primary habitat because it is the winter roost for a huge number of robins and blackbirds, and provides food sources for many other birds and mammals including the red-cockaded woodpecker and the red-headed woodpecker, both endangered species.

The Hardwoods and the larger Regeneration community are also within the boundaries of the Dare soil series. However, they are located on muck deposits which are, for the most part, not as deep as the peat deposits in the Atlantic white cedar and Pocosin areas.

The regeneration type of vegetation is occurring as a direct consequence of recent timber cutting. These sites are coming back in a large percentage of maple and evergreen shrubs and vines. Even though rated a secondary habitat, the regenerating forest provides food for many robins and warblers, a few species of mice and shrews, including the endangered southern bog lemming and the Dismal Swamp short-tailed shrew, and large mammals such as the bobcat, white-tailed deer, and black bear.

The Hardwood community is also rated as secondary habitat, but still provides refuge for many species. The Eastern bluebird, Swainson's warbler, and the red-shouldered hawk are present here, along with many songbirds, small mammals, and the bobcat, white-tailed deer, and black bear.

These two communities are valuable to state parks atmosphere because they provide valuable habitats and needed faunal diversity. They are excellent examples of what could be termed swamp succession in that they are showing the natural processes taking place under man-changed conditions such as lumbering and water manipulation.

The Ponzer soil series is ranked in the middle according to the depth of the peats and mucks, but it exhibits the most severe limitations for park-type activities because of the high water table and flooding probability. Where this soil is underlain by loamy materials, the vegetation includes pond pine, maple, cypress, and some bay and gum. Where it is underlain by sandy materials, the vegetation contains pond pine, tupelo gum, sweetbay, cypress, greenbrier, and wax myrtle. These two sets of vegetation types correspond to the flora found in the Pine forest and the Gum-Cypress community.

The Pine forest is desirable as vegetational component which promotes diversity and faunal habitat. It is part of the necessary habitat for the red-cockaded woodpecker, already mentioned as being an endangered species. The Gum-Cypress provides scenic beauty because it has little woody understory and only shade tolerant herbaceous plants and ferns populate the floor of the community. The scarcity of standing water promotes the growth of these species, but it must be remembered that this is one of the wetter plant communities, and therefore presents special problems for state park development. The Dismal Swamp short-tailed shrew, a variety of bats, and the ever present raccoon, opossum, and black bear are all found in the Gum-Cypress community. The Pine and Gum-Cypress communities are both rated as primary habitats because of the large numbers and great diversity of the animal species there.

The Gum-Cypress community also occurs on the Wasda soil series. This series, even though it still exhibits severe limitations for development, is the least restrictive of the three soil types present on the North Carolina site. Any development would have to be accomplished carefully and by the most environmentally conscious methods available in order to protect the habitat and ecology.

Finally, along the Dismal Swamp Canal is an area which has been very recently cut-over for timber. This community was actually part of the Gum-Cypress forest before logging operations thinned it down and it was apparently growing right up to the western edge of the Dismal Swamp Canal. This strip of land is composed of the soil originally dug out for the Canal, and also that soil recently dredged from the canal by the U.S. Army Corps of Engineers.

The combination of the already upturned and disturbed soil with the recent clear-cutting has produced the most logically developable area on the North Carolina property, especially considering that the soil is the least restrictive of three severely restrictive soils. It would seem that this strip of land could support controlled development with the least environmental harm.

One of the major considerations which must be recognized in any development situation in the Dismal Swamp is the protection of the various animal habitats, particularly those of the endangered species. These locations must be identified and avoided during any development in order to protect the species. This will require thorough on-site inspection of the immediate areas being considered for development and the surrounding areas which might feel any impact from the construction and existence of these facilities. Design moderation and modification would then be necessary to insure complete and adequate protection of the habitats. Of course, protection of animal habitats is only one of the factors which must be provided for in any development proposal.

Another major consideration is the extreme vulnerability of the Swamp to fire. During the drier parts of the year, and definitely during times of drought, the peat layer dries out to such an extent that fires can spread through the subsurface in a manner which makes them virtually inextinguishable.

Deep peat fires create depressions that fill with water during wet periods resulting in conditions favorable to reforestation by hydric species such as cypress and black gum. Shallow peat and surface fires that remove the existing vegetation without extreme peat loss are also evidenced in the Swamp. A dense Evergreen Shrug Bog association will usually revegetate these burned areas providing a highly productive wildlife habitat.

Under certain conditions fire favors the regeneration of white cedar. In one area, a hot surface fire burned over a recently lumbered white cedar area without removing the duff and peat harboring the seed source. As a result, the cedar on the burn site is over three times as tall as that of the adjacent unburned area.

Fires can be disastrous or beneficial depending on their timing and intensity; fires are known to be a contributing factor to the present habitat diversity in the Swamp. Fire can also be used as a tool to achieve specific management objectives under the proper conditions. Wildfires on the other hand, are a common concern to everyone. They generally have a negative effect on planned management and a potential for extensive regional loss of resources. Therefore, every effort must be made to prevent the occurrence of accidental fires within the Swamp.[6]

MASTER PLAN

EXISTING USE AND SITE CONSTRAINTS

As previously mentioned, the main resource of the site through history has been its timber. Its owners, "hard-headed businessmen, had no romantic illusions as to the future of the swamp". Every acre of the site has been either logged, burned, or both. Beginning with the construction of the Dismal Swamp Canal, and continuing with the addition of Cross Canal and the Corapeake Road, timber cutting operations gained access to different parts of the site in the early 1800's. Ownerships transferred from one lumbering company to another through the years, finally became uneconomical to operate.[41] Union Camp, Georgia-Pacific, Atlantic Farms, and J. H. Headley followed the practice of selling or donating Dismal Swamp property to the Nature Conservancy. However, before purchase of the 14,000 acre site, the property had been harvested for cypress, certain hardwood, white cedar, and pine. Therefore, much of the site will have to be managed in order to make existing forest communities valuable for a state park.

The Gum-Cypress Forest on the Georgia-Pacific tract was selectively cut for cypress and the Hardwood community along the canal was clear cut. The cypress community retained much of its character; however, the Hardwood community has lost all identity that it once retained. This clear cut area is regenerating into a mixed sycamore, red maple, and briar community.

The Headley tract was logged for pine and selected hardwood species in the 1960's. It is also regenerating into a mixed red maple, pine and briar community, which is impenetrable by either foot or vehicle. The old logging roads have been covered by briars; the only one which remains is Bull Boulevard.

Atlantic white cedar stands have been the target of logging operations on the Atlantic Farms parcel. In order to gain access to these stands, new roads were cut off the Corapeake Road to areas north and south of the property. Forest Line Road gave access to cedar stands to the west and south, and Boundary, Myrtle and Laurel Roads opened new areas to the north.

The second resource of the swamp has been the diversity of its fauna. Abundant communities of mammals, reptiles, and birds have been present through its history; hunters have taken advantage of this situation in a very unique way. Hunt clubs' have been organized by local residents; they lease hunting rights on lands owned by the timber companies, offering to help with policing the area, maintaining the roads, and fighting fires![44] Deer and bear are the hunters' main targets; however, this year the site was declared, on a temporary basis, a state game land, thus protecting these animal species for the present.

The third resource of the site is the Dismal Swamp Canal's location. Bordering on the east, the canal will allow access by water to the site for potential visitors. Although originally a ship canal, its present use is primarily recreational rather than commercial. The Albemarle & Chesapeake Canal has taken most of the commercial traffic since it is wider and deeper than the Dismal Canal. Also, the Dismal Canal has suffered water supply as well as bank erosion problems periodically through its later history. Currently the Corps of Engineers is evaluating their use policy for the canal. The first priority of the Corps is to use Dismal Swamp water for maintaining a navigable level in the canal for both commercial and recreational craft.[40] However, the Department of Interior's study report recommends that the priority water use be given to maintaining water levels within the swamp rather than the canal.[40] A decision on this policy should be made by the United States Congress this coming year. The decision will greatly affect the ability of the Wildlife Refuge and the state of North Carolina to manage water on their respective sites, since all water rights are retained by the Corps.

As yet, no policies have been set forth regarding the canal erosion problem. Opinions vary concerning the severity of the erosion, however, after a site inspection, one will find that the present roadbed of U.S. 17 is being threatened by canal bank erosion. Some areas along the highway have

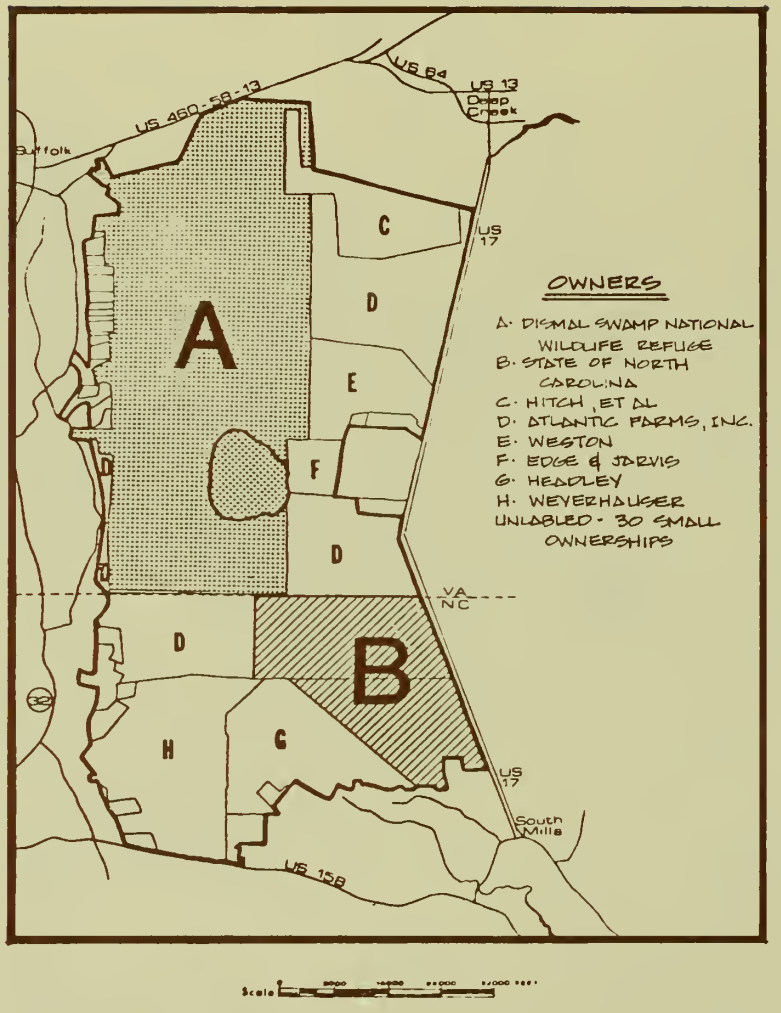
less than thirty feet between the canal bank and road bed. Whatever the rate of erosion, policies will need to be established to deal with this problem since both Virginia and North Carolina Departments of Transportation are considering a plan to upgrade U.S. 17 to a four-lane primary highway. Also tentative plans by the North Carolina Department of Transportation locate a welcome center and highway rest area on U.S. 17. These plans are based on a twenty year projection which estimates an increase in use from four to ten thousand cars per day traveling the highway.[36]

With this increase in use, noise generated from highway use will have to be considered. Presently, traffic can be heard from U.S. 17 approximately one-half mile into the site; however, the noise levels on all parts of the site are below limits which would interrupt normal conversation. Precaution will have to be taken to prevent this situation from becoming a problem in the future.

A fourth resource of the site can be found among those who are working to preserve the swamp. The Department of the Interior, States of North Carolina and Virginia, and cities of Chesapeake and Suffolk are organizing to make a concerted effort to save 123,000 acres of swamp. This preservation effort will aid North Carolina with its program by securing needed buffer land around North Carolina's property. The present 14,000 acres owned by North Carolina is land locked by property holdings of J. H. Headley, Weyerhaeuser, and Atlantic Farms. Access to the site is currently being denied from the Corapeake Road through the Atlantic Farms property and from SR 1219 through J. H. Headley's property. However, Headley has reserved the right-of-way along Bull Boulevard and Weyerhaeuser has equal rights along the Corapeake and Forest Line Roads.[51] Also, Weyerhaeuser has secured the water rights for the ditches which drain their land north of the State's property.[53] The legality of the construction of these ditches has not been questioned by the Corps of Engineers or the Department of the Interior.

With regard to these problems, the Department of the Interior can eliminate any question if they are truly commit-

OWNERSHIPS
PRIMARY STUDY AREA



FROM SOURCE #6

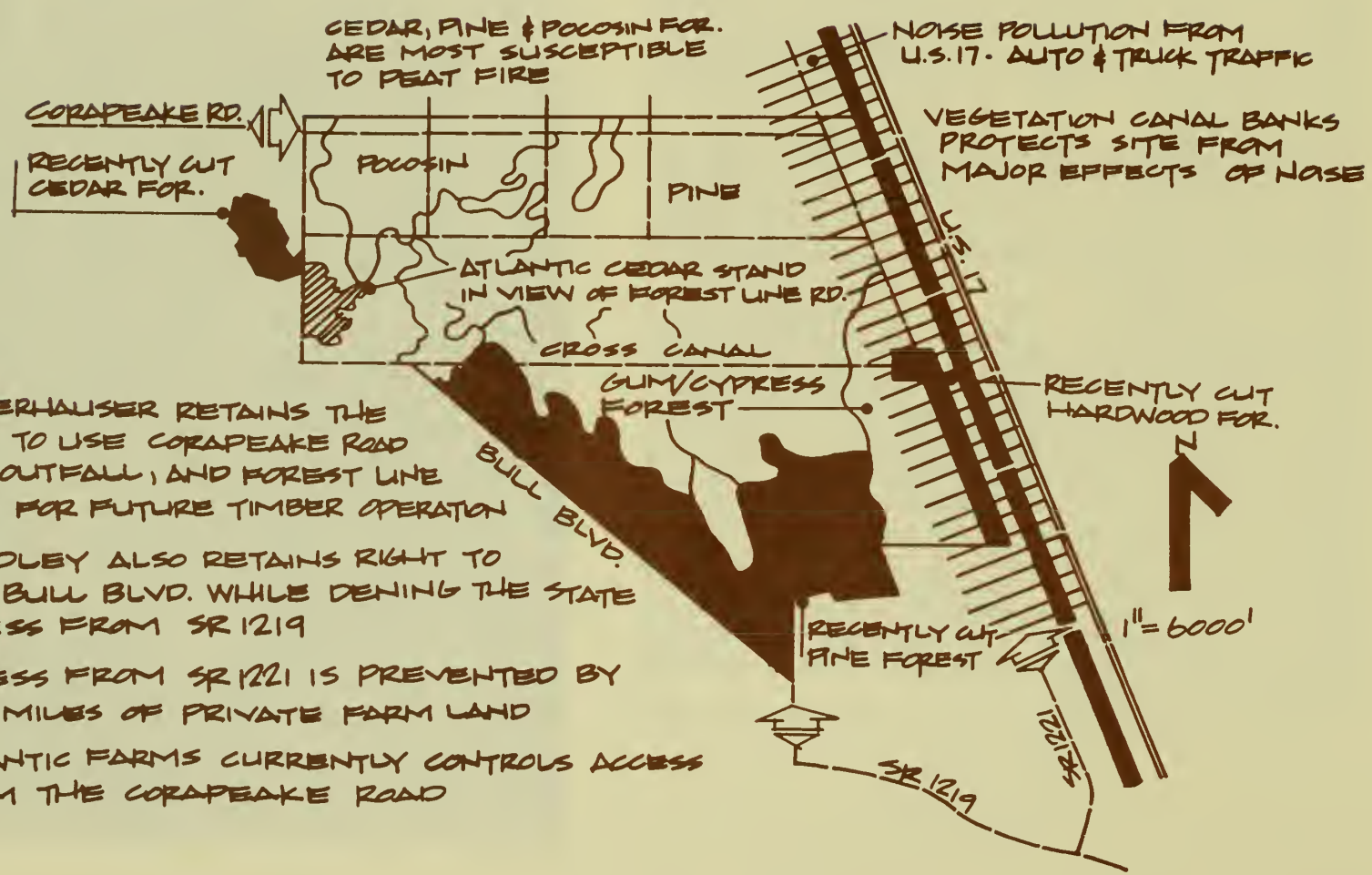
ted to purchasing all the property specified in their public use plan. The plan recommends purchase of property currently owned by Atlantic Farms, Weyerhaeuser and J. H. Headley which blocks access to the State's property; rights-of-ways and water rights would all be included with purchase.

If purchase is not completed, the state will have to secure the exclusive rights to access and use of the roads, and will have to secure a satisfactory visual buffer around the northern, western, and southern boundaries of the site. If such a buffer is not secured by the State of North Carolina, the visual integrity of the site could be threatened by future logging operations.

The other access to the site occurs from SR 1221 along the Dismal Swamp Canal. However, this entry also runs through private property and the Corps of Engineer's right-of-way does not include this dirt road. Therefore, the State would be responsible for negotiating another access agreement with the landowner.

A fifth possible resource to the site will be the proposed Pasquotank River impoundment which would be located due south of the site. The impoundment is being designed as a supplemental water supply for Elizabeth City, North Carolina. It is scheduled to be a 1900 acre impoundment with an average depth of three feet.[22] Water from the State's site would drain directly into the impoundment; thus the water quality of the site would have to be regulated so as not to pollute this new water supply from sedimentation or solid waste load. Possibly the water body could also serve as a recreational supplement to activities provided by a state park, such as a canoe trail linking the site with the lower portion of the Pasquotank. If nothing else, the reservoir could be used for water supply to the site if deemed necessary by later studies.

DISMAL SWAMP
SITE CONSTRAINTS



- WEYERHAUSER RETAINS THE RIGHT TO USE CORAPEAKE ROAD AND OUTFALL, AND FOREST LINE ROAD FOR FUTURE TIMBER OPERATION
- HEADLEY ALSO RETAINS RIGHT TO USE BULL BLVD. WHILE DENING THE STATE ACCESS FROM SR 1219
- ACCESS FROM SR 1221 IS PREVENTED BY TWO MILES OF PRIVATE FARM LAND
- ATLANTIC FARMS CURRENTLY CONTROLS ACCESS FROM THE CORAPEAKE ROAD

MASTER PLAN: PHASE #1

In the previous section, certain resources as well as constraints were described which will greatly affect the use of the site. In several instances, State Parks will not be able to control certain constraints or to predict their outcomes. Therefore, contingency plans were developed which took into consideration different policy outcomes. These plans were organized to represent a procedure for development, placing priorities on site and program development.

Phase #1 can be considered a 'no development' proposal. The site would remain a North Carolina State Game Land under the sponsorship of the State's Wildlife Resources Commission. Program emphasis would be given to the management of faunal habitats, primarily for endangered mammal species. Hunting and trapping would be allowed during certain times of the year for selected species.

'N. C. Hunting and Trapping Regulations'
N. C. Wildlife Resources Commission 1974-1975
for the Dismal Swamp

1. Bear	No open season in Camden County
2. Whitetail Deer	Oct. 14 - Jan. 1 (Bow and Arrow, Sept. 13 - Oct. 12)
3. Wild Boar	Oct. 14 - Nov. 16 and Dec. 16 - Jan. 1
4. Raccoon and Opossum	Oct. 14 - March 1
5. Squirrels	Oct. 14 - Feb. 1
6. Rabbits	Nov. 23 - Feb. 8
7. Quail	Nov. 23 - Mar. 1
8. Wild Turkey	Apr. 12 - May 3
9. Ruffed Grouse	Oct. 14 - Mar. 1
10. Pheasants	Nov. 23 - Mar. 1
11. Red and Gray Fox	During legal season for any other animal.
12. Groundhog	No restriction
13. Wildcat	Dec. 16 - Feb. 15
14. Crows	Nov. 30 - Feb. 1 and May 28 - July 26

Trapping

Beaver, Mink, Muskrat, Opossum, Otter, Raccoon, Wildcat - Dec. 16 - Feb. 15.

This type management proposal would preserve all wildlife habitats as well as open the site to limited public use. However, this phase requires that access from a public road be secured either through negotiation or development. Presently, three possible access routes intersect a public road, N. C. 32, S. R. 1221, and S. R. 1219. The most convenient and shortest access would be from S. R. 1219 to Bull Boulevard. This route would require negotiation of an access agreement with J. H. Headley, owner of the adjacent property. Highest priority should be placed on acquiring this easement, since this access would permit quick entry in case of fire. The second priority access route should be located off N. C. 32 to the Corapeake Road. This entrance requires a four and one-half mile drive through the swamp to the property line; however, this entrance and the S. R. 1219 route would allow access to the plant communities of the site which are most vulnerable to peat fires, the Atlantic white cedar, Evergreen Shrub Bog and Pine Forest communities.

The third possible entrance from a public road would come off S. R. 1221 as it intersects an old farm road leading north to the site. This farm road is located on private property, just west of the Corps of Engineers' right-of-way along the Dismal Canal. Again, a trip of two miles is required through private property to the site. Agreements for access would have to be made with landowners along with minor road improvements before the road could be used as a public access for hunters and management personnel.

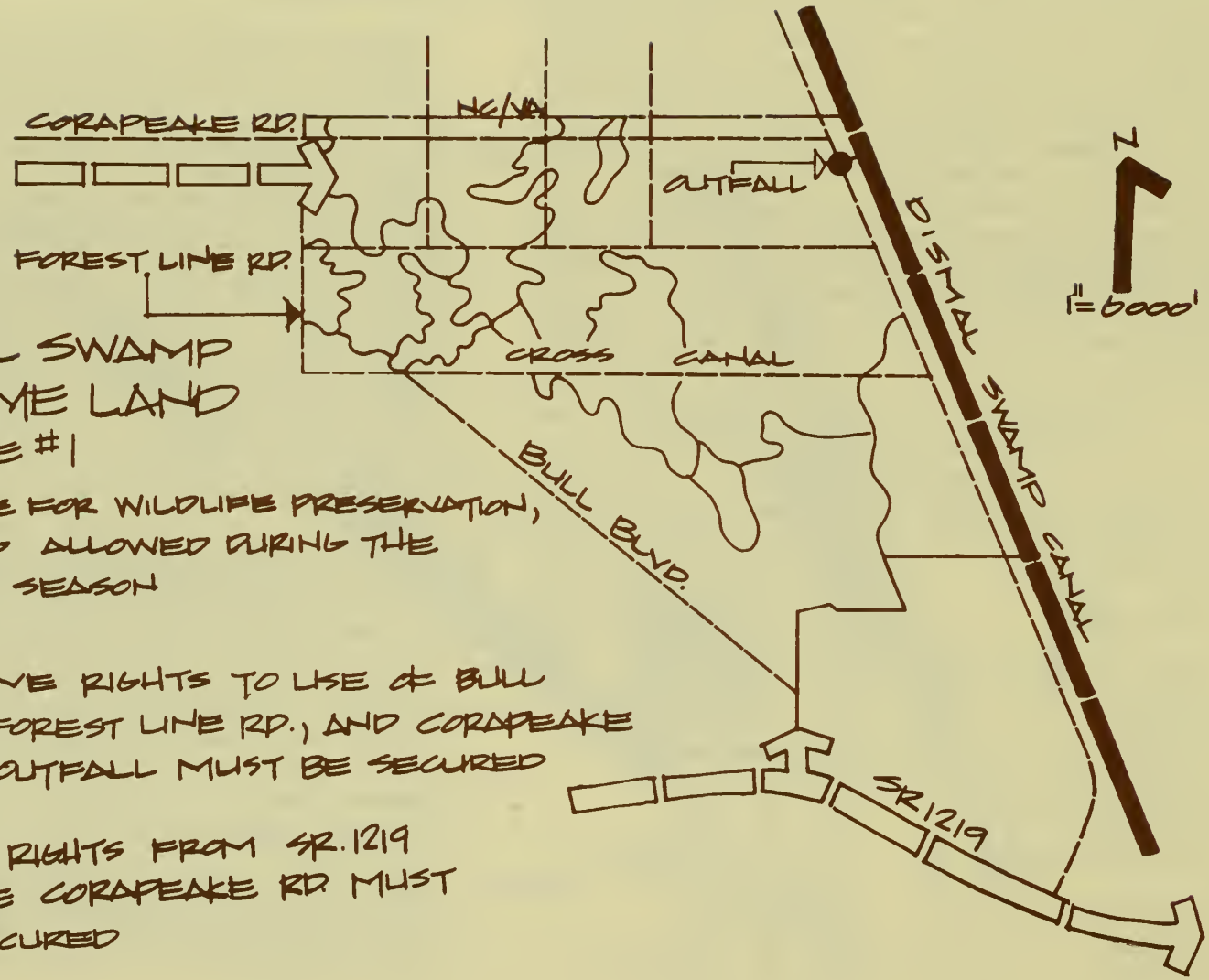
In order to protect the site from fire and to monitor game land users, development of these three access points is recommended. The size and interior circulation system of the site makes protection a difficult task, requiring that several entrances be provided. This phase assumes that the existing logging roads would be used for interior circulation, needing only periodic grading to make them passable during dry weather.

DISMAL SWAMP
N.C. GAME LAND
PHASE #1

- MANAGE FOR WILDLIFE PRESERVATION, HUNTING ALLOWED DURING THE PROPER SEASON

- EXCLUSIVE RIGHTS TO USE OF BULL BLVD., FOREST LINE RD., AND CORAPEAKE RD AND OUTFALL MUST BE SECURED

- ACCESS RIGHTS FROM SR. 1219 AND THE CORAPEAKE RD MUST BE SECURED



Environmental impacts on the site will be minimal since no development is required other than periodic road maintenance. Under this phase, the existing plant communities could be allowed to succeed under the present environmental circumstances. Also, the faunal populations would be managed for preservation under the Wildlife Resources Commission's program. Of course, a fire protection plan would have to be designed with the assistance of the Office of Forest Resources in order to further minimize any danger to the site. Since the spring and summer months are considered the times the area is most susceptible to fire, hunting should be restricted on the site for game in season during these months. Seasons for groundhog, crow, and wild turkey should be restricted during this time period. All other hunting seasons fall outside this time period.

The site would be managed as part of the existing 20,000 acre Dismal Swamp Game Land located in parts of Pasquotank, Camden, Perquimans, and Currituck Counties. No significant addition of personnel or equipment would be required to manage this 14,000 acre tract. During the period the site would remain a game land, State Parks would not have any direct responsibility for the site's management.

PHASE #2

Phase #2 would take advantage of the unique character of the site to preserve it as a State Park. Like Phase #1, a State Park would also preserve the environment, but would allow for a wider range of public use. Since the site is not especially suited for traditional State Park activities such as family camping, picnicking, or swimming, a Specialized Nature Interpretation Program is recommended. The components of an interpretive program consist of management, education and nature study. They are combined to give the visitor a complete experience in a unique environment. The first of these components, management, is designed to guarantee preservation of the floral and faunal habitats. The plant communities would be preserved and protected according to their importance as examples of native vegetation. The area would also remain a permanent refuge for faunal species.

The next component, education, is intended to be the first step in an environmental education program. The park visitor is given the opportunity to obtain information concerning the uniqueness of the site. Explanations of the plant and animal communities will be available using a variety of techniques. Lectures, multi-media presentations and guided tours are examples of the methods employed in a State Park.

The third component, nature study, is designed for individuals, families, or groups who would want an extended trip into the site for the purpose of experiencing the 'swamp environment'. Basically, the experience would be a self-guided tour of the different environments of the site. The visitor would determine his length of stay according to the amount of land one wished to survey.

Phase #2 would emphasize the nature study component of the program. Hiking, nature interpretation, and wilderness camping would be provided as the main activities on site. Vehicular access for park users comes off S. R. 1219; a parking facility would be provided and the user would then hike onto the site. A six thousand square foot parking lot would be required for fifteen camper, three staff, and three bus spaces. A mobile park office would be placed in coordination with the lot. Approximately two acres would be necessary for the office, parking lot, utilities and suitable buffer from the road.

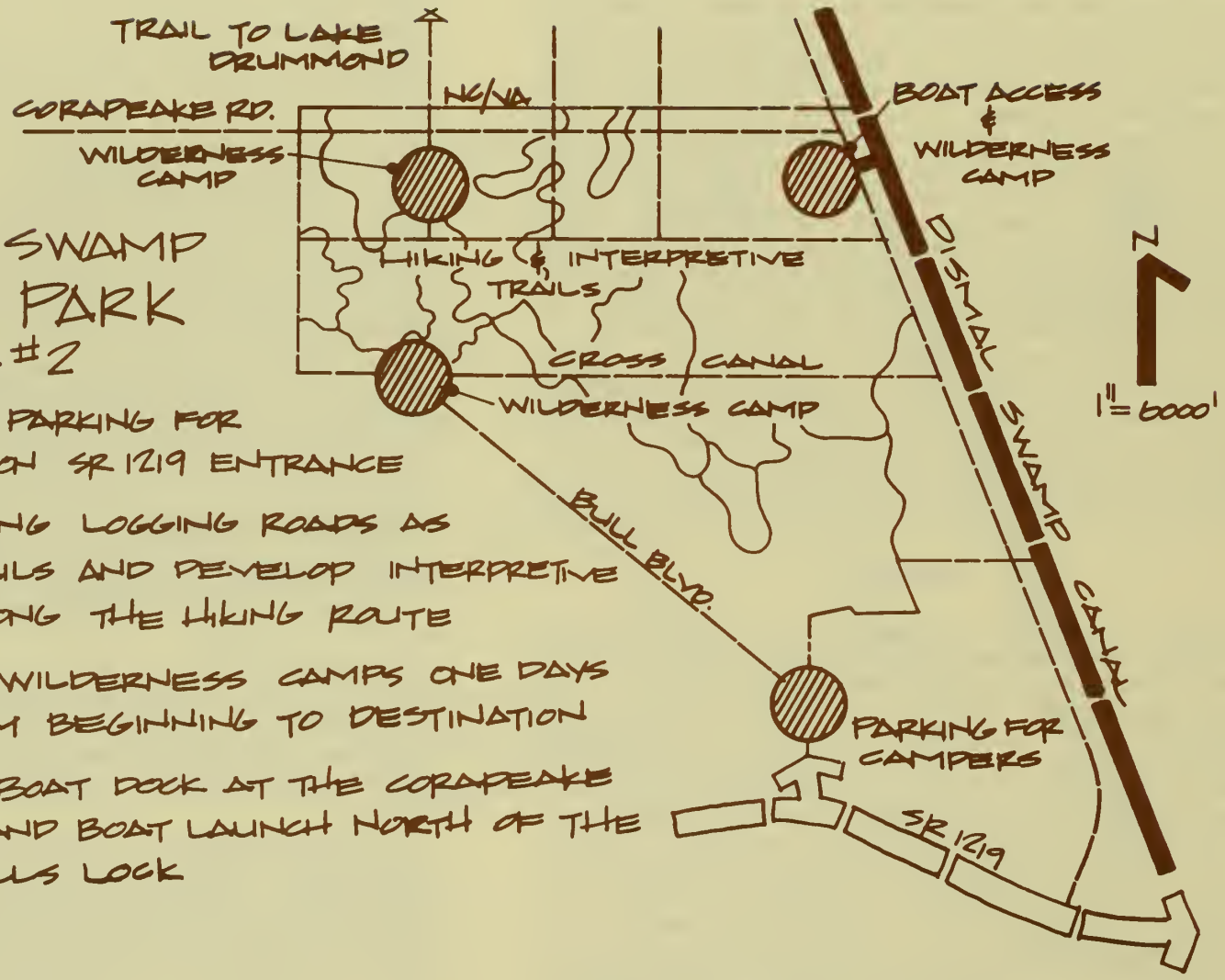
Existing logging roads would be used as hiking trails; and along these roads, located one day's hike apart, wilderness camps would be placed for both families and groups. Wilderness camping provides a limited shelter, on the order of a wooden lean-to, a hand-pump water supply and a pit privy.

As proposed, a minimum of three wilderness camps will be provided. Each camp will have, as a first increment, five single family and one group camping site with an expected use of 2000 people per year. The camps will be placed in a linear fashion along the existing logging roads. The individual or family camps should be placed a minimum of 150 feet apart. Each camp will require a minimum of 2,500 square feet for the specified activities. Fifty square feet

DISMAL SWAMP STATE PARK

PHASE #2

- DEVELOP PARKING FOR CAMPERS ON SR 1219 ENTRANCE
- USE EXISTING LOGGING ROADS AS HIKING TRAILS AND DEVELOP INTERPRETIVE TRAILS ALONG THE HIKING ROUTE
- DEVELOP WILDERNESS CAMPS ONE DAYS HIKE FROM BEGINNING TO DESTINATION
- DEVELOP BOAT DOCK AT THE CORAPEAKE OUTFALL AND BOAT LAUNCH NORTH OF THE SOUTH MILLS LOCK



would be required for fireplace and eating area, and one hundred and twenty square feet is needed for the tent or shelter. The remaining facilities could be placed as they best fit a particular site, thus allowing the possibility for conservation of certain overstory trees. The group site is designed to accommodate a group not exceeding fifty individuals. Forty thousand square feet will be required for tents, fireplace, pit privy, water supply, and garbage receptacles. An area approximately two hundred feet in diameter would need to be selectively cleared.

Interpretive trails would emanate from the hiking trails where they intersect with different vegetative communities. Self-guiding trails would lead through areas of specific environmental interest. In many places, such trails would have to be elevated or closed during times of high water. The development of interpretive trails will take variable forms according to specific sites. Areas which have extremely deep peat deposits along with a weak bearing strength capability will need elevated walkways and graded trails. The Gum-Cypress Forest will require elevated walkways to transport people into the area and to protect the understory vegetation. A combination of elevated walkways and graded trails in the Hardwood and Pine Communities will be adequate. The Hardwood and Pine Communities are in the second priority class for nature interpretation; therefore, trails into these areas could be seasonal, opened during times of low water and minimal fire hazard.

INTERPRETIVE TRAILS TO BE ELEVATED IN EXTREME MUCKY AREAS

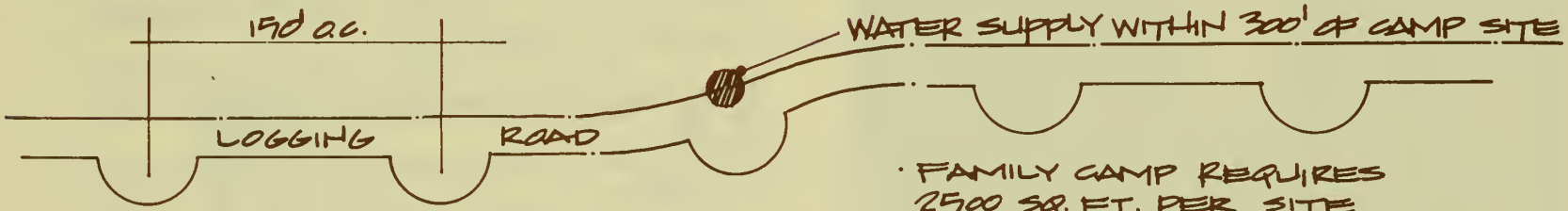
A second access to the site would take advantage of the Dismal Swamp Canal. A drainage outfall, constructed in the late 1960's offers a ready-made boat access area to the site. A small boat dock, to accommodate boats eighteen-feet or less, is being proposed. The dock would be designed to handle eight boats.

In order to provide North Carolina citizens water access, a boat launch north of the South Mills lock is also being requested. The Corps of Engineers has given tentative approval and suggested serveral sites for a twenty-five car facility. Sufficient Corps right-of-way is available just north of the South Mills drawbridge on the west bank and just north of the lock on the east bank. This location woud allow small boat access to the canal without loss of water from unnecessary lockages at South Mills.

The development of this phase assumes that the Department of the Interior has the ability to acquire land surrounding the State's property. With this understanding, the linkage of Boundary Road as a hiking trail with Lake Drummond becomes possible. This trail would greatly expand the interpretation program by giving the journey a reasonable destination to one of the outstanding features of the Swamp. This trail is necessary if North Carolina is to develop a viable State Park which takes advantage of the natural features of the Swamp.

However, if the Department of the Interior is not able to purchase the adjacent lands to the north and west of the site, the State will have to negotiate for the control of Forest Line and Corapeake Roads, and Bull Boulevard along with sufficient land to control the visual character of its boundaries. A visual buffer west of Bull Boulevard and Forest Line Road would have to be purchased or guaranteed from the existing landowners.

The management of the site would fall under the complete control of the North Carolina Division of Parks and Recreation. The State Park Management Section will assume direct responsibility for the administration of the site. Responsibility would be transferred from the Wildlife Resources



WILDERNESS CAMP

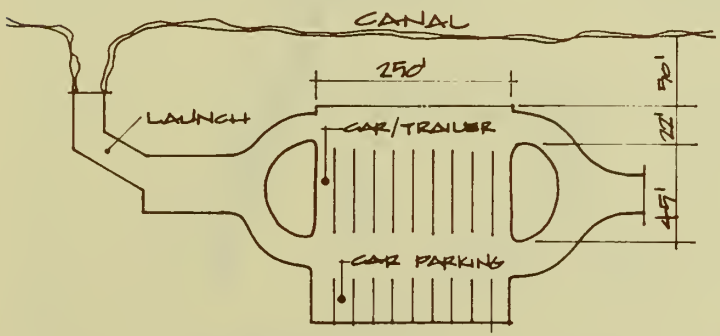
EACH CAMP SITE PLACED 150' APART WITH A WATER SOURCE FOR EACH FIVE CAMP SITES.

(NO SCALE)

- FAMILY CAMP REQUIRES 2500 SQ. FT. PER SITE
- ONE GROUP CAMP REQUIRES 40,000 SQ. FT. - IT WILL HAVE ITS OWN WATER SUPPLY
- EACH CAMP WILL HAVE SPACE FOR TENT, STOVE, PIT PRIVY AND BUFFER FROM ADJOINING CAMP SITE

Commission to Parks and Recreation when property and buffer agreements are completed. A permanent Ranger/Naturalist, park attendants and supportive labor would be required. The attendants could be hired on a seasonal basis, depending on need. Also, the naturalist would be required to organize the interpretive inventory and to design the trails. At this stage of development, an extensive, full time staff is not needed for the Dismal Swamp, so that Merchants Mill Pond and the Dismal Swamp could share a park superintendent. The Ranger/Naturalist would also be responsible for monitoring camping reservation and patrolling the site between the hours of 8:30 a.m. - 5:30 p.m. After these hours, the campers are responsible for their own safety and well-being. However, a public telephone would be available at the park office for emergencies. The Camden County Sheriff's Office, as well as the ranger 'on call' could be reached after hours if necessary.

The attendants, under the supervision of the Ranger, would maintain the wilderness camps, hiking and interpretive trails, and assist with camping reservation duties. Either a ranger or an attendant would be available during daytime operation at the office.



BOAT LAUNCH · 29 CAR/TRAILER & 10 CAR PARKING SPACES
NO SCALE

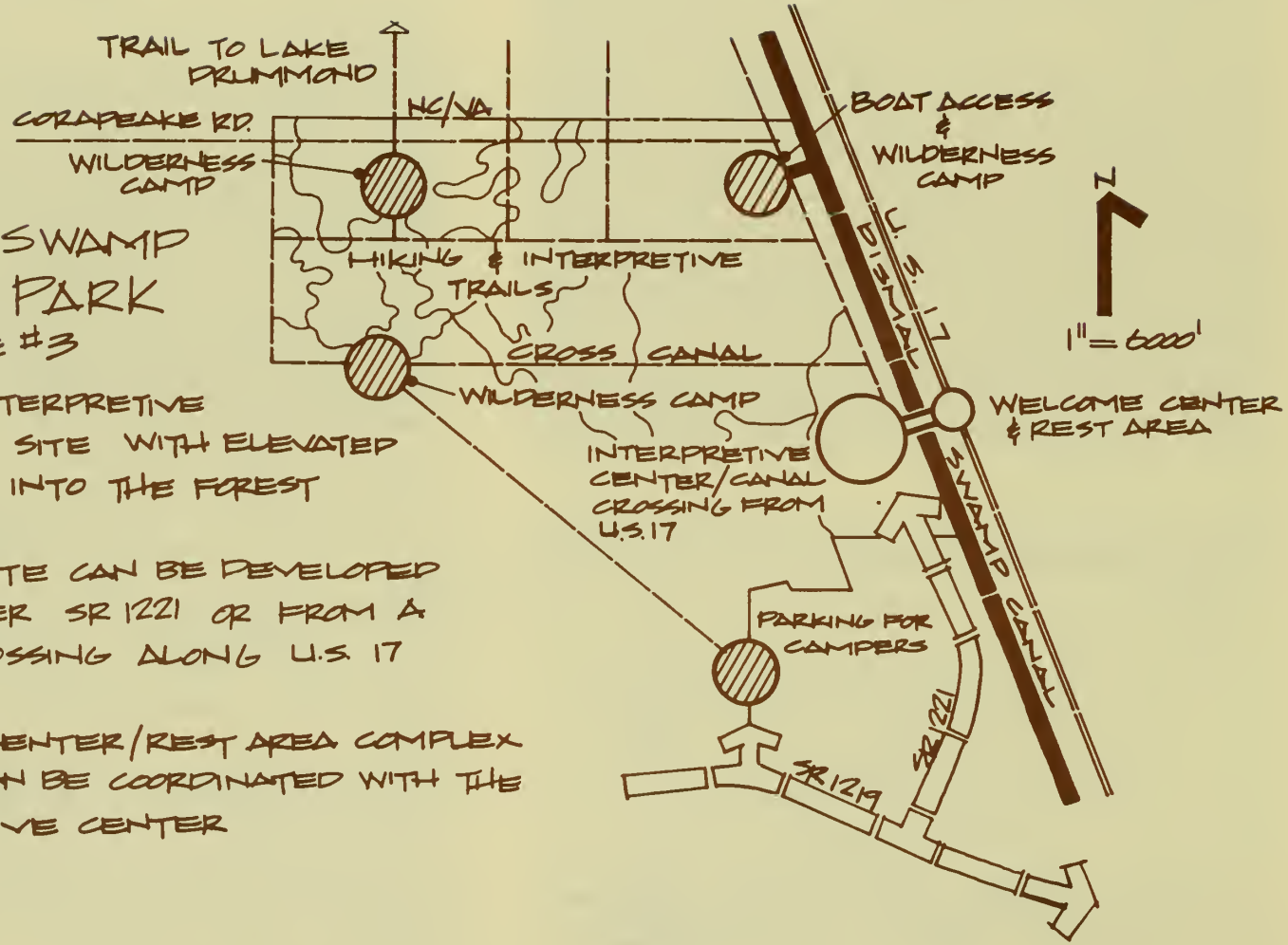
PHASE #3

Phase #1 and #2 were designed to attract a limited and very selective clientele. Phase #3 expands the nature interpretation program initiated in Phase #2 to include short term visitors unable to dedicate more than several hours to the site. For this visitor, who would be traveling U. S. 17 by car or the Dismal Swamp Canal by boat, a program could be designed to give the visitor a brief experience in the swamp. Primary emphasis would be given to education and secondary emphasis to nature study. The principal objective would be to educate the visitor about the unique geological and wildlife characteristics of the swamp. The visitor would be given secondary information about the site, information that he would not be able to experience in the field because of his limited time commitment. This educational data could be presented in a number of ways, by lecture, publication, media presentation, or guided tour.

In order to combine the advantage of the projected traffic volume along U. S. 17 and a unique forest community on the site, the interpretive program is proposed to be located in the Gum-Cypress forest that borders the Dismal Swamp Canal on the west bank. This community is thought to be one of the climax stages of the swamp's successional development. Although the cypress has been selectively cut for pole timber, many specimens of cypress and gum still remain, not to mention the different fern communities present. This forest is still one of the most pleasant and biologically interesting areas in the swamp. With the intermitant standing water and wildlife types, the Gum-Cypress forest would be one of the most stimulating areas for the visitor to experience. The individual would receive the feeling of having been in the Dismal Swamp after a short exposure to this area. Also, the selection of this site would insure that the Dismal Swamp Canal becomes part of the visitor's experience. This canal is a major feature of the cultural history of the swamp, and should not be omitted from the interpretive program.

DISMAL SWAMP STATE PARK
PHASE #3

- DEVELOP INTERPRETIVE CENTER ON SITE WITH ELEVATED WALK-WAYS INTO THE FOREST
- ACCESS ROUTE CAN BE DEVELOPED FROM EITHER SR 1221 OR FROM A CANAL CROSSING ALONG U.S. 17
- WELCOME CENTER/REST AREA COMPLEX ON U.S. 17 CAN BE COORDINATED WITH THE INTERPRETIVE CENTER



The main goal of the interpretive program would be to illustrate the natural and cultural development of the swamp. Theories about the geological origin should be explained along with descriptions of the effects man has had upon the swamp. Secondly, the present wildlife should be interpreted and related to the site's historical development. The practices of the lumbering companies should be illustrated along with products retrieved as a result of their efforts. The role of the swamp in providing raw materials for industry would be an important component of the program.

The wilderness camping and wildlife management programs in Phase #2 would be continued. Access off S. R. 1219 for the hiking trails would be retained along with the boat access area at the Corapeake Road outfall. The provision of a hiking trail terminating at Lake Drummond from the State's site would also be considered a requirement of the master plan.

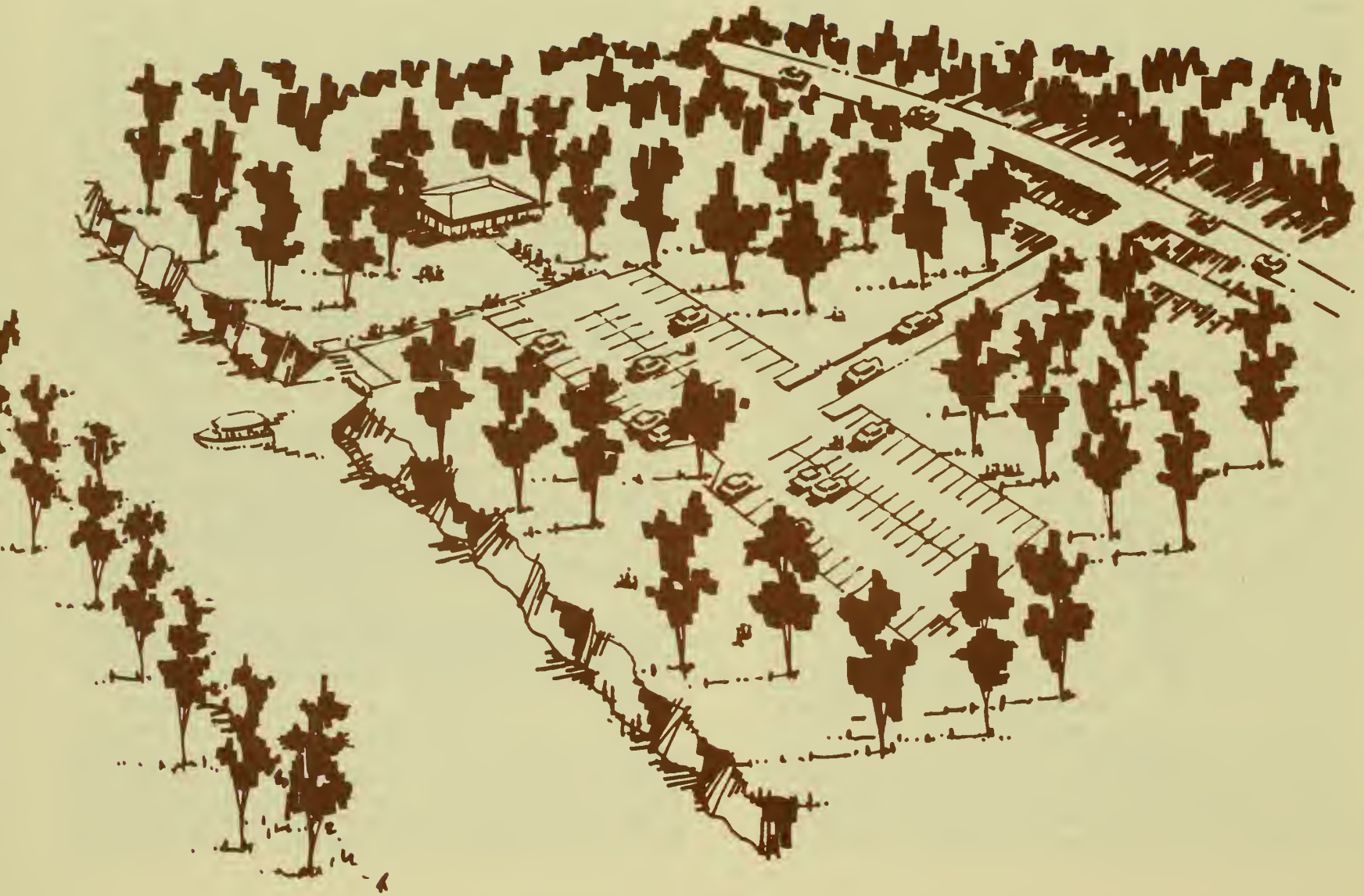
New facilities required for this expanded program include an interpretive/information center, maintenance area, one group camp, and an access system for the site. The interpretive/information center would be the focus of the educational programs for site visitors and planned to accomodate from 50,000 to 100,000 visitors per year. Orientation information would be distributed here. The information would include a brief description of the site and of the type of activities provided. The administrative office of the park would move from the temporary location at the Bull Boulevard entrance to the interpretive center. All wilderness camping reservations will be handled through this new office. All exhibits and audio-visual presentations will be housed in this facility, and interpretive trails would emanate from the center and extend into the Gum-Cypress forest. Guided tours along the interpretive trail would be organized regularly as part of the experience offered at the center. In coordination with the center, a group camp will be provided for visiting organizations who wish a more personalized and in-depth study of the Park. The camp would accomodate a group of fifty people or less and have the same facilities that are provided in the wilderness camping area. Also, a maintenance area for storage and minor repair of equipment will be located within the immediate vicinity of the center.

Access to the interpretive center could be developed several ways. Either a canal crossing could be designed or a road along the west bank of the canal could be developed from S. R. 1221. Present policy by the Army Corps of Engineers prohibits construction of any permanent bridge across the canal which has an elevation less than 65 feet above the water level of the canal. Other crossing structures must be movable, and when not in use, cannot infringe on the existing canal width. Drawbridge, barge, or swinging bridge would be acceptable crossing techniques. Several design schemes have been developed which illustrate different access techniques. Each scheme will have different program requirements that directly affect the provision of facilities for the interpretive program. The schemes take advantage of different policy variables to produce the previously described interpretive program.

Design Scheme #1

Design Scheme #1 assumes that the Division of Travel and Promotion and the Department of Transportation are able and willing to cooperate with the Division of Parks and Recreation in the location and coordination of a welcome center, highway rest area, and canal crossing to the interpretive center. Tentative plans by Transportation, and Travel and Promotion locate a rest area and welcome center along U. S. 17 near the N. C./Virginia border. Also, the Department of Transportation is currently planning the upgrading of U. S. 17 to a primary highway. With those plans in mind, Scheme #1 recommends that these facilities be coordinated in one area so that each agency will benefit from the other's presence.

A welcome center would be located west of the north and southbound traffic lanes, and a rest area for highway travelers would also be provided. A restroom facility and picnic area are functions of such a rest area. Across the canal from this complex, the interpretive center for the State Park would be located. In this respect, the welcome area



would become the means for establishing access to the park; and the park would serve as the attraction for the welcome area. This situation produces a multi-use area for the visitor. He can stop for information, or refreshment, or to visit a State Park.

The use of this complex based upon the traffic projection of the highway, indicates that a maximum of two hundred parking spaces will be needed. Fifty spaces will be required for those visitors who only use the welcome center and rest area, approximately a thirty minute stay. One hundred parking spaces will be provided for visitors who would picnic or visit the interpretive center or both. A maximum of ten trailer and twenty truck parking spaces will also be provided. In order to provide for wilderness campers who would begin their journey from the interpretive center, a minimum of ten spaces will be provided. Depending on the success of the wilderness camping program, future plans should allow for doubling of the parking accommodations.

Approximate visitation figures per day would average four-hundred people during peak seasons in the spring, summer, and fall months. Tourist as well as group use should account for a major portion of the area's use. Hopefully, in the near future, the Swamp will become a drawing card able to expand its appeal to a larger population.

With a projected visitation of four-hundred people per day, an interpretive building of approximately 5,000 square feet should be provided. Areas for laboratory, reference, and administrative work should be given space within the building. In order to accommodate group activities, space for exhibits, lectures and other meetings should be incorporated into the layout. Additional space could be added for nature craft activities if the demand indicates. Of course other functional requirements for toilet, utility, and storage facilities are included in the initial area requirements.

The interpretive trails related to the center should be one-half mile in length. The trails should be self-guiding and should illustrate different themes. One trail should describe the existing vegetation types unique to a Gum-Cypress forest. Another trail should relate and illustrate management practices used to preserve the Swamp. Still another trail could show and describe places and practices used by predecessors of the swamp to extract its resources. The trails could remain separate or combinations could be designed according to convenience. However, they should not require more than 45 minutes to walk, approximately a one-half mile trip.

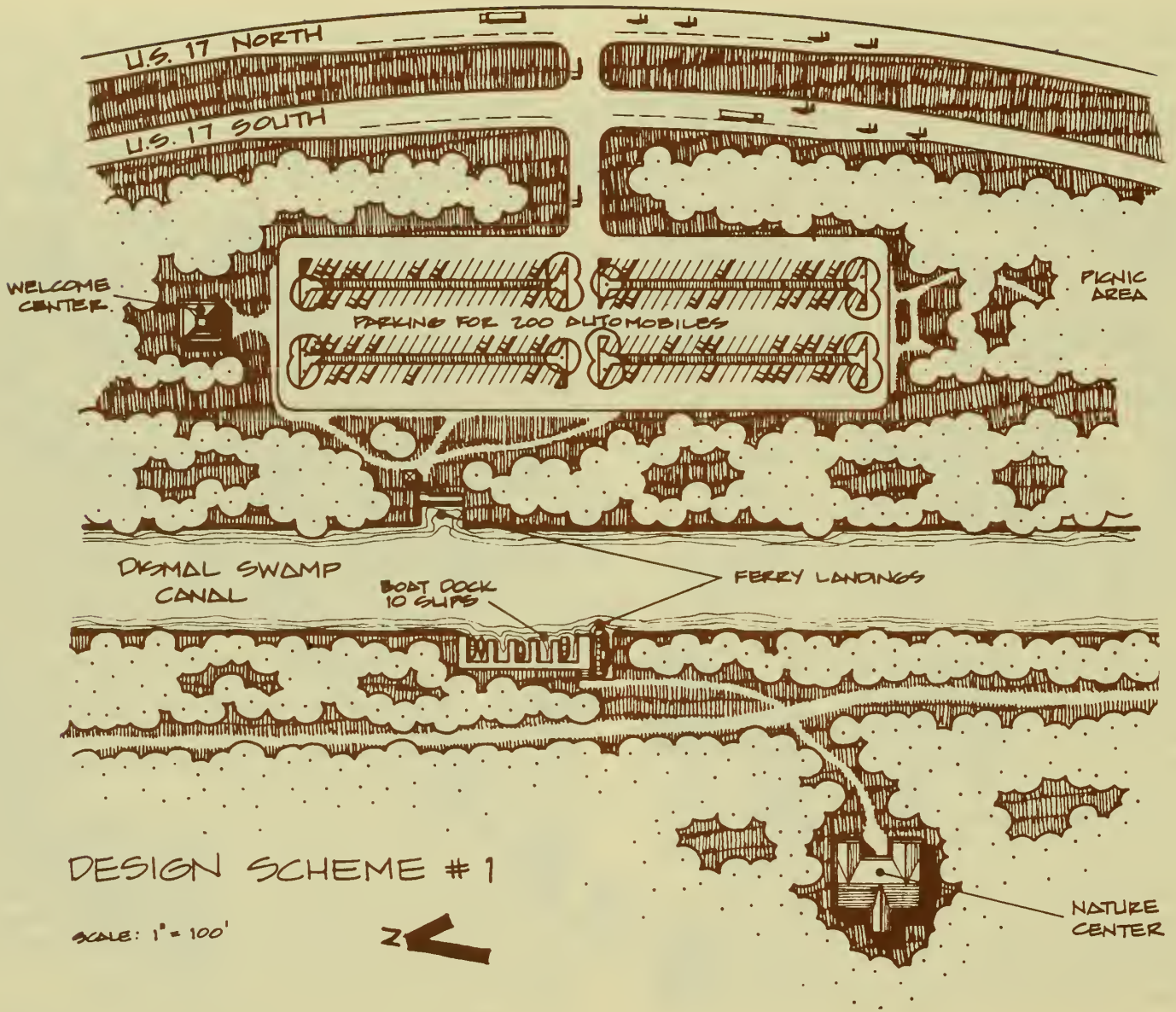
In order to make the trails accessible to the general public in an area where intermitant standing water is present, they need to be elevated on an all-weather permanent surface. For this reason, elevated wooden walkways have been suggested for this type situation. These walkways, a minimum of five-feet wide, will allow handicapped and wheelchair, as well as elderly, individuals to visit the site.

Public access to the interpretive center will be provided by a boat ferry. Once the visitor exits off U. S. 17, pedestrian access to all activities including the ferry is available. The site will also take advantage of boat access from the canal to locate a dock in coordination with the ferry landing. A ten slip dock for boats eighteen-feet or less will be provided to encourage use of the site by boat enthusiasts who are also interested in exploring the swamp. The boat launching facilities provided in the North Carolina and Virginia should insure consistent use of the canal by water craft.

Management of the welcome center would be the responsibility of the Division of Travel and Promotion. Road maps as well as promotional information would be available here. A receptionist will be on duty seven days a week, eight hours every day. Interior janitorial maintenance would be provided by Travel and Promotion Division.

The Department of Transportation would assume responsibility for outdoor maintenance activities, garbage collection, lawn mowing, and policing of the grounds. Repair and maintenance of the restroom facility and picnic area would also fall within the duties of Transportation. Police protection would be sponsored by the N. C. Highway Patrol and by the Camden County Sheriff's Office.

State Parks would be responsible for providing a display and other background information about the character and


U.S. 17 NORTH
U.S. 17 SOUTH
WELCOME CENTER
PARKING FOR 200 AUTOMOBILES
PICNIC AREA
DISMAL SWAMP CANAL
BOAT DOCK 10 SLIPS
FERRY LANDINGS
NATURE CENTER
DESIGN SCHEME #1
SCALE: 1" = 100'
N

operation of the Park in the welcome center. The center and park should be advertised together on all road signs provided on U.S. 17. Park advertisement on public roads should begin along U.S. 158 near Morgans Corner and continue through South Mills on the northbound traffic lane. Identification for southbound traffic should begin at the N.C./Virginia border.

Once visitors cross on the ferry, they would become the responsibility of State Parks. The ferry service will be operated by State Park personnel; hourly trips across the canal will begin at 9:30 a.m. and end 6:30 p.m. that evening. This operation will run seven days a week, and will require one full-time and one part-time ferry operator.

Only one other addition to the proposed staff in Alternative #2 would be necessary. A new Ranger I would assist the Ranger/Naturalist with his previously described duties. Of course, additional supportive labor would be added as the need arises. The Ranger/Naturalist would assume responsibility for the interpretive programs related to the center. His activities would be directly supervised by the Chief Park Naturalist and park superintendent. Even at this last stage of development, a full-time park superintendent would not be needed. The Dismal Swamp and Merchants Millpond would still share a superintendent.

Design Scheme #2

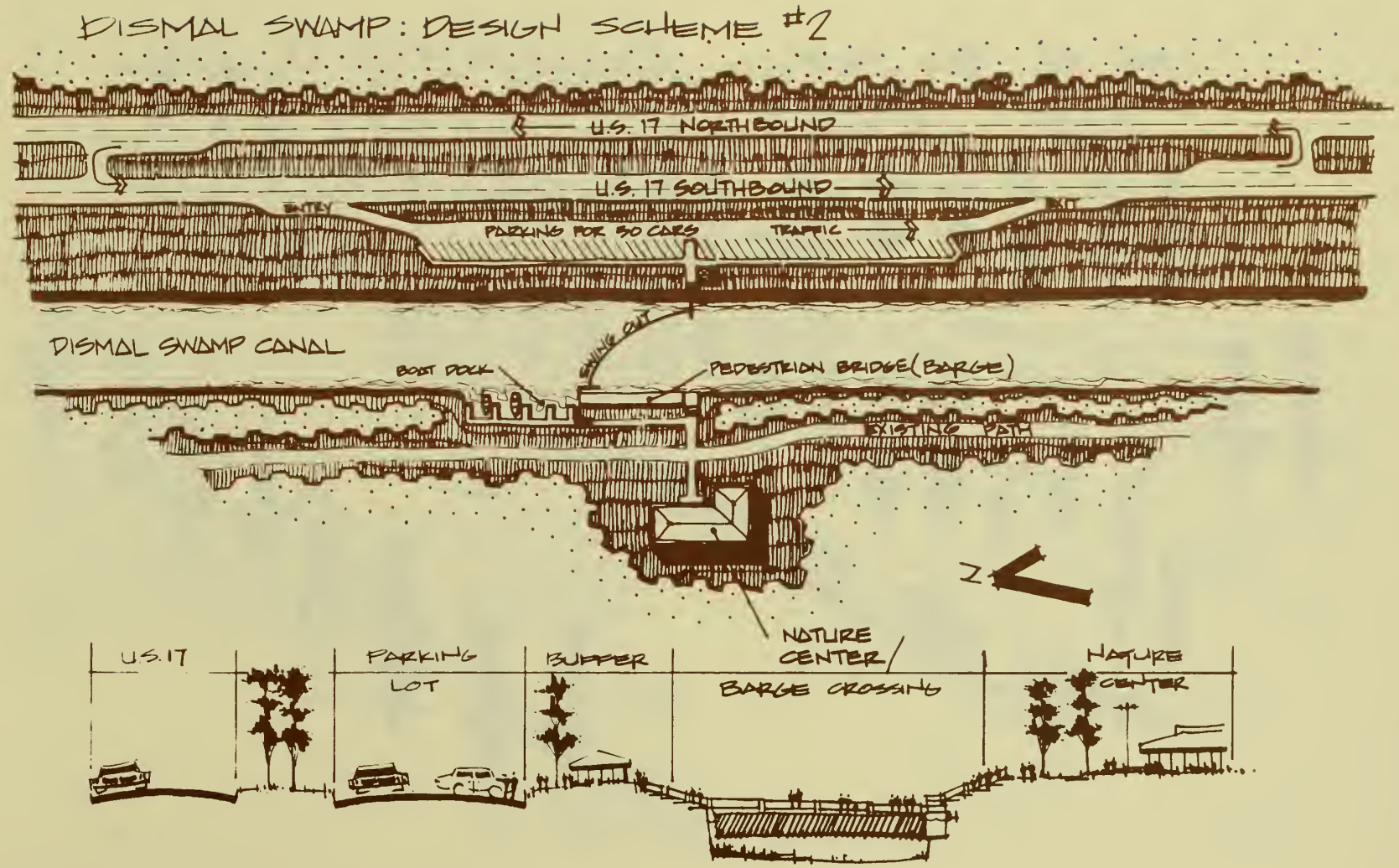
Assuming provision of a welcome center cannot be coordinated with the Department of Transportation, Design Scheme #2 suggests limited development east of the canal. A parking lot would be provided between the east bank of the canal and the southbound traffic lane of U. S. 17. Approximately ninety feet is available in this situation, therefore, a linear parking lot running parallel to the canal and highway is proposed. The lot would serve only interpretive center visitors and requires that access from both lanes of traffic from U. S. 17 be developed. Since the interpretive center would be the only attraction, the parking and spacial requirements for the interpretive program would be smaller than those proposed in Design Scheme #1. Projections indicate that from one to three hundred people per day would visit the facility. For this reason, an interpretive center with 1,600 square feet and a parking facility for fifty cars is proposed. The interpretive center would have space for a combined meeting and exhibit hall, a laboratory and reference room, an administrative office, and toilet facilities. The group camp would also be located in close relation to the center in order to accommodate overnite groups of fifty people or less.

The canal crossing would be negotiated by a barge placed on the west bank of the canal. The barge would swing across the canal to the east bank, so that visitors could easily walk the length of the barge to the opposite bank. Docks would be located on each bank to accommodate visitors getting on and off the barge. A ten slip boat dock will also be provided to take advantage of the current and projected small boat use in the canal. The dock will be of the same kind and character as the one requested in Design Scheme #1.

Management of the area will be the total responsibility of the Division of Parks and Recreation. Once the visitor exits off U. S. 17 into the parking lot, he will be the responsibility of Parks and Recreation. However, no additional personnel will be necessary beyond what was specified in Scheme #1. The ferry operator would have the responsibility for operating the barge crossing every two hours beginning at 9:30 a.m. and ending at 5:30 P.M. that evening.

Design Scheme#3

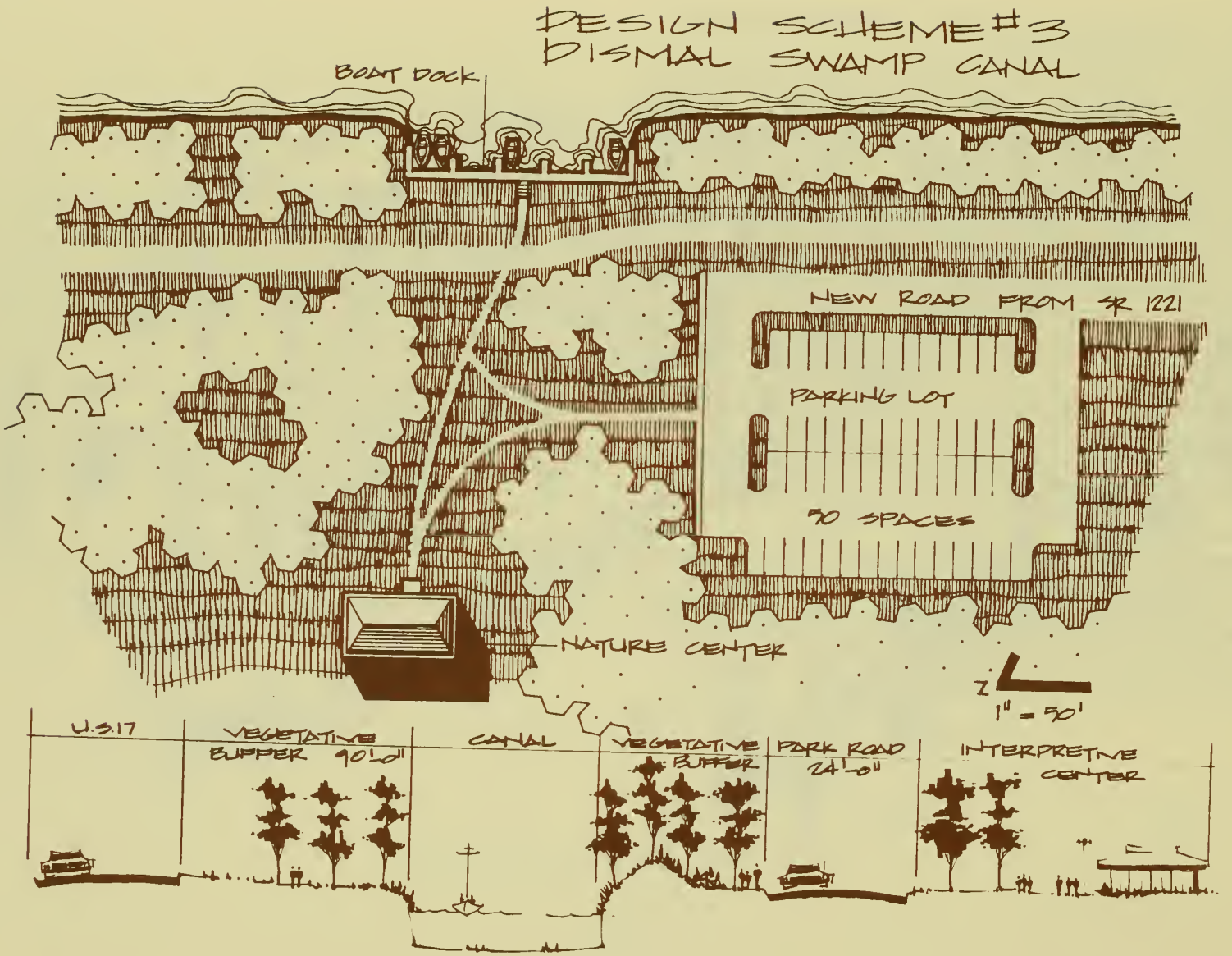
Access for Design Scheme #3 is provided by an all weather, hard-surface road located on the western bank of the Dismal Canal. The road begins at the termination of S.R. 1221 and extends northward to the proposed site of the interpretive center. In order to avoid any conflict with the canal, the alignment would not be placed less than sixty feet from the canal bank for this three mile section of park road. A right-of-way of 150 feet is recommended so that use along the road can be controlled. Since much of the road alignment is currently located on crop and forest land, the cost for the right-of-way should not be excessive. Ten thousand linear


DISMAL SWAMP: DESIGN SCHEME #2
U.S. 17 NORTHBOUND
U.S. 17 SOUTHBOUND
ENTRY
EXIT
PARKING FOR 50 CARS
TRAFFIC
DISMAL SWAMP CANAL
SWING OUT
BOOT DOCK
PEDESTRIAN BRIDGE (BARGE)
EXISTING PATH
N
U.S. 17
PARKING LOT
BUFFER
NATURE CENTER/ BARGE CROSSING
NATURE CENTER

feet of right-of-way would have to be purchased from S. R. 1221 to the State's property.

The park visitor would have to travel a minimum of five miles from U. S. 17 to the site. He would turn onto S. R. 1219 which is south of South Mills on U. S. 17. Traveling west on S. R. 1219, he would turn right on S. R. 1221 and travel four miles north to the interpretive center. Even though this is not a difficult route to follow, one cannot guarantee that the casual traveler or tourist will take the trouble to find the site. The use projections for Design Scheme #1 cannot be used for this final scheme. The program requirements must be adjusted to reflect the access constraints. For this reason, a minimal interpretive center of 1,600 square feet and parking for fifty vehicles is recommended. This projection estimates that a miximum of two hundred people per day will visit the interpretive center. Of course, the interpretive trails, group camp, and small boat dock that were specified in the earlier schemes would be incorporated in this plan as well. The interpretive facility would be comparable to the one described in Design Scheme #2, with limited space being given for exhibitions, laboratory work, and administrative duties.

Management of the site would be the sole responsibility of the Division of Parks and Recreation. A Ranger/Naturalist II and a Ranger I with seasonal attendants will be necessary to operate and maintain the park. Personnel requirements will be essentially the same as in the other two design schemes, except no ferry or barge operator is required.


DESIGN SCHEME #3
DISMAL SWAMP CANAL
BOAT DOCK
NEW ROAD FROM SR 1221
PARKING LOT
70 SPACES
NATURE CENTER
N
1" = 50'
U.S. 17
VEGETATIVE BUFFER 90'-0"
CANAL
VEGETATIVE BUFFER
PARK ROAD 24'-0"
INTERPRETIVE CENTER

INITIAL DEVELOPMENT INVESTMENTS

Phase #1 requires no development, only that access rights be required. Access cannot be denied to the State; however, other more suitable access points should be developed. If the U. S. Department of the Interior purchases the surrounding property, no further investment for land will be necessary.

Phase #2 would require minimal investment for the specified activities. Approximately forty thousand dollars would be required for the parking lot and temporary office. Dock construction for the Corapeake Outfall has been estimated at $30,000 for material and labor. If a minimum of two miles of elevated walkways were provided for the wilderness interpretive program, $50,000 would be requested. This figure could be reduced to half if the State Park used its own labor force. Clearing and grading for the hiking trails and wilderness camps will require park labor provided in the personnel description. Total development investment would cost a little over $100,000.

Depending on the type of access alternative chosen for the interpretive center, cost will vary a great deal for Phase #3. Design Scheme #1 requires $20,500 for the acquisition of ten acres of property for the welcome center. Parking lot and road modifications for the complex were estimated at $420,000 along with a minimum $75,000 for the welcome center/rest area building. An additional $60,000 would be necessary for a ferry and docking facility. The nature center prototype of this size would cost $100,000 for the building and site preparation. The interpretive trails, elevated wooden walkways, would cost at least $8,000 for every half mile trip. This cost only covers cost of materials; if a private construction firm did the work, labor would increase the cost two or three times above the cost of material. Total cost would exceed $700,000; however, it could be shared between three budgets; Department of Transportation, Division of Travel and Promotion, and Division of Parks and Recreation.

Design Scheme #2 requires $240,000 for road and median modification, and parking lot construction. The barge, and boat dock were estimated at a cost of $55,000; $20,000 for the barge and construction of the berth, and the remainder for the ten-slip boat dock. The smaller interpretive center would run about $40,000 and the elevated walkways would be the same as in Scheme #1. Total cost runs just under $400,000, with State Parks bearing the major portion of the cost. The Department of Transportation could only be asked to share a very small portion of the cost for road modifications.

Responsibility for Design Scheme #3 would rest entirely with the Division of Parks and Recreation. An additional $30,000 would be required for 10,000 linear feet of right-of-way for the proposed park road. Road development for this entrance was estimated at $980,000 for dredging, removal of spoil, fill material, and paving as well as for site preparation and grading. An additional $80,000 for the parking lot would be required. The interpretive center's and boat dock's costs would remain constant, $40,000 and $30,000 respectively. Total investment amounts to a little over $1,200,000 for development initiated by Parks and Recreation.

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