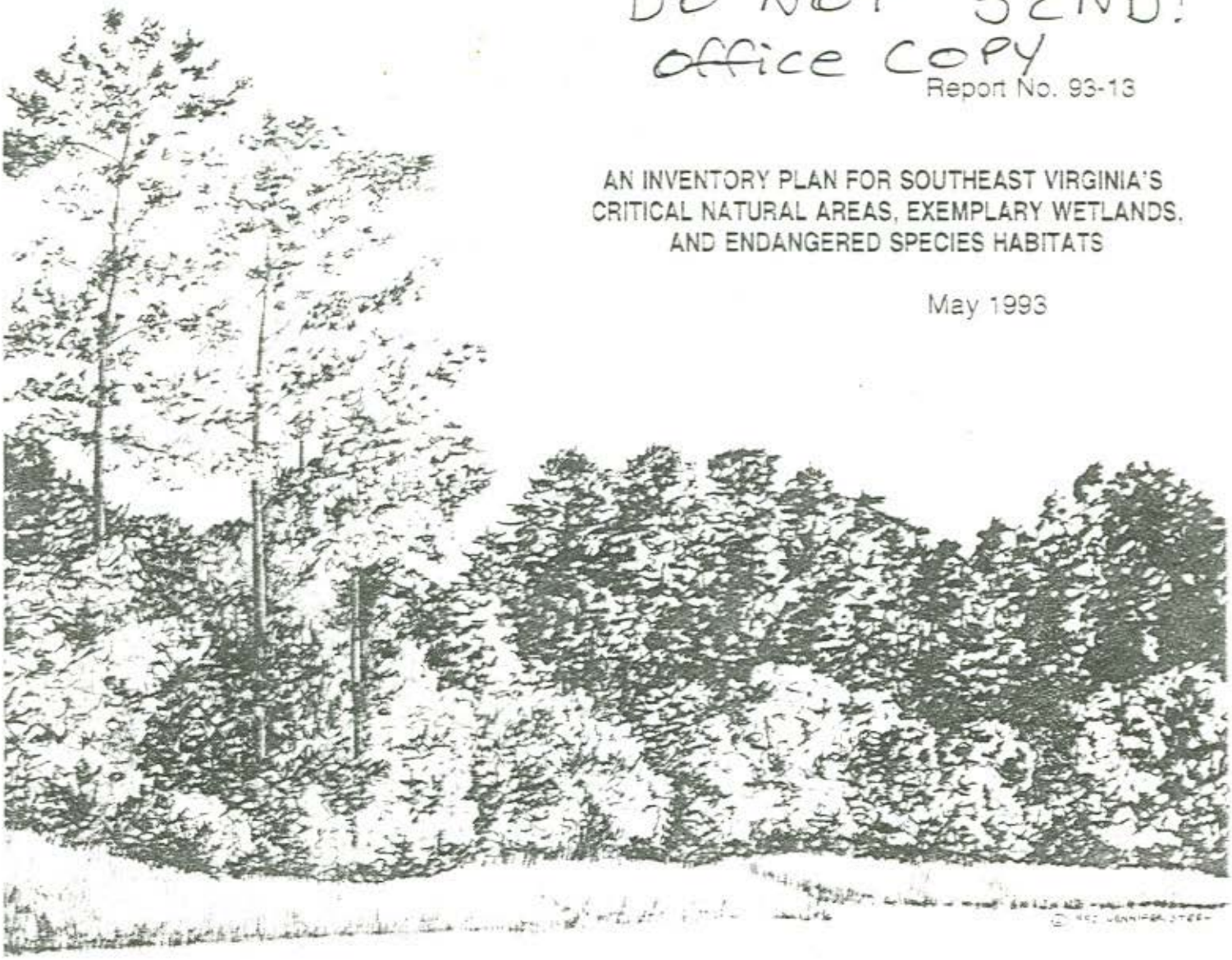
DO NOT SEND!
office COPY

Report No. 93-13

AN INVENTORY PLAN FOR SOUTHEAST VIRGINIA'S CRITICAL NATURAL AREAS, EXEMPLARY WETLANDS, AND ENDANGERED SPECIES HABITATS

May 1993



ALBEMARLE-PAMLICO ESTUARINE STUDY

NC Department of Environment, Health, and Natural Resources

Albemarle-Pamlico

Environmental Protection Agency National Estuary Program

AN INVENTORY AND PROTECTION PLAN FOR SOUTHEAST VIRGINIA'S CRITICAL NATURAL AREAS, EXEMPLARY WETLANDS, AND ENDANGERED SPECIES HABITATS

By:

Thomas J. Rawinski and Gary P. Fleming
Virginia Department of Conservation and Recreation
Division of Natural Heritage
1500 East Main Street, Suite 312
Richmond, VA 23219

"The research on which the report is based was financed in part by the United States Environmental Protection Agency and the North Carolina Department of Environment, Health, and Natural Resources, through the Albemarle-Pamlico Estuarine Study.

Comments of the publication do not necessarily reflect the views and policies of the United States Environmental Protection Agency, the North Carolina Department of Environment, Health, and Natural Resources, nor does mention of trades names or commercial products constitute their endorsement by the United States or North Carolina Government."

Albemarle-Pamlico Study Report No. 93-13 May, 1993

This report should be cited as follows:

Rawinski, T.J. and G.P. Fleming. 1993. An inventory and protection plan for southeast Virginia's critical natural areas, exemplary wetlands, and endangered species habitats. Albemarle-Pamlico Study Rep. No. 93-13, Raleigh. 200 pp.

ACKNOWLEDGEMENTS

Many people participated in this project. We thank them collectively and wish to acknowledge their individual contributions. Michael Lipford, Thomas L. Smith and Laura McKay deserve credit for planning the scope of the project and bringing needed conservation attention to this ecologically significant corner of Virginia. We also recognize the substantial contributions made by those field biologists who originally documented many of the rare species and communities, or conducted invaluable ecological research. This long list of individuals includes Ruth A. Beck, Byron Carmean, Roger de Rageot, Cecil C. Frost, Charles O. Handley, Jr., Alton M. Harvill, Jr., Richard L. Hoffman, Robert E. Jenkins, C. Barry Knisley, Gerald F. Levy, Joseph C. Mitchell, Lytton J. Musselman, Mitchell D. Norman, John F. Pagels, Christopher A. Pague, Christopher Plunkett, Sue Ridd, Robert K. Rose, Ronald Southwick, Donna M.E. Ware, Stewart Ware, Thomas F. Wieboldt, Gary Williamson, and Joan B. Wright. Dana S. Bradshaw was especially helpful in delineating Red-cockaded Woodpecker habitat. Sudi H. Sakurada provided a wealth of demographic information from University of Virginia's Center for Public Service.

We are grateful to Virginia Council on the Environment's Coastal Resources Management Program and the National Oceanographic and Atmospheric Administration for funding the 1991 natural heritage inventory in a portion of the study region. The 1991 inventory effort contributed greatly to our knowledge of the natural history of southeastern Virginia and allowed staff biologists to visit many more potential natural areas than otherwise would have be possible.

Randall G. Waite of the North Carolina Department of Environment, Health, and Natural Resources provided technical assistance and guidance to us during the study. Comments received from anonymous reviewers on an earlier draft of this report were very helpful.

Nearly everyone in the Department of Conservation and Recreation's Division of Natural Heritage assisted in some manner. In particular, Allen Belden and J. Christopher Ludwig each wrote a site description for the report. Sarah Holbrook served as proofreader and editor. Megan Rollins generated useful summary statistics from the DNH computer database. Caren A. Caljouw and Larry Smith reviewed the management and protection recommendations sections. Patricia Jarrell assisted with quarterly reports and financial affairs. Staff field biologists who endured thunderstorms, giant mosquitoes, and seed ticks in pursuit of prime natural areas were J. Christopher Ludwig, Kurt Buhlmann, Christopher A. Clampitt, Steve Roble, Allen Belden, Phil Stevenson, and Sarah Mabey. Faye McKinney was the glue which held this entire operation together, by securing vehicles, coordinating itineraries, and completing our travel expense reports.

EXECUTIVE SUMMARY

The Albemarle-Pamlico Estuarine Study region of southeastern Virginia encompasses approximately 10 percent of the state's land mass. It includes the Chowan River and Dismal Swamp drainage basins, and portions of the Coastal Plain and Piedmont physiographic provinces. An intensive field inventory was conducted to document this region's significant natural areas, wetlands, and endangered species habitats. The project was funded by the U.S. Environmental Protection Agency through the Albemarle-Pamlico Estuarine Study and the North Carolina Department of Environment, Health, and Natural Resources. The information provided in this report should assist land owners, land use planners, and other conservationists in protecting Virginia's biological and ecological diversity.

A total of 57 ecologically significant sites were documented from the region. The sites were prioritized according to their biological significance, described in detail, and mapped. Protection and management recommendations were prepared for each site and the region as a whole.

Significant natural areas in this part of Virginia are being destroyed or degraded at an alarming rate due to intensified land use activities such as wetland drainage, logging, agriculture, development, and, indirectly, human population growth. In the past, much of this impact was inadvertent because land owners simply were not informed of a site's ecological significance. This report should help prevent further inadvertent natural area destruction, and encourage land owners and land use planners to protect these vital irreplaceable resources.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS....ii

EXECUTIVE SUMMARY....iii

TABLE OF CONTENTS....iv

LIST OF FIGURES....vi

LIST OF TABLES....vi

INTRODUCTION/BACKGROUND....1
Virginia's Division of Natural Heritage....1
Natural Heritage Resources....1

PROJECT PROCEDURES....5

DATA SUMMARY/SITE REPORTS....7

Dix Bridge (Mecklenburg County)....12
Reekes Mill (Mecklenburg County and Lunenburg County)....15
Route 613 Flatrock Creek (Lunenburg County)....18
Nottoway River Falls (Lunenburg County and Nottoway County)....21
Long Branch Granite Flatrock (Nottoway County)....24
Whetstone Granite Flatrock (Nottoway County)....26
Great Creek Forest (Brunswick County)....29
Gasburg Granite Flatrock (Brunswick County)....32
Route 652 Granite Flatrock (Brunswick County)....36
Flatrock Branch (Brunswick County)....39
Dahlia Swamp (Greensville County)....42
Moonlight Railroad Swale (Greensville County)....45
Foxtail Bogs (Greensville County)....48
Emporia Mussel Site (Greensville County)....51
Emporia Powerline Bog (Greensville County)....54
Double Bridge (Greensville County and Sussex County)....57
Haleys Bridge (Greensville County and Southampton County)....60
Piney Grove (Sussex County)....63
Manry 604-606 (Sussex County)....66
Manry-Wakefield Site (Sussex County)....69
Sussex Schoolhouse (Sussex County)....72
Chub Sandhill (Sussex County)....75
Huske Flatwoods (Sussex County)....78
Stony Creek Town (Sussex County)....81
South Jarratt Meadows (Sussex County)....84
Nottoway Bluffs (Sussex County and Southampton County)....87
Assamoosick Sandhills (Southampton County)....91
Round Gut Sandhill (Southampton County)....94
Pleasant Pines (Southampton County)....97
Blackwater Cedar Swamp (Southampton County)....100
South Quay Pine Barrens (Suffolk City)....103

Balm of Gilead Flatwoods (Suffolk City).....109
Disputanta (Prince George County).....112
Blackwater River - Below Route 603 (Surry County and Sussex County).....115
Blackwater River - Above Route 620 (Isle of Wight County).....117
Zuni Macrosite
  South Zuni Sandhills (Isle of Wight County).....119
  Antioch Swamp Barrens (Isle of Wight County).....122
  Blackwater Ecologic Preserve (Isle of Wight County).....125
  Horse Swamp Barrens (Isle of Wight County).....128
Route 618 Pine Barrens (Isle of Wight County).....131
Cat Ponds (Isle of Wight County).....134
Muddy Cross Ponds (Isle of Wight County).....137
Northwest River Macrosite
  Upper Section (Chesapeake City).....140
  Northwest River Park (Chesapeake City).....143
  Southwestern Marshes (Chesapeake City).....146
  Smith Creek (Chesapeake City).....149
Dismal Swamp Macrosite
  Great Dismal Swamp National Wildlife Refuge (Chesapeake & Suffolk Cities)..152
  Northwest Section (Chesapeake City and Suffolk City).....157
  Smith Ridge (Chesapeake City).....160
Seashore State Park and Natural Area (Virginia Beach City).....163
False Cape State Park (Virginia Beach City).....167
North Landing River Macrosite
  Southern Marshes (Virginia Beach City).....172
  North Landing River Natural Area Preserve (Virginia Beach City).....175
  North Pocosin (Virginia Beach City).....178
  West Neck Creek (Virginia Beach City).....182
  North Pocaty (Chesapeake City).....185
  Gum Swamp (Chesapeake City and Virginia Beach City).....188

DATA ANALYSIS.....191

CONCLUSIONS/DISCUSSION.....195

RECOMMENDATIONS.....196

REFERENCES.....198

APPENDICES.....200

LIST OF FIGURES

1. Map of the entire Albemarle-Pamlico Estuarine Study region in Virginia showing the Coastal Resources Management Program region investigated in 1991.....2

2. Index of Virginia U.S.G.S. quadrangles (topographic maps) encompassing the Albemarle-Pamlico Estuarine Study region.....3

3. The rare plant, Small's stonecrop (Diamorpha smallii), growing at Gasburg Granite Flatrock.....35

4. Endangered long-leaf pine barren.....108

5. Low pocosin vegetation found along the North Landing River.....181

LIST OF TABLES

1. Definition of Natural Heritage state rarity ranks (S-ranks).....4

2. U.S. Fish and Wildlife Service species status codes, with abbreviated definitions.....6

3. Area, percent forest land, and natural heritage resource occurrences of APES region municipalities.....192

4. Area of non-reserved timberland, by municipality and ownership class.....193

5. Estimates of the human population in the APES region municipalities, 1988.....194

INTRODUCTION/BACKGROUND

In May 1991 the Virginia Department of Conservation and Recreation, through its Division of Natural Heritage, was contracted by the Virginia Council on the Environment's Coastal Zone Resources Management Program to conduct a natural heritage inventory in the southeastern Virginia counties of Prince George, Surry, and Isle of Wight, and the cities of Chesapeake, Suffolk, and Virginia Beach. This work contributed to the Albemarle-Pamlico Estuarine Study (APES) by addressing the issue of natural area preservation and conservation, as drafted in the Albemarle-Pamlico Comprehensive Conservation Management Plan. Field work was conducted throughout the 1991 field season and a final report prepared (Rawinski and Ludwig 1992).

In December 1991 the Department of Conservation and Recreation entered into a contractual agreement with the North Carolina Department of Environment, Health and Natural Resources to complete a natural heritage inventory for the entire APES region of southeastern Virginia, an area encompassing the Virginia portions of the Chowan River and Dismal Swamp drainage basins (Figures 1 and 2). This project was funded by the United States Environmental Protection Agency through the Albemarle-Pamlico Estuarine Study. The region covers 4,273 square miles, which is approximately 10% of Virginia's land mass. The primary goal of the project was to identify important rare species sites and exemplary natural communities, with a particular emphasis on wetland habitats. The present report summarizes inventory results, and includes management and protection recommendations for individual sites and for the region as a whole. The project complements similar inventory efforts recently conducted in the APES region of North Carolina (Frost et al. 1990, LeGrand et al. 1992, Smith et al. 1993).

Virginia's Division of Natural Heritage

The Virginia Natural Area Preserves Act of 1989 (§10.1-209 et seq. of the Code of Virginia) directs the Department of Conservation and Recreation to "preserve the natural diversity of biological resources of the Commonwealth." The Act further establishes the Virginia Natural Heritage Program (now called the Division of Natural Heritage) and requires the Department to develop a natural heritage plan, produce an inventory of the Commonwealth's natural heritage resources, maintain a natural heritage data bank of inventory data, and provide for the protection and stewardship of natural areas. The Division of Natural Heritage fulfills this mandate as the Commonwealth's principal collector and manager of data on natural heritage resources: "the habitat of rare, threatened, or endangered plant and animal species, rare or state significant natural communities or geologic sites, and similar features of scientific interest" (§10.1-209 of the Code of Virginia). The Division of Natural Heritage is part of a network of 84 natural heritage data centers.

Natural Heritage Resources

Most natural heritage resource have assigned status ranks which indicate relative rarity or status (Table 1). The primary criterion for ranking natural heritage resources is the number of extant occurrences, i.e. the number of known distinct localities or populations. Other important ranking

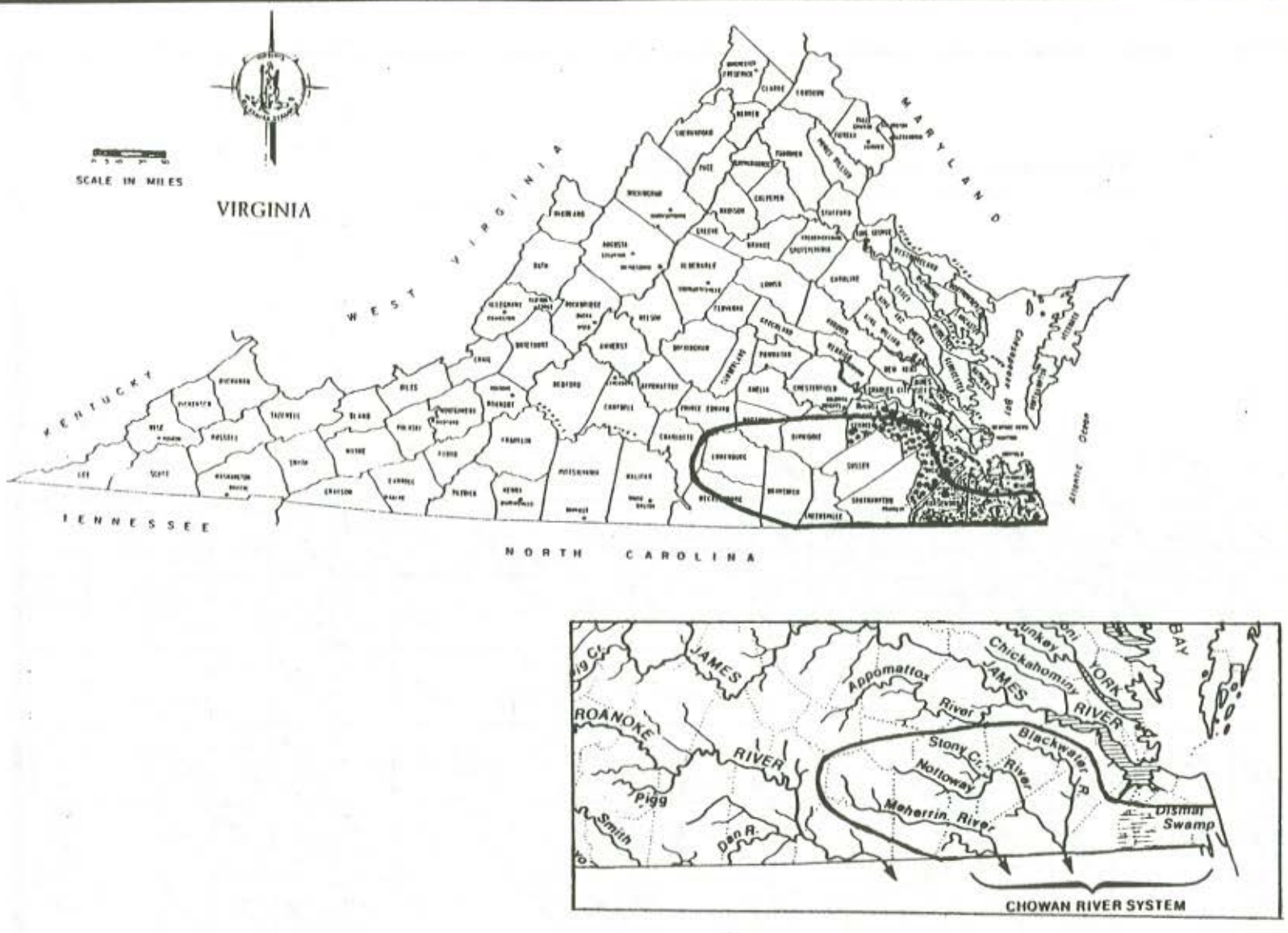
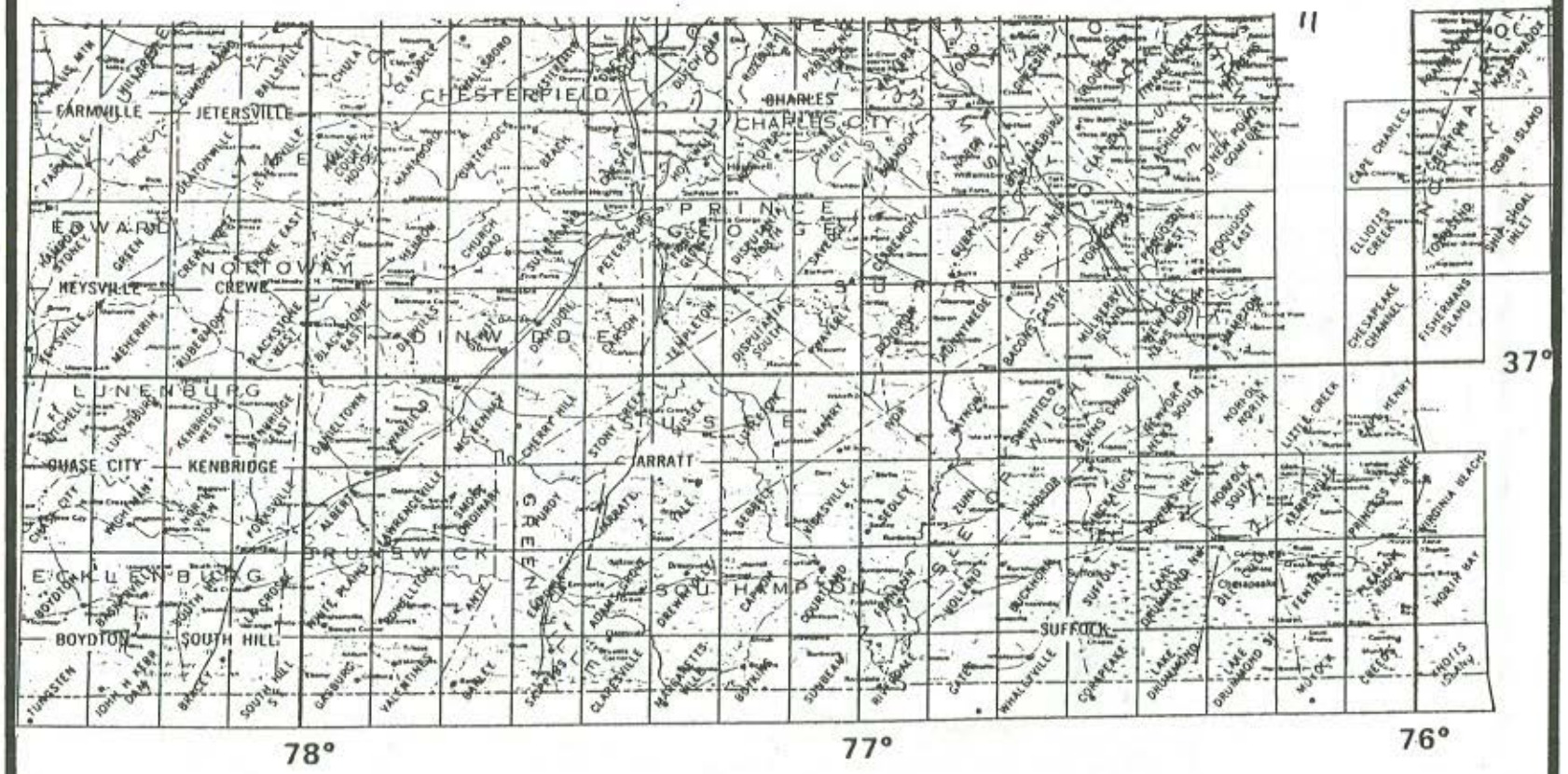


Figure 1. Map of the entire Albemarle-Pamlico planning region in Virginia, showing the Coastal Resources Management Program region investigated in 1991 (shaded area).

Virginia Index



North Carolina

Figure 2. Index of Virginia U.S.G.S. quadrangles (topographic maps) encompassing the Albemarle-Pamlico Estuarine Study region.

Table 1. Definition of Natural Heritage state rarity ranks (S-ranks). Global ranks (G-ranks) are similar, but are based on range-wide status. Ranks for most community types have not been generated due to on-going community classification efforts. The S and G ranks should not be interpreted as legal designations.

S1	Extremely rare; usually 5 or fewer occurrences in the state; or may have few remaining individuals; often especially vulnerable to extirpation.
S2	Very rare; usually between 5 and 20 occurrences; or with many individuals in fewer occurrences; often susceptible to becoming endangered.
S3	Rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
S4	Common; usually >100 occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.
S5	Very common; demonstrably secure under present conditions.
SA	Accidental in the state.
SH	Historically known from the state, but not verified for an extended period, usually >15 years; this rank is used primarily when inventory has been attempted recently.
SN	Regularly occurring migrants or transient species which are non-breeding, seasonal residents. (Note that congregation and staging areas are monitored separately).
SU	Status uncertain, often because of low search effort or cryptic nature of the element.
SX	Apparently extirpated from the state.

NOTE: Sometimes ranks are combined (e.g. S1S2) to indicate intermediate or somewhat unclear status. Elements with uncertain taxonomic validity are denoted by the letter, Q, after the global rank.

criteria are the number of individuals at each locality, the total number of individuals state-wide, the condition of the occurrences, the number of protected occurrences, and threats. The "S-ranks" (subnational/state) apply specifically to Virginia; global ranks, or "G-ranks", reflect status on a global scale.

Subspecies and varieties are assigned "T-ranks" in addition to their G-rank. Taken together, these ranks give an instant picture of the rarity of the natural heritage resource. S-ranks and G-ranks for community-types are provisional, or in some cases lacking, due to on-going efforts to classify the community taxa. Rarity ranks used by the Division of Natural Heritage are not legal designations, and they are continuously updated to reflect new information.

The U.S. Fish and Wildlife Service (USFWS) is responsible for the listing of endangered and threatened species, under the Endangered Species Act of 1973, as ammended. Federally listed species (including subspecific taxa) are afforded a degree of legal protection under the Act, and therefore sites supporting these species need to be highlighted. USFWS also maintains a review listing of potential candidate endangered or threatened taxa. Table 2 illustrates the various status categories used by USFWS. The status category of candidate species is based largely on the Service's current judgement of the possible vulnerability of each species.

In Virginia, two acts have authorized the creation of official state endangered and threatened species list. One act, administered by the Virginia Department of Game and Inland Fisheries, authorized listing of fish and wildlife species. The other act, administered by the Virginia Department of Agriculture and Consumer Services, allows for listing of plant and insect species. In general, these acts prohibit or regulate taking, possessing, buying, selling, transporting, exporting or shipping of any endangered or threatened species appearing on the official lists. Species protected by these acts are indicated as either listed endangered (LE) of listed threatened (LT).

The landscape unit that supports a particular natural heritage resource is called an element occurrence. The Division of Natural Heritage has mapped over 7000 element occurrences in the Commonwealth. Information on the location and quality of these element occurrences is computerized within the Division's Biological and Conservation Data System (BCD), and additional information is recorded on maps and in manual files. Each element occurrence is ranked to differentiate large, outstanding occurrences from the small, vulnerable ones. Species occurrences are ranked in terms of quality, condition, viability, and defensibility. Community occurrences are ranked by their size and overall natural condition. Element occurrence ranks range from A (excellent) to D (poor). Sometimes these ranks are combined to indicate somewhat unclear or intermediate status, e.g. AB, or CD, etc. Element occurrence ranks reflect the current condition of the species population or community. A poorly-ranked element occurrence can, with time, become highly-ranked as a result of successful management or restoration.

Table 2. U.S. Fish and Wildlife Service species status codes, with abbreviated definitions.

LE	listed endangered
LT	listed threatened
PE	proposed to be listed as endangered
PT	proposed to be listed as threatened
S	synonyms
1	status data is in support to list taxa as endangered or threatened, or taxa possibly already extinct
2	evidence of vulnerability, but insufficient status data exists, or taxa possibly already extinct
3A	persuasive evidence exists that taxa are extinct
3B	names that do not represent distinct taxa, according to recent published revisions and monographs
3C	taxa proven to be more abundant or widespread than previously believed and/or those that are not subject to any identifiable threat

Element ranks and element occurrence ranks form the basis for ranking the significance of entire sites. Site biodiversity ranks (B-ranks) are used to prioritize protection efforts among the sites. Five B-ranks are defined as follows.

B1 Outstanding Significance: only site known for an element, an excellent occurrence of a G1 species, or the world's best example of a community type.

B2 Very High Significance: excellent example of a rare community type, good occurrence of a G1 species, or excellent occurrence of a G2 or G3 species.

B3 High Significance: excellent example of any community type, good occurrence of a G3 species.

B4 Moderate Significance: good example of a community type, excellent or good occurrence of state-rare species.

B5 General Biodiversity Significance: good or marginal occurrence of a community type, or state-rare species.

Note: Sites supporting rare subspecies or varieties are considered slightly less significant than sites supporting similarly ranked species.

PROJECT PROCEDURES

Division of Natural Heritage (DNH) staff approach natural heritage inventories in a systematic and prioritized manner. In general, the most threatened geographical areas, habitats, and species receive inventory priority. The inventory is conducted in six stages:

1) Review of aerial photographs and maps. Aerial photographs of the entire survey area are reviewed in detail to identify potential natural areas (PNAs) to be studied in the following stages. Where possible, both the oldest available photographs and the most recent ones are studied. Comparing these two sets of photographs helps determine how long forests and other vegetation types have been in their current condition. To aid in their interpretation, the photographs are compared with topographic, wetlands, and soils maps.

2) Gathering existing information. Museum collections are visited by DNH staff, and specimen label information is recorded for rare species. Published and unpublished information on natural areas in the inventory area is collected and assimilated in conjunction with the review of aerial photographs. Maps of public lands (federal, state and local) within the survey area are gathered, and the distribution of natural heritage resources is examined. Local naturalists, soil conservationists, foresters, and college faculty are consulted for additional information. During this stage, some potential natural areas are eliminated from further consideration while others are added.

3) Aerial reconnaissance. Selected potential natural areas are studied in more detail by aerial reconnaissance using small aircraft. Typically, this is done in the early spring or late fall when the ground is visible through the trees. Flights are especially useful in the rapidly changing landscape of southeastern Virginia. Flying allows the quick review of many tracts that would take days to visit by car and on foot. The primary goal of this stage is to eliminate from consideration the sites that have been recently destroyed, and to begin prioritizing the remaining sites for on-the-ground survey.

4) Initial ground survey. During the initial ground survey, ownership information is verified, conspicuous element occurrences are documented, land use activities are described, and if necessary, follow-up visits are planned.

5) Thorough inventory of the site. During this stage, detailed information is collected on the rare species or exemplary natural community present at a site. Portions of a site not visited on foot are evaluated on the basis of aerial photographs and other information. The area of land needed to protect the special biological features is determined. Threats and past or present disturbances are also noted. Element occurrence data are transcribed onto DNH maps, and entered into the BCD databases.

6) Compilation of results and preparation of final report. As fieldwork is completed, DNH biologists review the information gathered and rank sites according to their ecological significance. Maps are drawn showing preliminary conservation planning boundaries. Protection and management recommendations are written, and site descriptions are combined into a final report.

DATA SUMMARY/SITE REPORTS

Results of the natural heritage inventory are presented in 57 detailed site reports, arranged by county or city. In some cases, sites are grouped into larger landscape units (macrosites) to reflect that each component site is part of a larger ecosystem. The following reporting format was used:

SITE NAME: Most site names reflect a geographic locality or the prevalent type of vegetation.

SIZE: The approximate acreage in the conservation planning boundary.

BIODIVERSITY RANK: The overall significance of the natural area in terms of the rarity of the natural heritage resources and the quality of their occurrences. As described earlier, these ranks range from B1 (outstanding significance) to B5 (general biodiversity significance).

LOCALITY: The city or county.

QUADRANGLE AND QUADRANGLE CODE: The name of the USGS 7.5' quadrangle(s), otherwise known as topographic maps, on which the site occurs. The first five digits of the quadrangle code represent latitude and longitude (in degrees) of the quadrangle, which helps locate the map on the Virginia index (Figure 2).

LOCATION: Specific information on site location and directions to the site.

NATURAL HERITAGE RESOURCE SUMMARY TABLE: A synopsis of the natural heritage resources (rare species habitats and significant communities), together with their and their status ranks (global, state, U.S. Fish and Wildlife Service, and Virginia legal) and occurrence ranks.

SITE DESCRIPTION: A brief narrative describing the site, its significant elements, vegetation, habitat, and current land use.

BOUNDARY JUSTIFICATION: The preliminary conservation planning boundary delineated in this report includes all known occurrences of natural heritage resources and the adjacent lands required for their immediate protection. This information field explains the basis for particular boundaries.

THREATS: Potential threats to the site and its natural heritage resources. The threats listed for each site are not necessarily imminent. Rather, they are listed to illustrate the types of land use activities and factors likely to have the most deleterious impacts on the natural heritage resources.

MANAGEMENT RECOMMENDATIONS: A summary of the major issues and factors that should be considered in management of the site for its natural heritage resource values.

CURRENT STATUS: A summary of ownership and the degree of protection.

PROTECTION RECOMMENDATIONS: The desired level of protection actions needed.

REFERENCES: Pertinent literature.

SITE MAP: The site map shows the conservation planning boundary which contains all known element occurrences and the land determined to be important for the long-term maintenance of these elements. The following factors are considered when drawing these boundaries:

- the extent of current and potential habitat for rare species and exemplary natural communities,
- species movement and migration corridors,
- maintenance of surface water quality within the site and the surrounding watershed,
- maintenance of the hydrologic integrity of the groundwater, i.e. protecting soligenous wetlands requires that upslope groundwater recharge sites and sufficient buffer be maintained to ensure the quality and quantity of the groundwater seepage,
- land intended to mitigate a wide variety of off-site impacts,
- land or activities necessary to preclude or minimize invasive exotic species, and

- land necessary for management activities, such as prescribed burning.

The boundaries are intended for conservation planning purposes, and, at the very least, should prevent the inadvertent destruction of the natural areas. Many rare species are sensitive to disturbance, or may be sought out by collectors. Therefore, precise element locations within site boundaries are not given in this report. Virginia law includes natural heritage resources under a limited exemption to the requirements of the Freedom of Information Act.

The individual site reports focus on the most significant natural areas in the region, and consequently the less significant sites (such as those supporting roadside populations of globally-secure, state-rare species) are intentionally excluded. Not all of the potential natural areas in the region were field checked, so future discoveries of significant natural areas should be expected, particularly in western Suffolk.

SITE REPORTS

DIX BRIDGE FOREST

SIZE: ca. 73 acres **BIODIVERSITY RANK:** B3

LOCALITY: Mecklenburg County

QUADRANGLE: Forksville **QUADRANGLE CODE:** 3607871

LOCATION: The site lies one mile south-southeast of Dix Bridge. It encompasses a forested slope on the north side of Route 1, 0.5 mile west of the Mecklenburg - Brunswick County line.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
COLLINSONIA VERTICILLATA	WHORLED HORSE-BALM	G2G3	S1	-	-	B

SITE DESCRIPTION: On May 20, 1939 J.T. Baldwin, Jr. collected from this general area a specimen of whorled horse-balm (Collinsonia verticillata), a globally rare plant species. In 1986 Charles E. Stevens rediscovered the horse-balm, and in 1992 at least 200 plants were seen here. The horse-balm grows in a deciduous forest comprised of tulip poplar (Liriodendron tulipifera), white oak (Quercus alba), beech (Fagus grandifolia), and hickory (Carya spp.). Understory herbs such as black bugbane (Cimicifuga racemosa) and perfoliate bellwort (Uvularia perfoliata) indicate moderately fertile soils, especially in the ravine bottoms.

BOUNDARY JUSTIFICATION: The boundary includes the rare plant population and the upslope lands needed to maintain the colluvial processes which create fertile soils and habitat for the horse-balm. A small amount of land south of Route 1 is included as potential habitat for the species and as buffer.

THREATS: Primary threats are logging, development, and highway expansion/improvement. A nearby population of the whorled horse-balm was evidently destroyed by logging. Development threats are severe because the site lies between major highways, I 85 and Route 1.

MANAGEMENT RECOMMENDATIONS: Very little is known about the life history and specific habitat requirements of whorled horse-balm. Autecological studies are needed so that successful management prescriptions can be formulated.

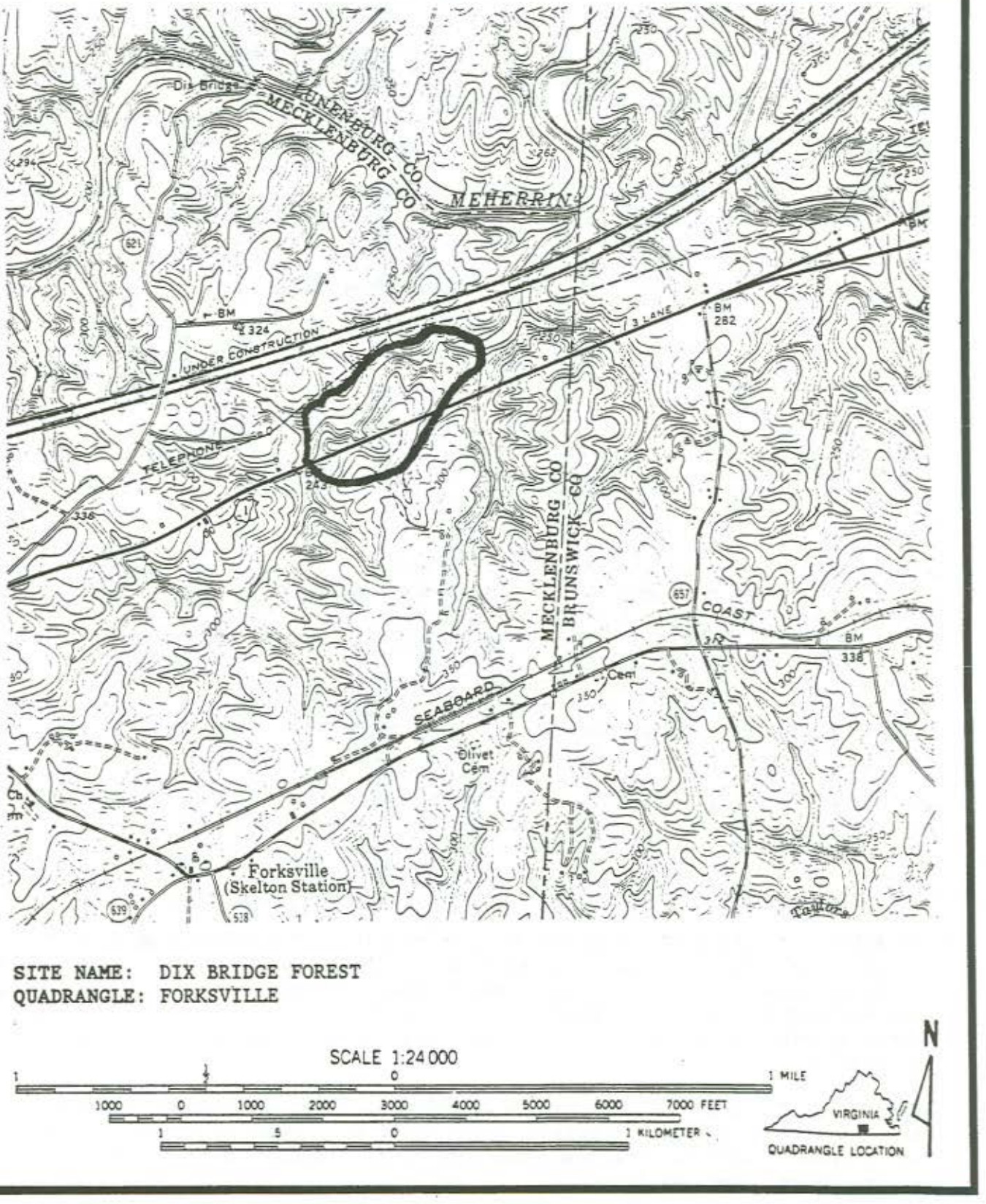
CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site is certainly worthy of protection because the whorled horse-balm is considered globally rare.

REFERENCES:

Baldwin, J.T., Jr. 1969. Micheliella verticillata in Virginia. Castanea 34:438.

Porter, D.M. 1991. Whorled horse-balm Collinsonia verticillata Elliot. Pages 139-140 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: DIX BRIDGE FOREST
QUADRANGLE: FORKSVILLE

REEKES MILL

SIZE: ca. 498 acres **BIODIVERSITY RANK:** B2

LOCALITY: Mecklenburg County and Lunenburg County

QUADRANGLE: Wightman **QUADRANGLE CODE:** 3607873

LOCATION: The site is centered at Reekes Mill and includes both the North Meherrin River and the South Meherrin River upstream of their confluence.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
animals:						
FUSCONAIA MASONI	ATLANTIC PIGTOE	G2	S2	2	LT	B
LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL	G4	S2	2	-	C
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	G5	S2	-	-	D

SITE DESCRIPTION: The south Meherrin River in the vicinity of Reekes Mill is a shallow stream with gravel beds, sand bars, and pools as deep as four feet. Above the river, forested slopes are dominated by oaks (Quercus sp.) with thick stands of mountain laurel (Kalmia latifolia) in the shrub layer. There is a report of an unusual conifer (hemlock?) from the area. Freshwater mussels are of greatest significance. Three rare species are present, including the globally rare Atlantic pigtoe (Fusconaia masoni). The full extent of the rare mussel populations needs to be determined. The entire site is undisturbed and scenic. Reekes Mill has long been abandoned.

BOUNDARY JUSTIFICATION: The boundary encompasses the known extent of rare mussel habitat along the South Meherrin River plus a limited section of potential habitat along the North Meherrin River. The boundary includes the upland forested slopes to protect the stream habitat and mussels from incompatible land development in the immediate area.

THREATS: Threats include major watershed perturbations such as new dams, accelerated ditching or deforestation, point-source pollution, and large-scale water withdrawal. Such activities would likely degrade water quality or alter the river's natural flow regime. Mussels require certain fish hosts for their early growth, so changes in the fishery could directly affect the mussel populations.

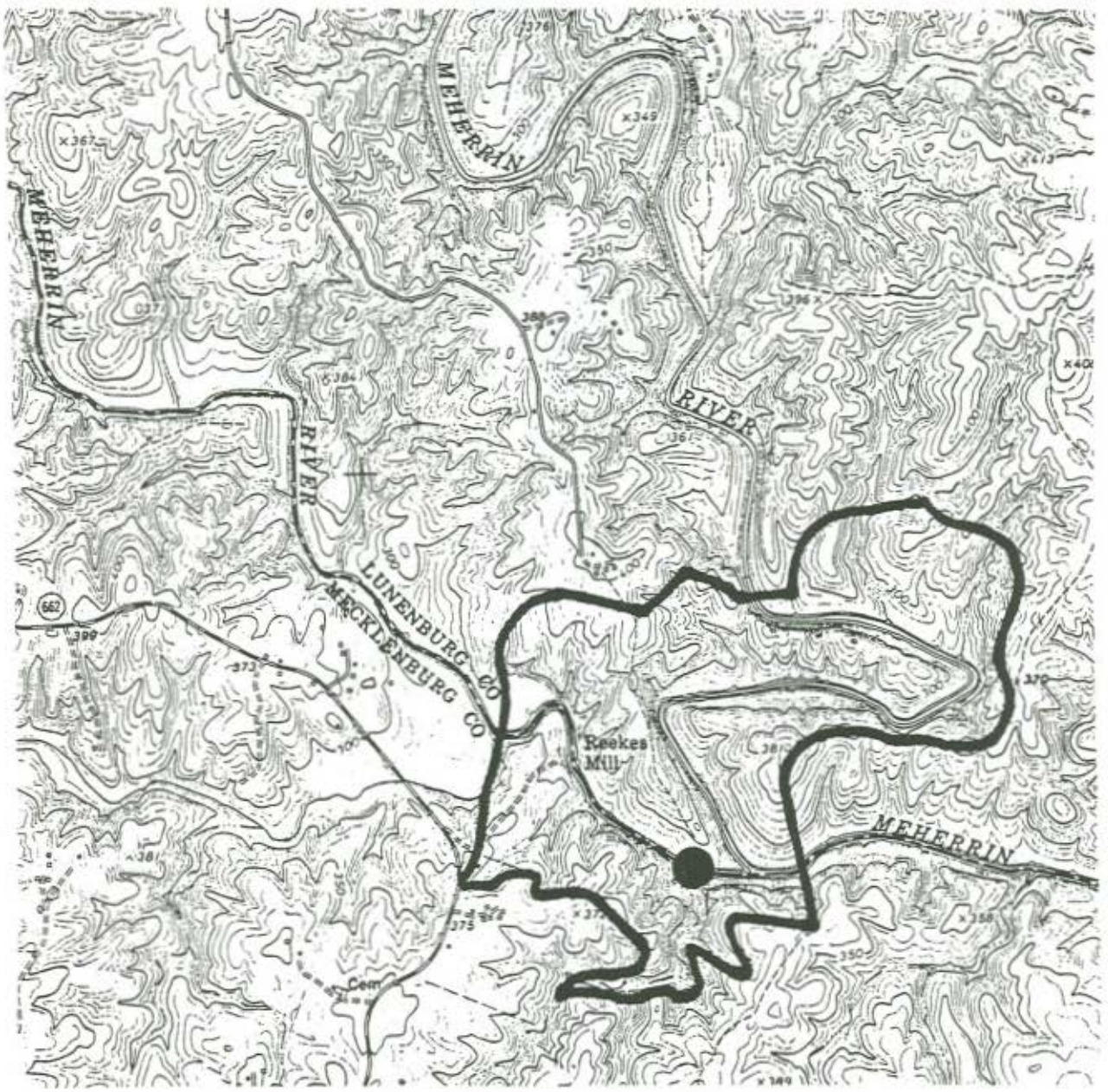
MANAGEMENT RECOMMENDATIONS: Little active management of the site is needed, but monitoring of mussel populations and water quality is recommended. This would enable early detection and mitigation of population declines or environmental problems.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Large-scale perturbations in the South Meherrin and North Meherrin Rivers should be carefully monitored, evaluated, and if necessary, mitigated. The site warrants protection as a rare mussel concentration area and as a representative natural area in the southern Piedmont of Virginia.

REFERENCES:

Gerberich, A. 1991. Atlantic pigtoe Fusconaia masoni (Conrad). Pages 275-276 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: REEKES MILL
QUADRANGLE: WIGHTMAN

SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

N

VIRGINIA

QUADRANGLE LOCATION

ROUTE 613 FLATROCK CREEK

SIZE: ca. 31 acres

BIODIVERSITY RANK: B4

LOCALITY: Lunenburg County

QUADRANGLE: Kenbridge West
Kenbridge East

QUADRANGLE CODE: 3607882
3607881

LOCATION: The site lies along the east side of Flatrock Creek about 100 yards downstream from the Route 613 Bridge.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC SCRUB	GRANITE FLATROCK	G3	S1	-	-	C

SITE DESCRIPTION: Flatrock Creek probably derived its name from the granite flatrock found near Route 613. The flatrock has distinct zones of vegetation which reflect different stages of succession. Lichens and mosses exist in the center of the outcrop, while small forbs and grasses such as fameflower (Talinum teretifolium), orange-grass (Hypericum gentianoides), eastern prickly-pear (Opuntia humifusa), and broom-sedge (Andropogon virginicus) grow around the periphery and in small fissures. Eastern red-cedar (Juniperus virginiana) and Virginia pine (Pinus virginiana) occur as scattered individuals where a modest amount of soil has formed. No rare species have been documented from this site, but community-based natural area protection sometimes results in the subsequent discovery of cryptic or poorly known rarities. An old run-down millhouse occurs at the northeast edge of the site.

BOUNDARY JUSTIFICATION: The boundary encompasses the flatrock, wooded buffer, and upslope lands. Such a boundary should protect the community from anthropogenic disturbances and minimize the invasion of exotic plant species.

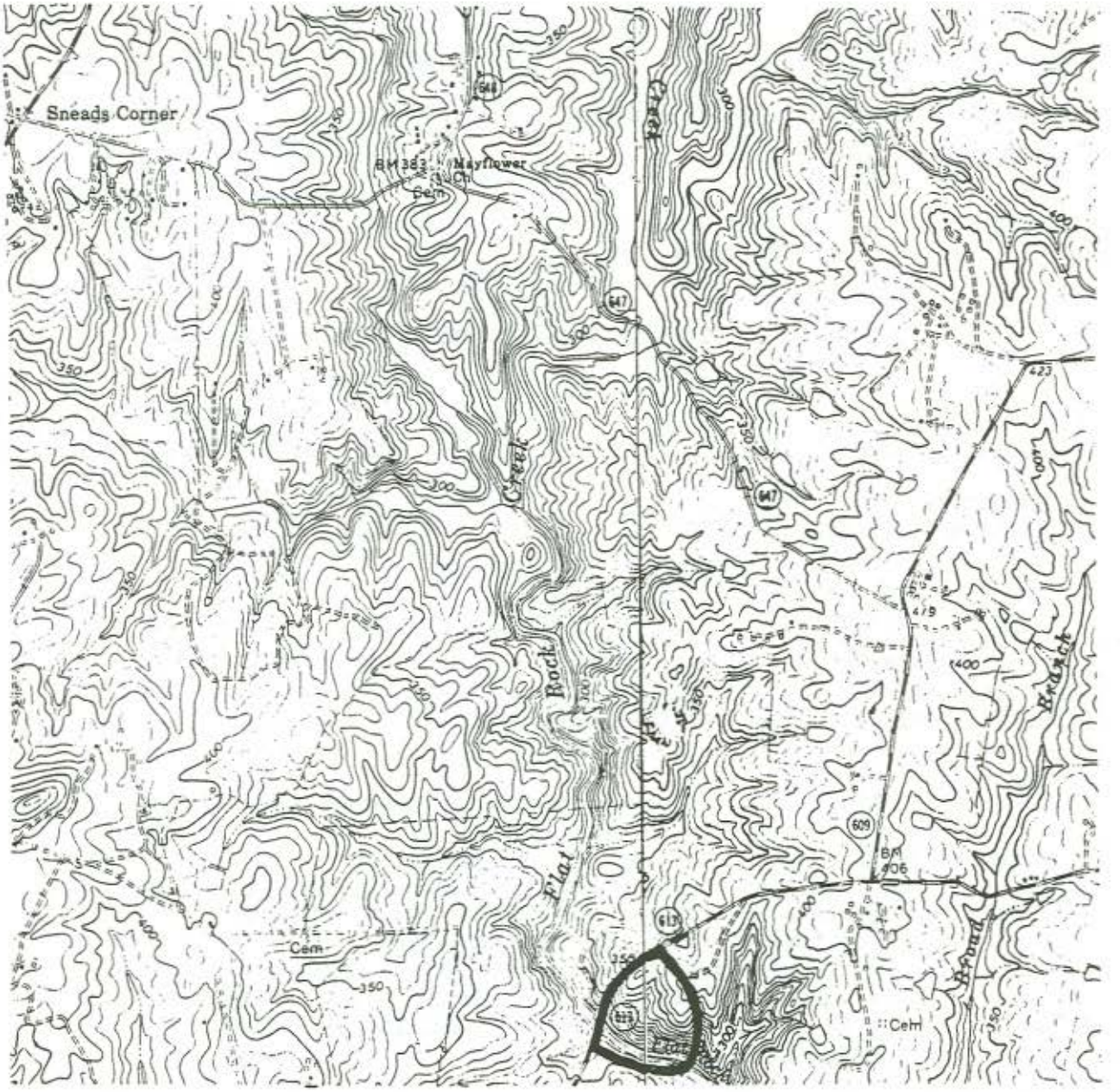
THREATS: Threats include human disturbance such as trampling and campfires. Once a flatrock is disturbed, exotic plants tend to proliferate. Of particular concern are Japanese honeysuckle (Lonicera japonica) and wild garlic (Allium vineale), species which might supplant the native flora.

MANAGEMENT RECOMMENDATIONS: Maintain a buffer of natural forest vegetation surrounding the flatrock, and minimize disturbance to the flatrock itself. Monitor the status of exotic plant species, and control them if necessary.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Granite flatrocks are fascinating natural environments. Protecting this site would be worthwhile and commendable.

REFERENCES:



SITE NAME: ROUTE 613 GRANITE FLATROCK
QUADRANGLE: KENBRIDGE WEST, KENBRIDGE EAST

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

VIRGINIA
QUADRANGLE LOCATION

N

NOTTOWAY RIVER FALLS

SIZE: ca. 300 acres **BIODIVERSITY RANK:** B2

LOCALITY: Lunenburg County and Nottoway County

QUADRANGLE: Rubermont **QUADRANGLE CODE:** 3707812

LOCATION: This site lies downstream of the Route 49 bridge and encompasses "The Falls" region of the Nottoway River.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
MOSS/LICHEN UPLAND VEGETATION		G3	S1	-	-	B
animals:						
ALASMIDONTA HETERODON	DWARF WEDGE MUSSEL	G1	S1	LE	LE	CD
AUTURUS ERYTHROPYGOS	A MILLIPEDE	G3	S1	-	-	-
ELLIPTIO LANCEOLATA	YELLOW LANCE	G4	S2	2	-	A
FUSCONAIA MASONI	ATLANTIC PIGTOE	G2	S2	2	LT	A
LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL	G4	S2	2	-	D

SITE DESCRIPTION: This site encompasses one of the more significant habitats for globally rare mussels in the eastern United States. The federally endangered dwarf wedge mussel (Alasmidonta heterodon) is present, as is the largest known population of the Atlantic pigtoe (Fusconaia masoni), another globally rare species. Water is well-oxygenated in the area of The Falls and the stream bed is free of silt. Freshwater mussels thrive under these conditions. Outcrops of granite along the river support a rare community of crevice plants, mosses, and lichens. Noteworthy plant species here include sandwort (Arenaria glabra), rock spikemoss (Selaginella rupestris), and fameflower (Talinum teretifolium).

The Route 49 bridge, an upstream dam, and dirt roads are the major disturbances to the site. Forested slopes border the Nottoway River throughout much of the site.

BOUNDARY JUSTIFICATION: The boundary is sufficient to protect the rare aquatic species and the rock outcrop vegetation from immediate on-site threats such as dams, bank stabilization, clear-cutting, and development. The boundary does not address impacts of land use activities throughout the Nottoway River drainage. These impacts should be monitored, evaluated, and if necessary, mitigated.

THREATS: Threats include major watershed perturbations such as new dams, accelerated ditching or deforestation, point-source pollution, and large-scale water withdrawal. Such activities would degrade water quality or alter the river's natural flow regime. Mussels require certain fish hosts for their early growth, so changes in the fishery could directly affect the mussel populations. While the fish host for the dwarf wedge mussel is unknown, an anadromous or catadromous species has been suggested (Moser 1989). Dams have been shown to be detrimental to anadromous fish populations. Shoreline development and bank stabilization constitute threats in the immediate area of The Falls. Lastly, swimmers and fishermen have been known to collect and destroy freshwater mussels for various reasons.

MANAGEMENT RECOMMENDATIONS: Unrestricted recreational use resulted in trampled vegetation, bank erosion, and trash at this site. Vehicles, including bulldozers, regularly drove across the stream bed from one bank to the other. The Town of Victoria recently requested assistance from law enforcement personnel to patrol the site and minimize visitor impacts. Recreation and rare species could coexist here as long as adequate recreational facilities and informational sources are provided. The two globally rare mussels should be monitored to detect any change in status. Ideally, water quality monitoring should also be conducted to detect and trace to their source, pollutants which might negatively affect the aquatic species.

CURRENT STATUS: The site encompasses private land holdings and land owned by the Town of Victoria.

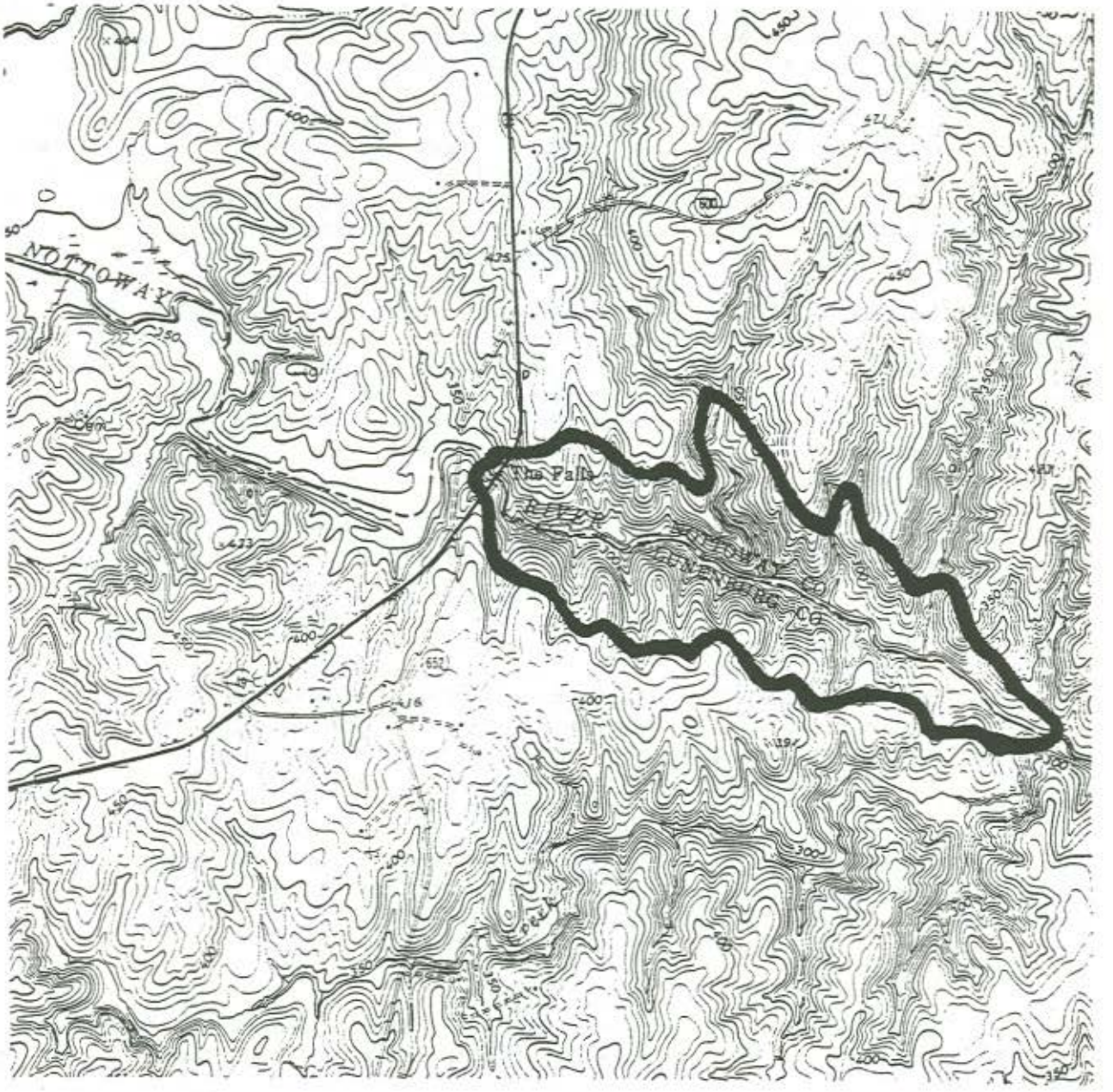
PROTECTION RECOMMENDATIONS: Large-scale perturbations in the Nottoway River watershed should be carefully monitored, evaluated, and if necessary, mitigated. To the extent possible, the upland forest bordering the Nottoway River at The Falls should be left in its natural condition. This will minimize siltation or pollution problems associated with adjacent developments. Any recreational activities should be closely monitored, and adequate facilities provided. To prevent the collection or destruction of mussels, signs should be posted which declare this section of the Nottoway River to be an endangered species habitat.

REFERENCES:

Berg, J.D. 1974. Vegetation and succession on Piedmont granitic outcrops of Virginia. M.A. Thesis. The College of William and Mary in Virginia, Williamsburg. 74 pp.

Gerberich, A. 1991. Atlantic pigtoe Fusconaia masoni (Conrad). Pages 275-276 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Moser, G.A. 1989. Endangered and threatened wildlife and plants: proposed endangered status for the dwarf wedge mussel. Federal Register 54(72):15236-15239.



SITE NAME: NOTTOWAY RIVER FALLS
QUADRANGLE: RUBERMONT

LONG BRANCH GRANITE FLATROCK

SIZE: ca. 28 acres **BIODIVERSITY RANK:** B4

LOCALITY: Nottoway County

QUADRANGLE: Blackstone East **QUADRANGLE CODE:** 3707718

LOCATION: The site lies 0.1 mile west of Route 644 immediately north of Long Branch.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC HERBACEOUS VEGETATION		G3	S1	-	-	C

SITE DESCRIPTION: This site features a quarter-acre granite flatrock in a scenic setting alongside a cascading stream. The flatrock is undisturbed and relatively free of exotics. Several of the characteristic granite flatrock plants, such as sandwort (Arenaria glabra), fameflower (Talinum teretifolium) and rushfoil (Crotonopsis elliptica), are present.

BOUNDARY JUSTIFICATION: The boundary includes sufficient buffer land to protect the flatrock from detrimental adjacent land uses.

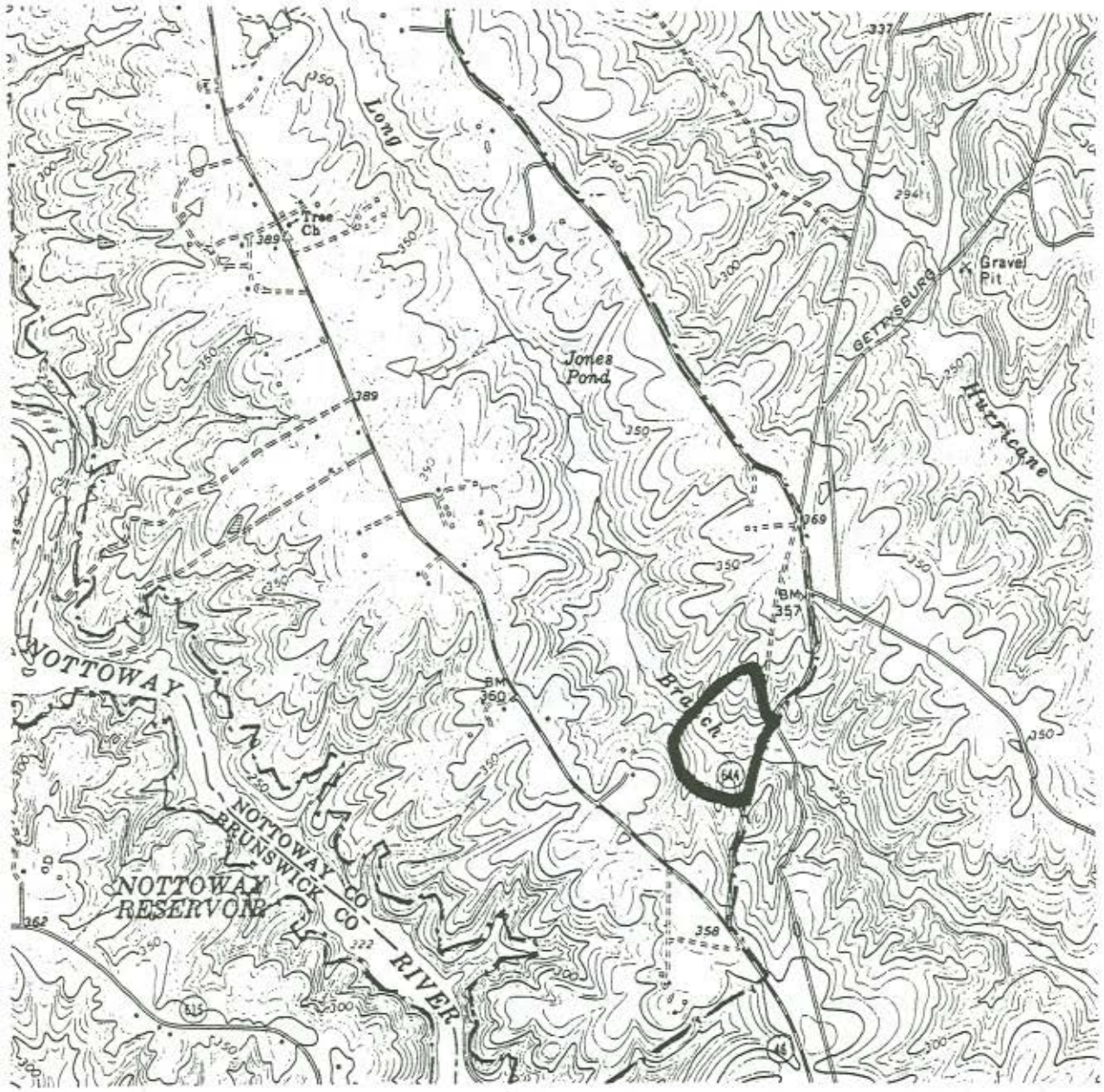
THREATS: Granite flatrocks have little or no soil, so any form of human disturbance can damage the mosses, lichens, and shallow-rooted herbs. Because this flatrock occurs near a stream, it is potentially threatened by impoundment construction.

MANAGEMENT RECOMMENDATIONS: The flatrock should be left in its natural condition and the vegetation periodically monitored. Potentially invasive exotic plants on the site should be monitored and, if necessary, controlled.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site would make a fine natural area.

REFERENCES:



SITE NAME: LONG BRANCH GRANITE FLATROCK
QUADRANGLE: BLACKSTONE EAST

SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

N

VIRGINIA

QUADRANGLE LOCATION

WHETSTONE GRANITE FLATROCK

SIZE: ca. 46 acres **BIODIVERSITY RANK:** B4

LOCALITY: Nottoway County

QUADRANGLE: Blackstone West **QUADRANGLE CODE:** 3707811

LOCATION: The site is located alongside Route 601 near the Whetstone Creek bridge.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC SCRUB	GRANITE FLATROCK	G3	S1	-	-	C
plants:						
CYPERUS GRANITOPHILUS	GRANITE-LOVING FLATSEDGE	G3Q	S1	3C	-	D

SITE DESCRIPTION: The Whetstone Granite Flatrock supports one of the larger exposures of granite bedrock on the Piedmont of Virginia. The shallow to non-existent soils promote a rare type of oligotrophic scrub vegetation characterized by eastern red-cedars (Juniperus virginiana) and Virginia pine (Pinus virginiana) overtopping herbaceous species such as rushfoil (Crotonopsis elliptica), buttonweed (Diodia teres), little bluestem (Schizachyrium scoparium), splitbeard bluestem (Andropogon ternarius), and orange-grass (Hypericum gentianoides). Amid lichens and mosses on the open portion of the outcrop one finds fameflower (Talinum teretifolium), rock-spikemoss (Selaginella rupestris), sandwort (Arenaria glabra), and the rare granite-loving flatsedge (Cyperus granitophilus).

BOUNDARY JUSTIFICATION: The boundary includes the largest granite outcrop and several smaller outcrops in the immediate vicinity. It also includes a modest amount of surrounding buffer land intended to mitigate impacts from off-site land use activities.

THREATS: Flatrocks are fascinating natural environments which attract people. Consequently, the Whetstone Granite Flatrock is a local hang-out, as evidenced by trampling disturbance and trash. Vehicular traffic on the flatrock is perhaps the most serious threat. Another threat is the potential expansion or re-routing of Route 601. Exotic plants which thrive following human disturbance are also threats. The problem species, Japanese honeysuckle (Lonicera japonica) and Chinese lespedeza (Lespedeza cuneata), appear to be increasing at the site.

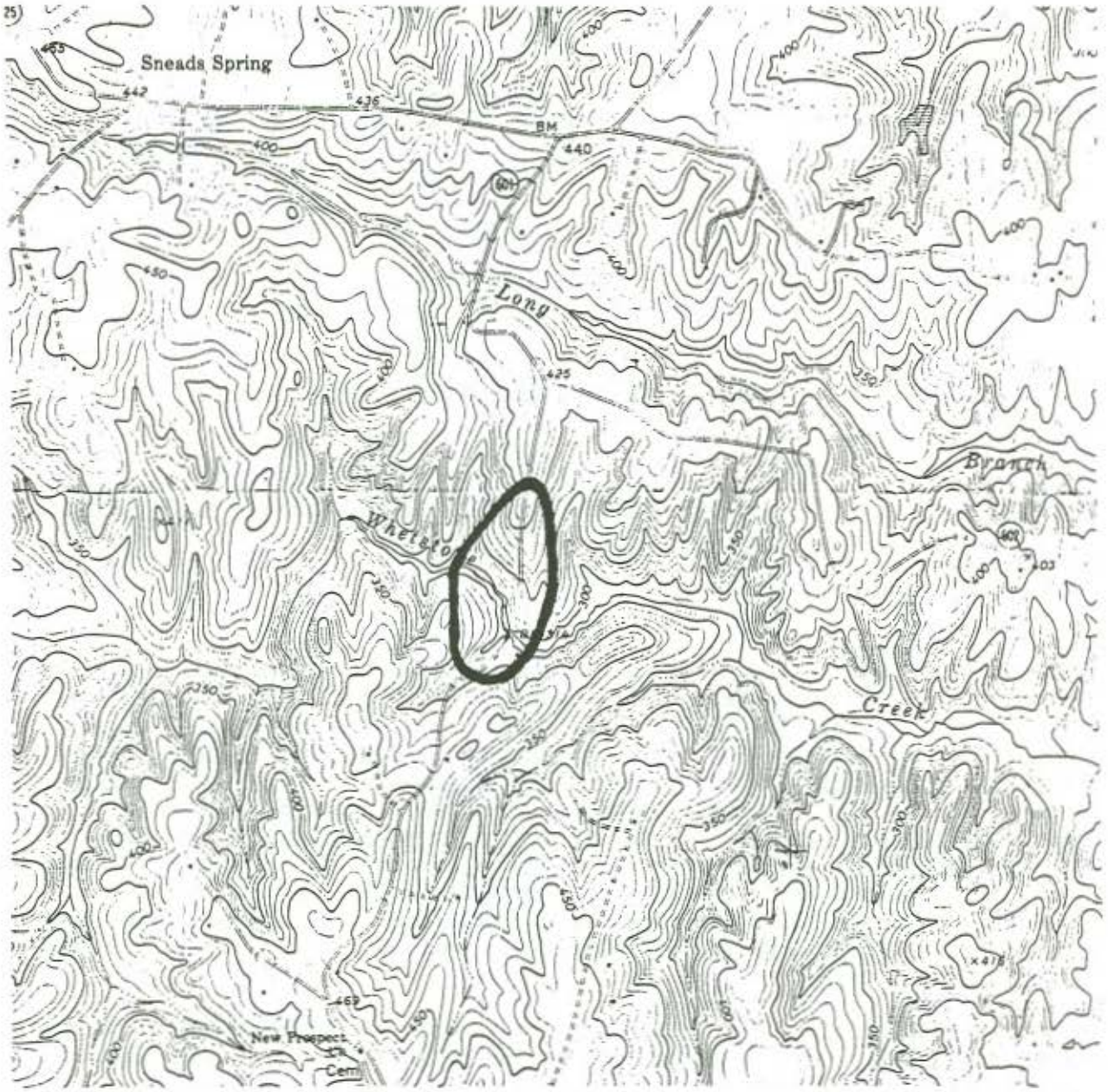
MANAGEMENT RECOMMENDATIONS: The vegetation and the rare plant species should be monitored to determine the impacts of trampling and invasive exotic plants. If the exotic plants are in fact detrimental, they should be controlled. The granite flatrock environment is more or less self-maintaining.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Prevent vehicular disturbance, minimize trampling impacts, and maintain buffer area. Inform Virginia Department of Transportation of the site's significance and the need to protect this ecologically sensitive area during road improvement activities.

REFERENCES:

Ware, D.M.E. 1991. Granite Flatsedge Cyperus granitophilus McVaugh. Pages 75-77 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: WHETSTONE GRANITE FLATROCK
QUADRANGLE: BLACKSTONE WEST

GREAT CREEK FOREST

SIZE: ca. 203 acres **BIODIVERSITY RANK:** B4

LOCALITY: Brunswick County

QUADRANGLE: Alberta **QUADRANGLE CODE:** 3607778

LOCATION: The site lies on the slopes east of Great Creek about 1.4 miles south-southwest of Oak Grove School. Route 46 lies east of the site.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
MESOTROPHIC FOREST	-	G3	S2	-	-	C

SITE DESCRIPTION: Much of the Great Creek valley was impounded in 1992 to form a reservoir, and adjacent lands were intensively logged in recent years. Fortunately, a small but highly significant forest remnant remains intact. This forest is dominated by southern sugar maple (Acer floridanum), shagbark hickory (Carya ovata), white oak (Quercus alba), buckeye (Aesculus sylvatica) and yellow oak (Quercus muhlenbergii). Herbaceous species such as white baneberry (Actaea pachypoda), ginseng (Panax quinquefolius), wild ginger (Asarum canadense) and downy woodmint (Blephilia ciliata) indicate nutrient-rich soils derived from a dark colored granitic rock and from colluvial processes. Several plant species occur as disjunct populations. The forest is significant from a phytogeographical perspective and represents a globally rare community type.

BOUNDARY JUSTIFICATION: The boundary encompasses the unusual forest plus sufficient buffer land to mitigate negative impacts from adjacent land use activities.

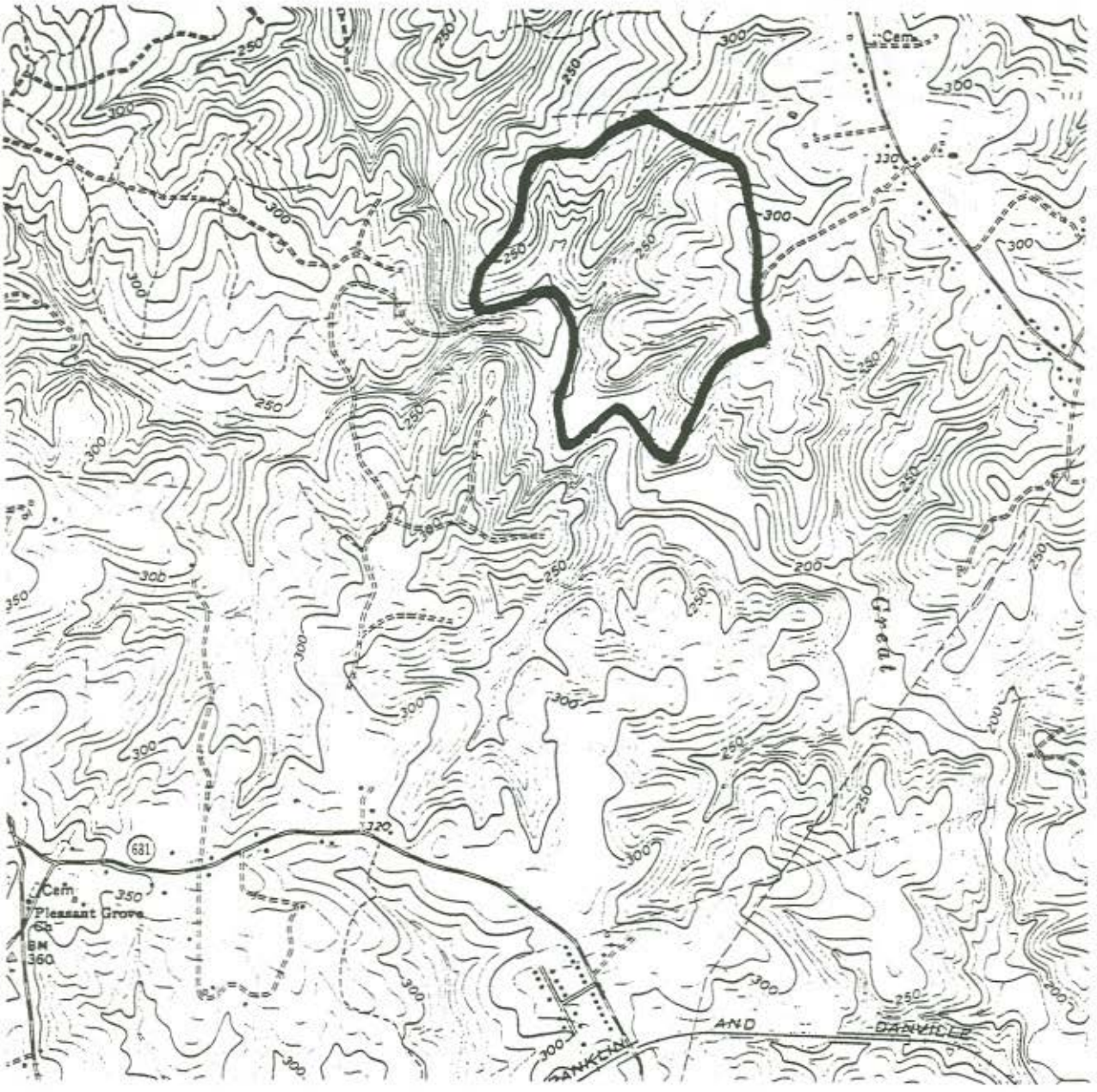
THREATS: The primary threat is logging. Development might also occur in the future. Part of the forest was recently destroyed as a result of reservoir construction.

MANAGEMENT RECOMMENDATIONS: The forest seems to require little active management. However, a few of the disjunct plant species exist as small populations. These will require careful monitoring, study, and management.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: It is unfortunate that natural resource management professionals failed to recognize the significance of the Great Creek forest prior to reservoir construction. So much land has been flooded in the Great Creek valley that establishing a small nature preserve around this forest remnant seems justifiable.

REFERENCES:



SITE NAME: GREAT CREEK FOREST
QUADRANGLE: ALBERTA

SCALE 1:24 000

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER

1 MILE

VIRGINIA

QUADRANGLE LOCATION

N

GASBURG GRANITE FLATROCK

SIZE: ca 42 acres **BIODIVERSITY RANK:** B3

LOCALITY: Brunswick County

QUADRANGLE: Valentines **QUADRANGLE CODE:** 3607757

LOCATION: The Gasburg Granite Flatrock site lies 1.5 miles east of Gasburg, north of Route 626.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
MOSS-LICHEN UPLAND VEGETATION	-	G3	S1	-	-	BC
plants:						
CYPERUS GRANITOPHILUS	GRANITE-LOVING FLATSEDGE	G3Q	S1	3C	-	C
DIAMORPHA SMALLII	SMALL'S STONECROP	G3G4	S1	-	-	BC
PORTULACA SMALLII	SMALL'S PURSLANE	G2G3	S1	3C	-	C

SITE DESCRIPTION: This site contains Virginia's most significant granite flatrock community. It also supports the only known Virginia population of Small's stonecrop (Diamorpha smallii), an endemic restricted to Southeastern granitic flatrock habitats. Fortunately, the core of the site is now owned by The Nature Conservancy and managed as a preserve, but adjacent land uses appear to be having a detrimental impact on the native flatrock vegetation. People continue to drive their vehicles on the granite outcrop, and weeds from a nearby agricultural field are spreading onto the edge of the flatrock.

BOUNDARY JUSTIFICATION: The boundary includes the three adjacent granite outcrops and sufficient buffer land to mitigate detrimental impacts associated with recreational use and exotic species.

THREATS: While the core of the site is protected by The Nature Conservancy, threats from inappropriate recreational use (e.g. campfires, vehicular use) and from exotic plant species remain pervasive.

MANAGEMENT RECOMMENDATIONS: Management of this natural area will require constant vigilance, educational programs, exotic species monitoring and control, and the continued use of vehicular barriers.

CURRENT STATUS: Most of the site is protected by The Nature Conservancy, but important buffer land is privately owned and unprotected.

PROTECTION RECOMMENDATIONS: Maintain and expand vehicular barriers, and extend protection to the significant buffer land.

REFERENCES:

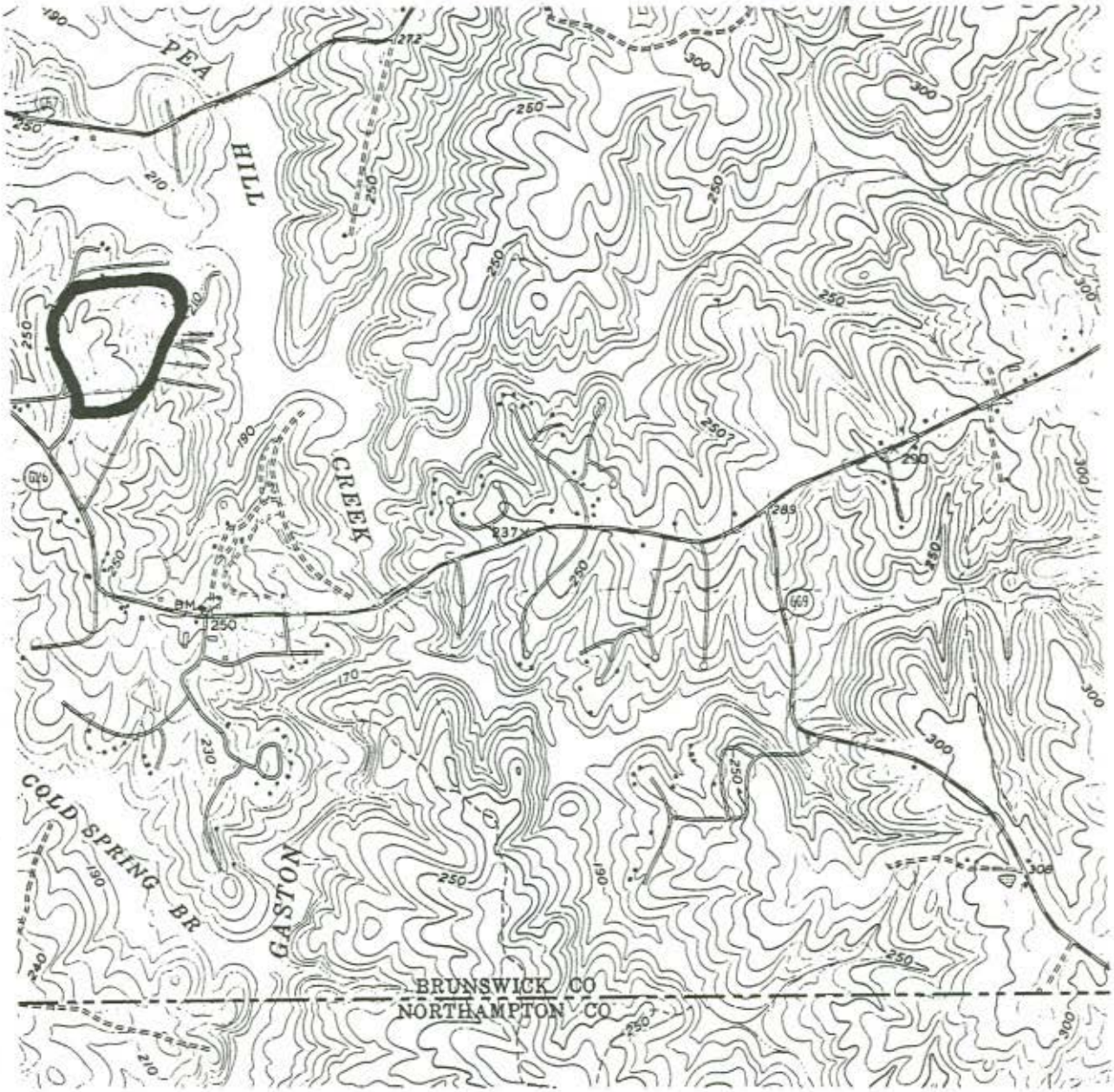
Berg, J.D. 1974. Vegetation and succession on Piedmont granitic outcrops of Virginia. M.A. Thesis. The College of William and Mary in Virginia, Williamsburg. 74 pp.

Harvill, A.M., Jr. 1976. Flat-rock endemics in Gray's Manual range. Rhodora 78:145-147.

Ware, D.M.E. 1991. Granite Flatsedge Cyperus granitophilus McVaugh. Pages 75-77 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Ware, D.M.E. 1991. Small's purslane Portulaca smallii P. Wilson. Pages 101-102 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Ware, D.M.E. 1991. Small's stonecrop Diamorpha smallii Britton. Pages 112-114 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: GASBURG GRANITE FLATROCK
QUADRANGLE: VALENTINES

Figure 3. The rare plant, Small's stonecrop (Diamorpha smallii), growing at Gasburg Granite Flatrock.

ROUTE 652 GRANITE FLATROCK

SIZE: ca. 77 acres **BIODIVERSITY RANK:** B4

LOCALITY: Brunswick County

QUADRANGLE: Alberta **QUADRANGLE CODE:** 3607778

LOCATION: The site is located north of Route 652 at a point 0.3 mile east of Route 644. The granite flatrock is quite small, and lies about 100 yards east of a small unnamed stream.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC SCRUB	GRANITE FLATROCK	G3	S1	-	-	C

SITE DESCRIPTION: The granite exposure at this site is very small, but because it is undisturbed and virtually free of exotic plants it deserves conservation attention. The granite forms a gently sloping "pavement", lacking fissures or cracks. It is approximately 33 by 14 yards in size. The typical mosses and lichens are present, as are a few characteristic flatrock herbs such as fameflower (Talinum teretifolium), wild pink (Silene caroliniana) and dwarf dandelion (Krigia virginica). No rare species have been documented from this site, but community-based natural area protection sometimes results in the subsequent discovery of cryptic or poorly known rarities.

BOUNDARY JUSTIFICATION: The boundary encompasses the granite flatrock and a modest amount of surrounding buffer land intended to mitigate impacts from off-site land use activities.

THREATS: Because flatrock vegetation is so fragile, it can be threatened by any form of human disturbance. Once disturbed, niches for exotic plants are created, and these species can supplant the native species. Fortunately, the site is far from roads and difficult to locate. Threats are therefore minimal.

MANAGEMENT RECOMMENDATIONS: No active management appears to be needed. However, continued monitoring and zoological inventory is recommended.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Because of its small size, remote location, and lack of rare species, this flatrock does not warrant urgent protection action.

Nevertheless, the pristine quality of the flatrock vegetation is significant, and the site should eventually receive conservation attention.

REFERENCES:

SITE NAME: ROUTE 652 GRANITE FLATROCK
QUADRANGLE: ALBERTA

FLATROCK BRANCH

SIZE: ca. 57 acres **BIODIVERSITY RANK:** B3

LOCALITY: Brunswick County

QUADRANGLE: Lawrenceville **QUADRANGLE CODE:** 3607777

LOCATION: The site is located immediately west of Flatrock Branch, south of Route 712.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC HERBACEOUS VEGETATION		G3	S1	-	-	B
plants:						
CYPERUS GRANITOPHILUS	GRANITE-LOVING FLATSEDGE	G3Q	S1	3C	-	BC
PORTULACA SMALLII	SMALL'S PURSLANE	G2G3	S1	3C	-	B

SITE DESCRIPTION: The granite flatrock habitat at this site covers about one acre, making it one of Virginia's larger and more significant occurrences. Two globally rare flatrock endemics occur here, granite-loving flatsedge (Cyperus granitophilus) and Small's purslane (Portulaca smallii). An old cabin and trash are remnants of past disturbance on portions of the flatrock. Exotic plants such as Chinese lespedeza (Lespedeza cuneata), wild carrot (Daucus carota), and rabbits-foot clover (Trifolium arvense) also indicate past disturbance. Portions of the flatrock remain relatively pristine however, and the site is a fascinating and impressive natural area.

BOUNDARY JUSTIFICATION: The boundary encompasses the granite flatrock plus sufficient forested buffer land to mitigate impacts from adjacent land uses.

THREATS: Granite flatrock vegetation is easily damaged, so any form of human disturbance can be detrimental. Adjacent development or road expansion would likely cause an increase of exotic plant growth on the flatrock.

MANAGEMENT RECOMMENDATIONS: The exotic plants should be monitored and, if necessary, controlled. Removal of old trash items would improve the aesthetic qualities of the site. Visitors should be encouraged to protect the fragile vegetation from excessive disturbance. The rare plant populations should be monitored, studied, and if possible, enhanced through appropriate management.

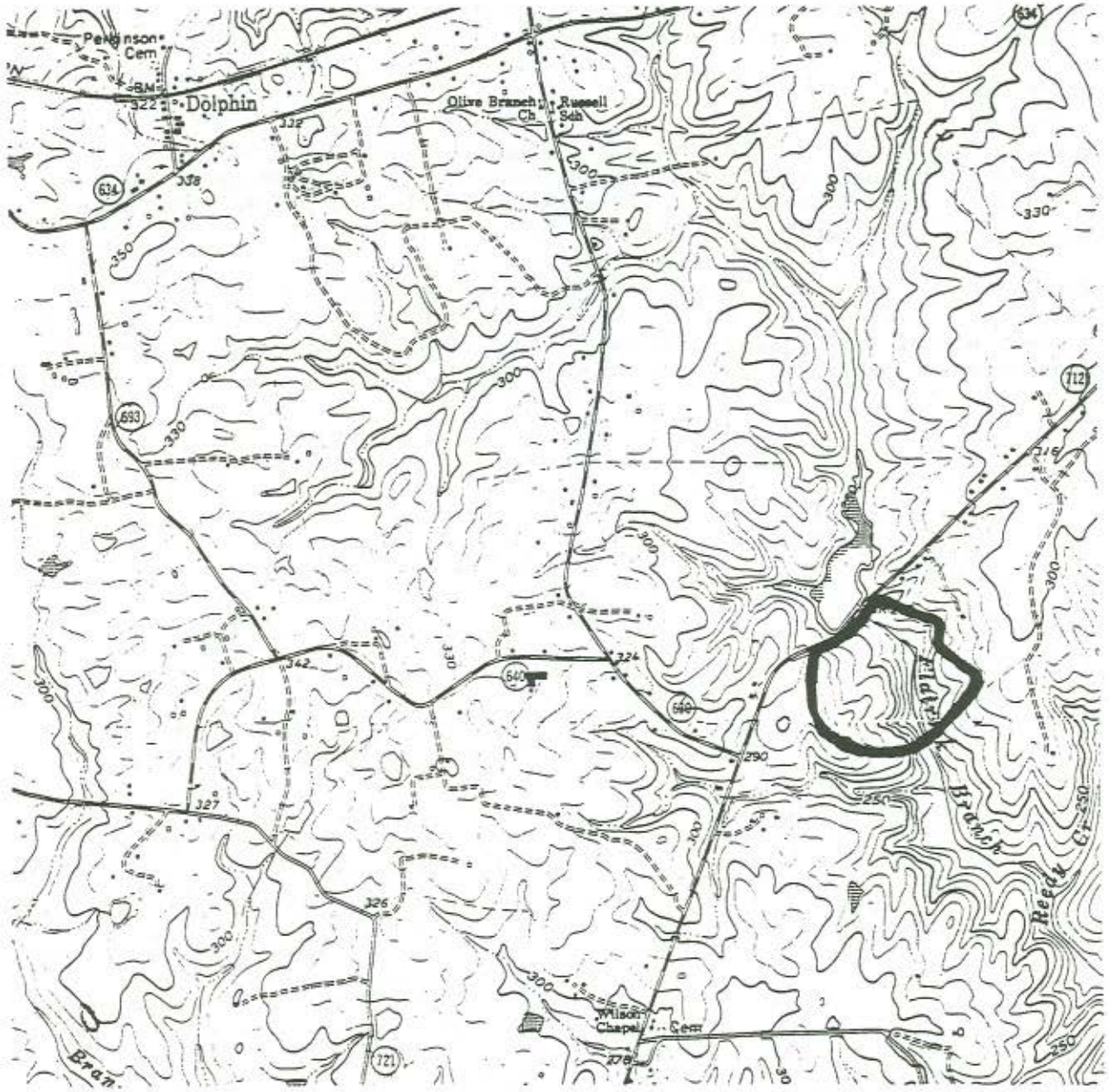
CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site deserves urgent conservation attention as one of Virginia's finer occurrences of a rare granite flatrock community.

REFERENCES:

Ware, D.M.E. 1991. Granite Flatsedge Cyperus granitophilus McVaugh. Pages 75-77 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Ware, D.M.E. 1991. Small's purslane Portulaca smallii P. Wilson. Pages 101-102 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: FLATROCK BRANCH
QUADRANGLE: LAWRENCEVILLE

DAHLIA SWAMP

SIZE: ca. 153 acres **BIODIVERSITY RANK:** B2

LOCALITY: Greensville County

QUADRANGLE: Skippers **QUADRANGLE CODE:** 3607755

LOCATION: The site is one mile north-northwest of Dahlia. It lies between Route 301 and Fontaine Creek.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
EUTROPHIC SATURATED FOREST	-	-	S2	-	-	BC
plants:						
HEXASTYLIS LEWISII	HEARTLEAF	G3	S2S3	3C	-	A

SITE DESCRIPTION: This site contains a rare type of wetland forest influenced by an unusual hydrologic regime. The wetland is perennially saturated from groundwater seepage, and at the same time receives significant moisture and colluvium from overland flow. Trees include red maple (Acer rubrum), white ash (Fraxinus americana), American holly (Ilex opaca) and sweetbay magnolia (Magnolia virginiana). In the understory, spicebush (Lindera benzoin) and thick tangles of laurel-leaf greenbrier (Smilax laurifolia) prevail. Roundfruit hedge-hyssop (Gratiola virginiana) grows in shallow water habitats, and on mossy tree hummocks one finds thousands of heartleaf (Hexastylis lewisii) plants.

Formerly, the site included bog-like habitats a short distance to the north, but impoundments and residential development degraded the natural qualities of this area. Also, northern pitcher-plants (Sarracenia purpurea) and yellow pitcher-plants (Sarracenia flava), both considered rare species in Virginia, have been dug up, transplanted, and probably removed altogether from the site by well-intentioned but misguided carnivorous plant enthusiasts.

BOUNDARY JUSTIFICATION: The boundary includes the significant wetland and upslope lands necessary to maintain the natural hydrologic regime and protect the wetland from potentially damaging impacts from surrounding land uses.

THREATS: Threats include logging, ditching, pond construction, and perhaps eutrophication resulting from intensified agricultural activity or housing development. Depredation of carnivorous plant populations has already been a problem here.

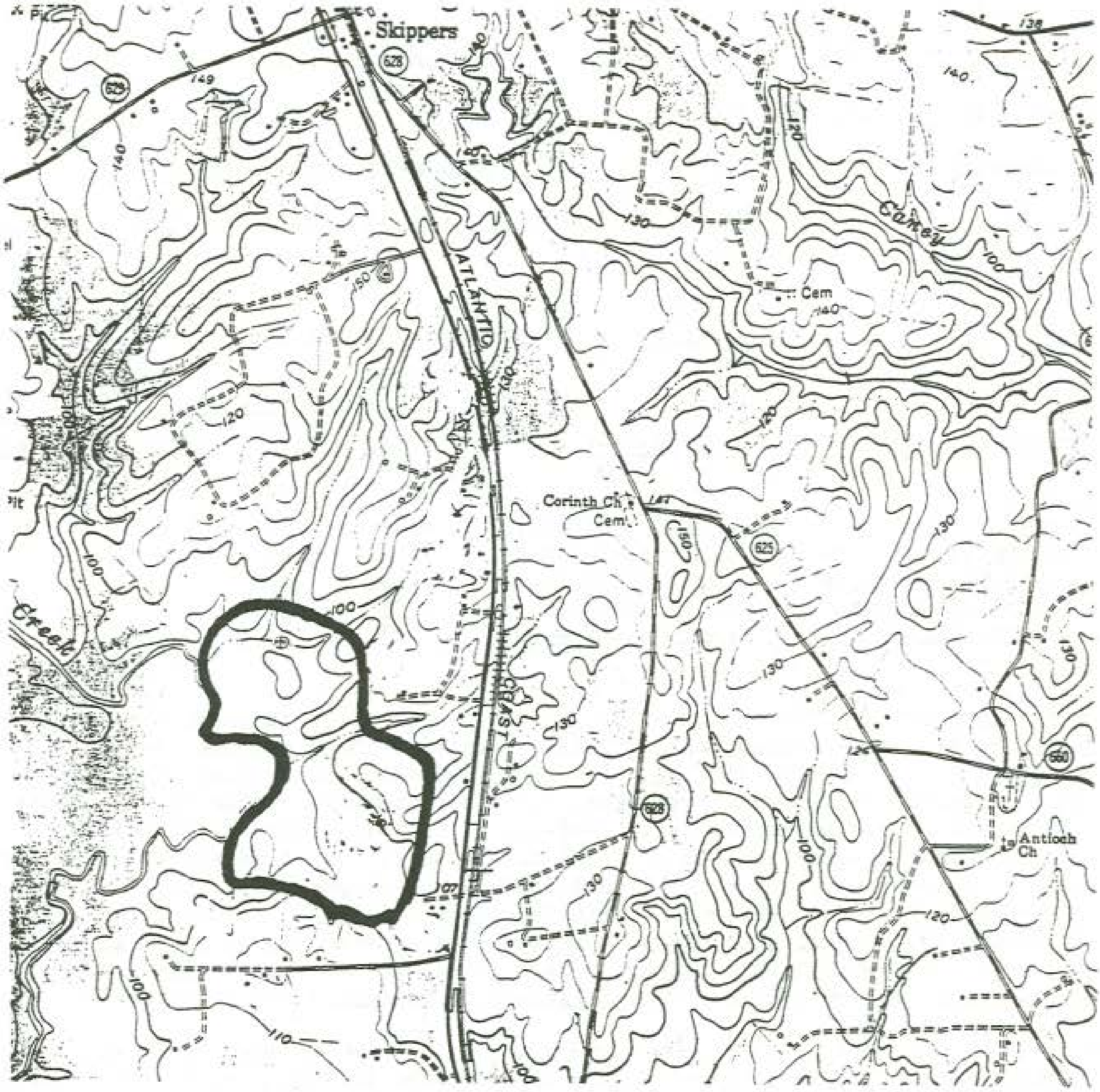
MANAGEMENT RECOMMENDATIONS: This wetland should be left in its natural condition. At some wetlands prescribed burning can rejuvenate rare plant populations, but this particular wetland is perennially wet and probably would not burn. Additional community sampling and zoological inventory are needed here. Depredation of rare plant populations should be denounced because it can remove all reason to protect the natural environments which gave rise to the rarities. Also, removing plants can negate an option of future management which might have restored certain declining indigenous populations.

CURRENT STATUS: The site is privately owned.

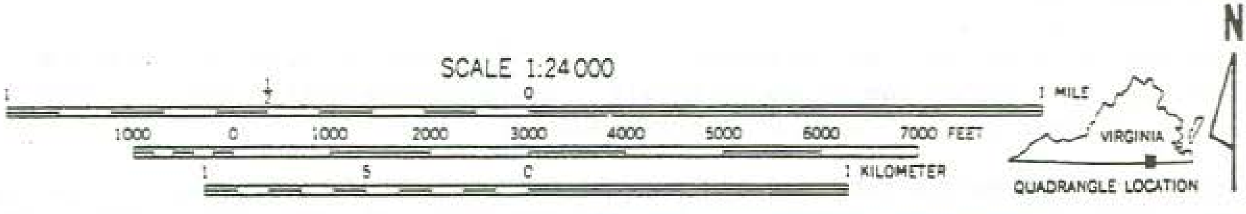
PROTECTION RECOMMENDATIONS: The site deserves protection as a rare wetland type and as habitat for a phenomenal population of the globally rare heartleaf.

REFERENCES:

Harvill, A.M. Jr. 1969. The Dahlia Bog. Jeffersonia 3(3):8-9.



SITE NAME: DAHLIA SWAMP
QUADRANGLE: SKIPPERS



MOONLIGHT RAILROAD SWALE

SIZE: ca. 215 acres **BIODIVERSITY RANK:** B4

LOCALITY: Greensville County

QUADRANGLE: Emporia **QUADRANGLE CODE:** 3607765

LOCATION: The site lies east of the Seaboard Coast Railroad, 0.2 to 0.6 mile south of Moonlight.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
ALETRIS AUREA	GOLDEN COLICROOT	G5	S1	-	-	D
CIRSIUM VIRGINIANUM	VIRGINIA THISTLE	G3G4	S2	-	-	B
COREOPSIS LINIFOLIA	TEXAS TICKSEED	G4Q	S1	-	-	D
DROSERA BREVIFOLIA	DWARF SUNDEW	G5	S2	-	-	CD
ERYNGIUM YUCCIFOLIUM	RATTLESNAKE-MASTER	G5	S2	-	-	AB

SITE DESCRIPTION: The moist lowland bordering the railroad south of Moonlight supports five light-demanding rare plant species. These rarities were probably more common in Virginia when pine lowlands were frequently burned and open habitats maintained. Presently, the plants persist in the open habitats maintained along the railroad right-of-way. The vegetation is exceptionally rich in plant species and has affinity to stream terrace pine savannas farther south. Noteworthy plant species include false scurf-pea (Psorales psoralioides), swamp sunflower (Helianthus angustifolius), purple-disk sunflower (Helianthus atrorubens), large-flowered aster (Aster grandiflorus), spike gay-feather (Liatris spicata), savanna eupatorium (Eupatorium leucolepis), yellow-fringe orchis (Platanthera ciliaris) and coast violet (Viola brittoniana).

BOUNDARY JUSTIFICATION: The boundary includes the rare plant populations plus the recently clear-cut lowland to the east. The clearcut area represents potential habitat for the rarities and, with prescribed burning management, could become an outstanding pine savanna approximating the original forest conditions here.

THREATS: Threats include herbicide spraying along the railroad right-of-way, ditching, and succession to woody growth. Soils here are seasonally ponded and are therefore unsuitable for development.

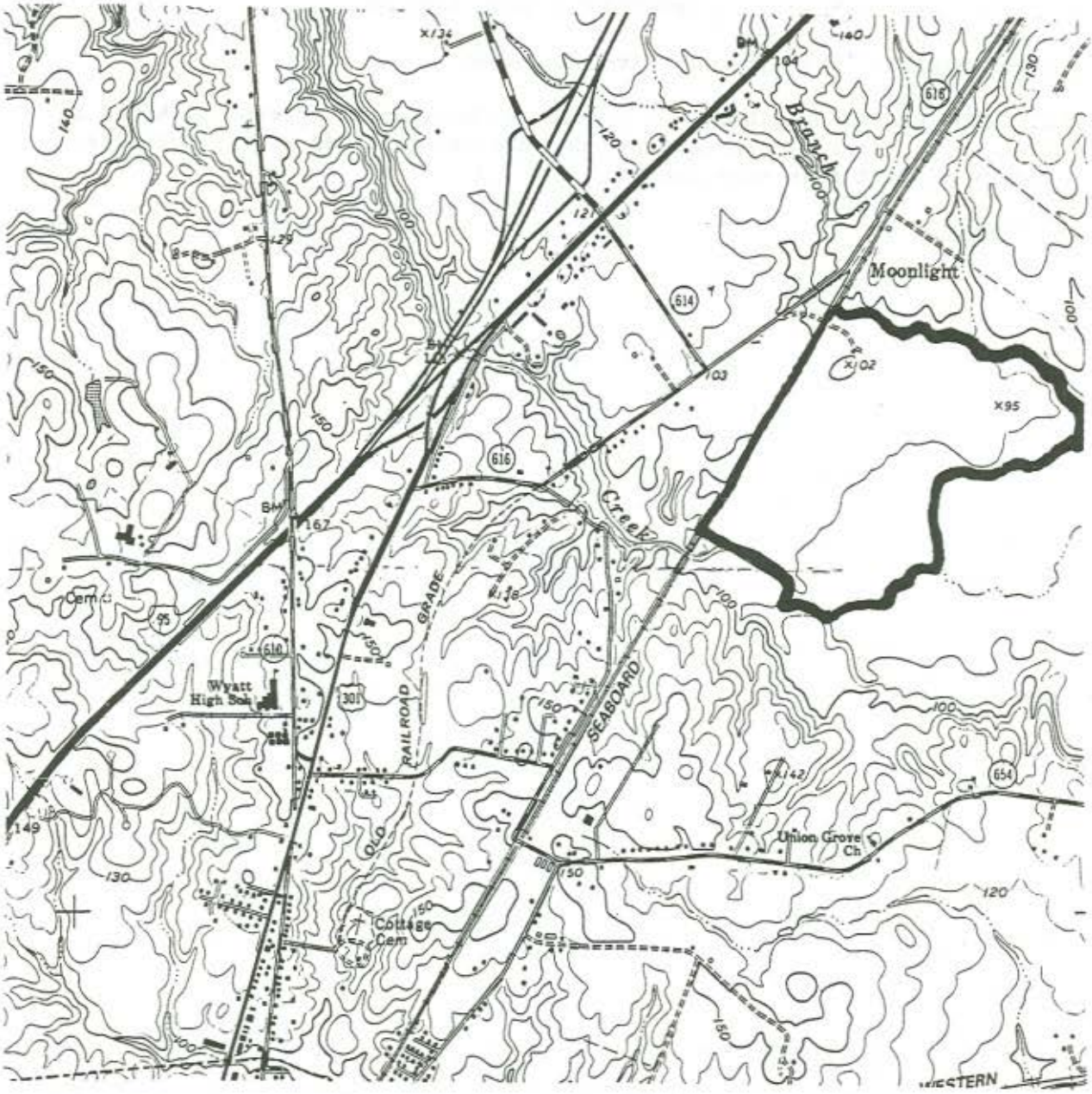
MANAGEMENT RECOMMENDATIONS: Prescribed burning should be employed to control the growth of woody species along the railroad right-of way. Furthermore, the

large clear-cut area, if regularly burned, would likely support many of the rare species and become an exceptional pine savanna.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: A protection/management agreement should be pursued with the railroad company, and additional lands within the site boundary protected in some manner.

REFERENCES:



SITE NAME: MOONLIGHT RAILROAD SWALE
QUADRANGLE: EMPORIA

FOXTAIL BOGS

SIZE: ca. 153 acres **BIODIVERSITY RANK:** B4

LOCALITY: Greensville County

QUADRANGLE: Jarratt, Purdy **QUADRANGLE CODE:** 3607774, 3607775

LOCATION: The site is located along the powerline right-of-way east of Route 680.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
ALETRIS AUREA	GOLDEN COLICROOT	G5	S1	-	-	B
ASCLEPIAS RUBRA	RED MILKWEED	G4G5	S2S3	-	-	D
CAREX BARRATTII	BARRATT'S SEDGE	G3	S1S2	3C	-	AB
CLEISTES DIVARICATA	SPREADING POGONIA	G4	S1	-	-	BC
LACHNOCAULON ANCEPS	BOG-BUTTONS	G5	S2	-	-	AB
RHYNCHOSPORA CEPHALANTHA	CAPITATE BEAKRUSH	G5	S2	-	-	C
SCLERIA MINOR	SLENDER NUTRUSH	G4G5	S2	-	-	D

SITE DESCRIPTION: This site features two boggy clearings near the headwaters of small streams beneath a powerline. The site derives its name from the vast population of foxtail clubmoss (Lycopodium alopecuroides) which dominates the wet soil habitats. The diversity of native species is very high, and to date, seven rare species have been documented. The site is an exceptional botanical area. Fire once maintained open bogs such as this, but at present these habitats largely depend upon regular mowing to suppress competitive woody growth.

BOUNDARY JUSTIFICATION: The boundary includes the two boggy powerline wetlands, the adjacent forested wetland and adjacent upland forest. Sufficient land is included in the boundary to safeguard the wetland from detrimental off-site impacts and permit the option of prescribed burning management.

THREATS: Threats include ditching, filling, herbicides, and excessive off-road vehicular traffic. Carnivorous plant buffs have been known to introduce pitcher-plants (Sarracenia spp.) into bog-like wetlands such as this. Such introductions degrade the natural condition of the vegetation.

MANAGEMENT RECOMMENDATIONS: Regular mowing has maintained the open condition of this site and has enabled the rare and unusual plants to persist in the absence of competitive woody growth. Mowing or prescribed burning should be

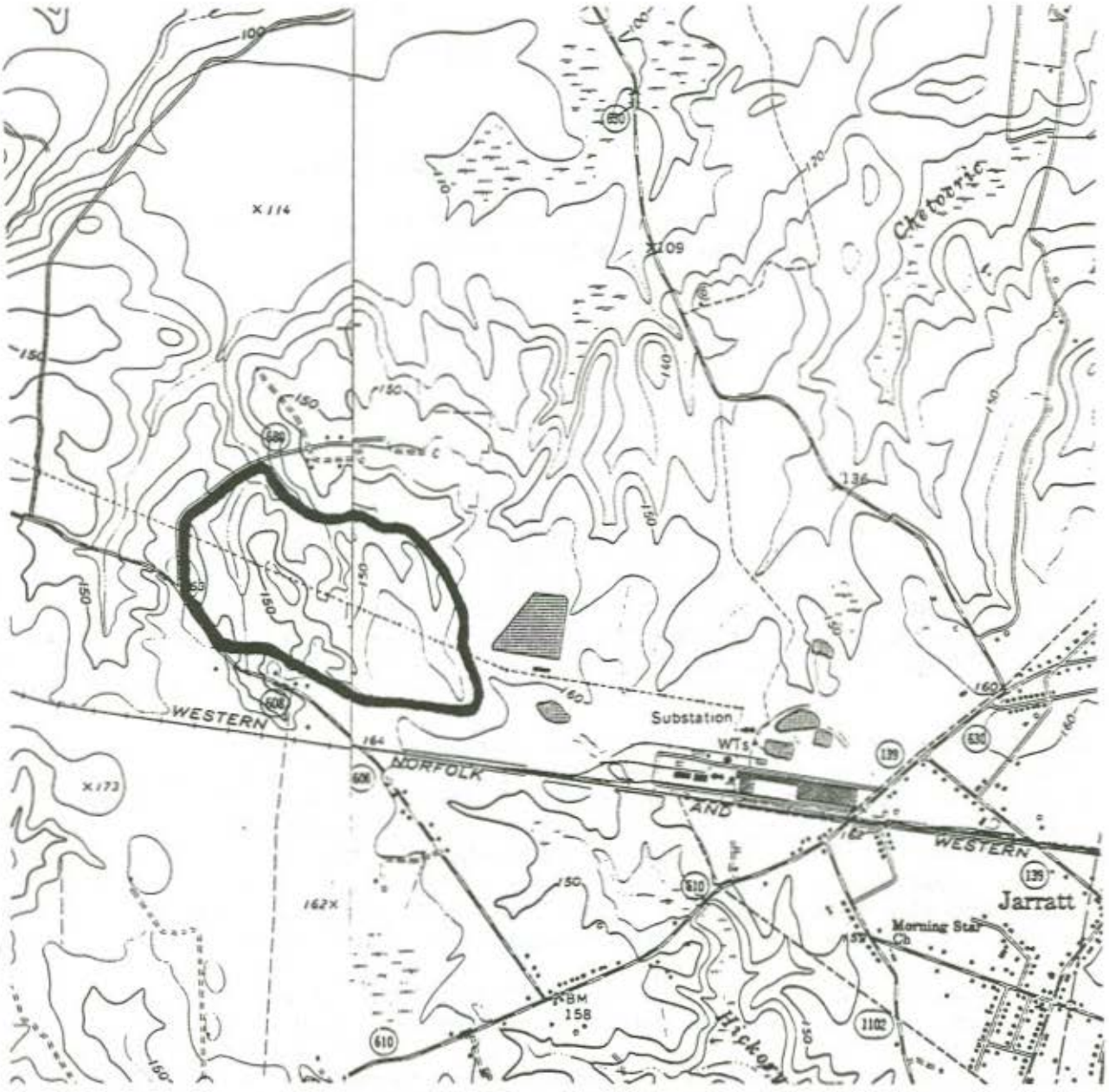
continued. Also, the potential exists to triple the size of the open wetland by burning portions of the adjacent wet forest.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site should be protected because it is one of the more interesting and significant botanical areas on Virginia's coastal plain.

REFERENCES:

Stevens, C.E. and T.F. Wieboldt. 1991. Barratt's sedge Carex barrattii Schweinitz and Torrey. Pages 70-71 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: FOXTAIL BOGS
QUADRANGLE: JARRETT, PURDY

EMPORIA MUSSEL SITE

SIZE: ca. 110 acres **BIODIVERSITY RANK:** B3

LOCALITY: Greensville County

QUADRANGLE: Emporia **QUADRANGLE CODE:** 3607765

LOCATION: The site encompasses that section of the Meherrin River in Emporia between the Route 301 bridge and railroad bridge.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
animals:						
ELLIPTIO LANCEOLATA	YELLOW LANCE	G4	S2	2	-	D
ELLIPTIO ROANOKENSIS	ROANOKE SLABSHELL	G2Q	S1	-	-	B
LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL	G4	S2	2	-	A
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	G5	S2	-	-	B
LEPTODEA OCHRACEA	TIDEWATER MUCKET	G4	S2S3	-	-	A
LIGUMIA NASUTA	EASTERN PONDSHELL	G4	S2S3	-	-	B

SITE DESCRIPTION: At least 12 native freshwater mussel species occur in this section of the Meherrin River, making this site one of the more significant freshwater mussel habitats in eastern Virginia. The Roanoke slabshell mussel (Elliptio roanokensis) is apparently globally rare, but the taxonomic validity of this mussel is questionable. The river is slow-moving and the substrate is mostly sandy. A city park borders a portion of the river, and elsewhere, highly developed lands abut the site. Bridges, trash, and drain pipes are the major disturbances to the riverine habitat.

BOUNDARY JUSTIFICATION: The boundary includes the river and its immediate floodplain. Much of the adjacent land has been developed.

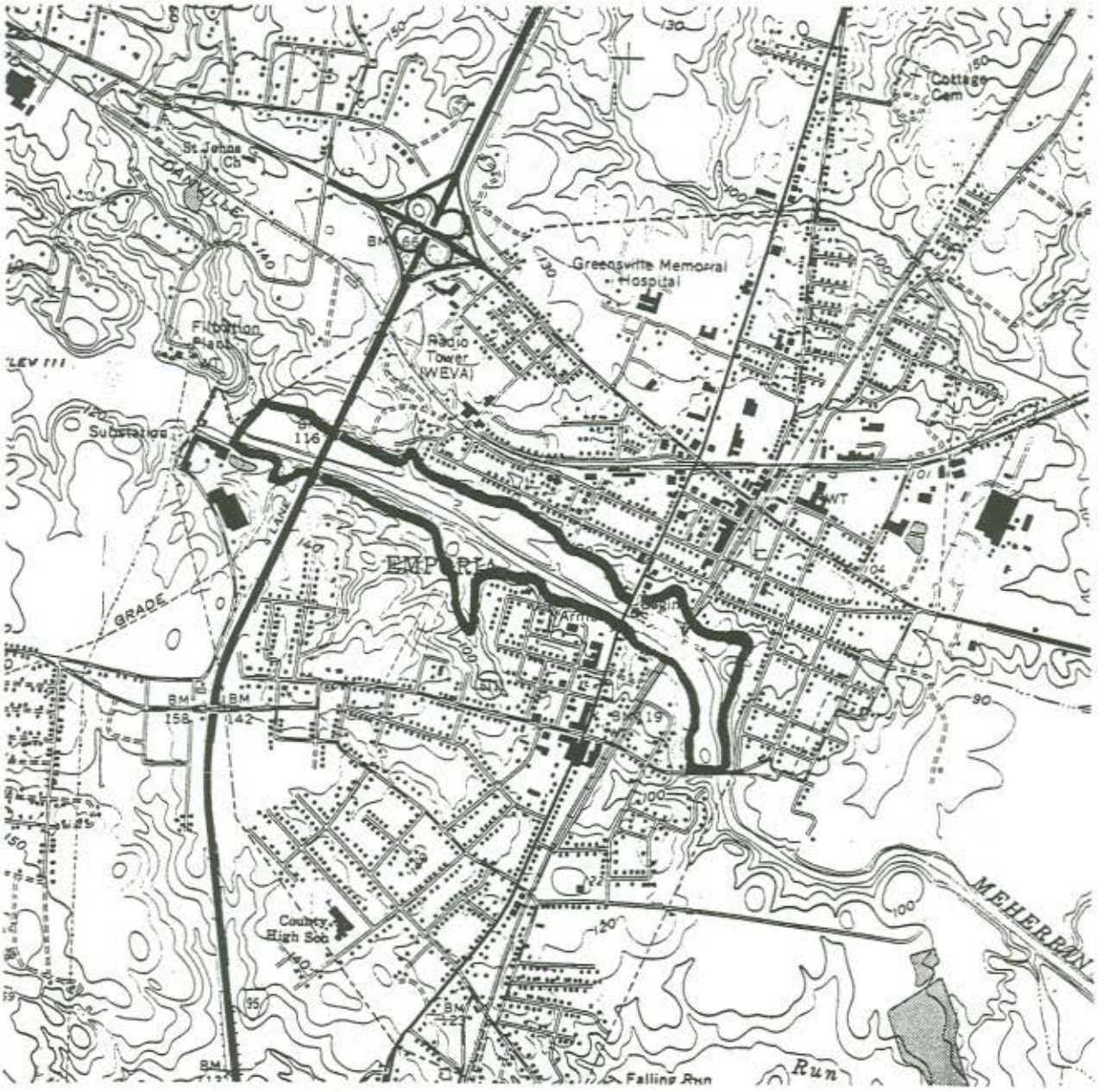
THREATS: Throughout Virginia the mussel fauna has suffered irreparable declines as a result of anthropogenic activities and pollutants. Considering the highly disturbed nature of this site, the presence of so many thriving mussel populations comes as a surprise. It is possible however that outflow from an upstream dam may help oxygenate the water, thereby improving the habitat for the mussels. The dam could also be the source of future negative impacts such as dramatic disruptions to the natural flow regime of the river, rapid releases of water, or releases of silt-laden water. Additional threats are pollution and declines in fish host populations.

MANAGEMENT RECOMMENDATIONS: The mussel populations here should be monitored. If declines are evident, the contributing factors should be identified and corrected.

CURRENT STATUS: Part of the site is owned by the city of Emporia and managed as a park. The remainder is apparently privately owned.

PROTECTION RECOMMENDATIONS: The site should be protected from major perturbations such as channelization, bank stabilization and dredging.

REFERENCES:



SITE NAME: EMPORIA MUSSEL SITE
QUADRANGLE: EMPORIA

EMPORIA POWERLINE BOG

SIZE: ca. 83 acres

BIODIVERSITY RANK: B5

LOCALITY: Greensville County

QUADRANGLE: Emporia
Skippers

QUADRANGLE CODE: 3607765
3607755

LOCATION: The site encompasses a portion of a power line right-of-way a short distance west of Interstate 95, 0.7 miles south Route 639.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
RHEXIA PETIOLATA	CILIATE MEADOWBEAUTY	G3G5	S1	-	-	D
SCLERIA MINOR	SLENDER NUTRUSH	G4G5	S2	-	-	B
ZIGADENUS DENSUS	BLACK SNAKEROOT	G5	S1	-	-	CD
RHYNCHOSPORA CEPHALANTHA	CAPITATE BEAKRUSH	G5	S2	-	-	BC

SITE DESCRIPTION: Fire-maintained boggy wetlands have nearly disappeared from Virginia's coastal plain due to fire suppression. Fortunately, rare bog plants persist on clearings found along powerlines, roads, and railroads. The Emporia powerline bog represents one of the better bog-like habitats in the area. Groundwater seepage maintains wet, nutrient-poor soils on very gently sloping terrain. Prevalent plant species are beak-rush (Rhynchospora spp.) yellow-eyed grass (Xyris spp.), foxtail clubmoss (Lycopodium alopecuroides), meadow-beauty (Rhexia spp.), and sphagnum (Sphagnum spp.). Woody species on the edge of the open wetland include titi (Cyrilla racemiflora), sweetbay magnolia (Magnolia virginiana) and loblolly pine (Pinus taeda). Four rare plant species occur, and the potential for rare dragonflies and damselflies is good.

BOUNDARY JUSTIFICATION: The boundary encompasses the entire boggy wetland and includes sufficient upland buffer to secure the natural hydrology and protect the wetland from impacts associated with adjacent land uses.

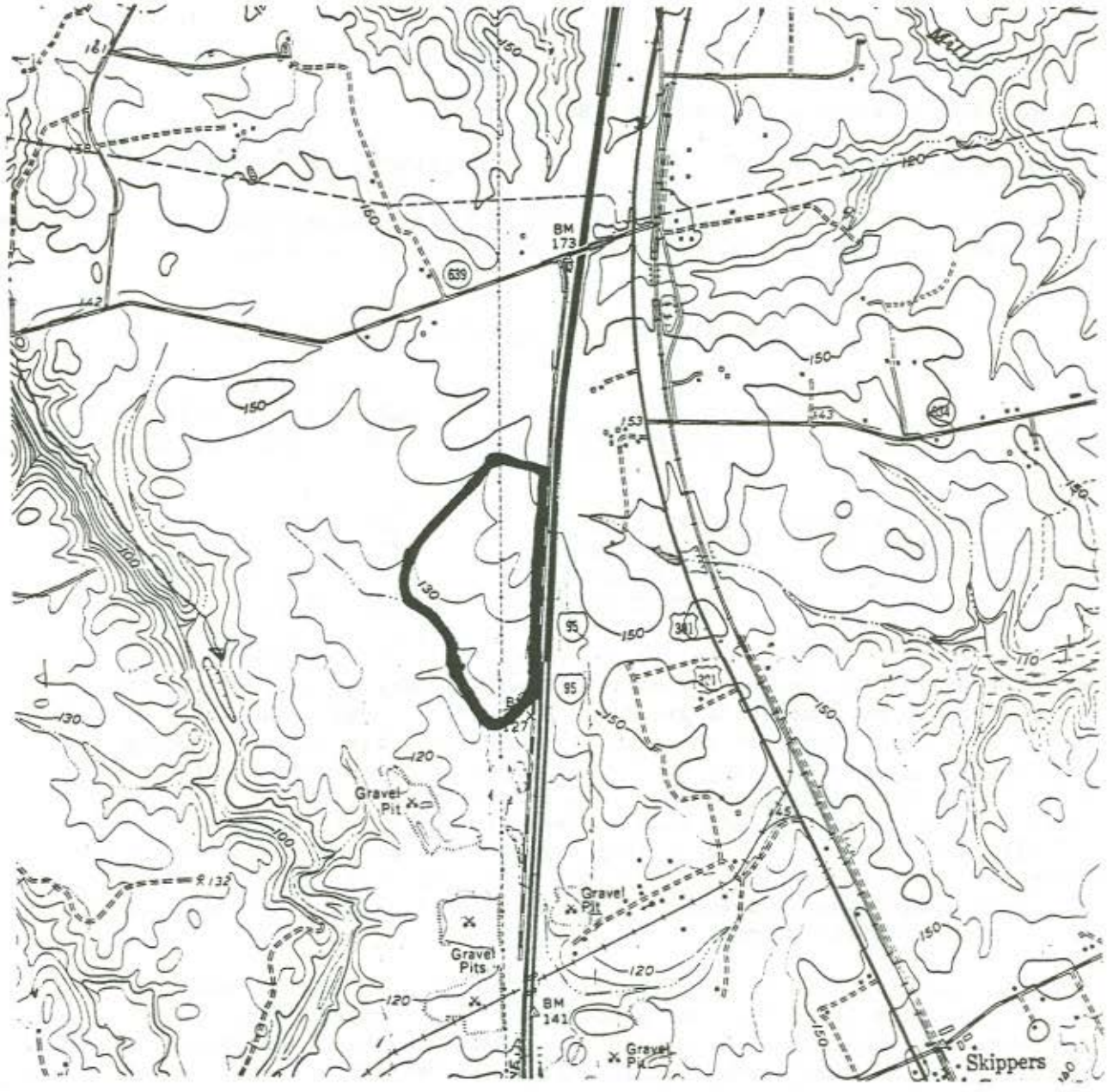
THREATS: Threats include ditching, filling, herbicides, and excessive off-road vehicular traffic.

MANAGEMENT RECOMMENDATIONS: Regular mowing has maintained the open condition of this small wetland and has enabled the rare and unusual plants to persist in the absence of competitive woody growth. Mowing or prescribed burning should continue at this site. Also, the potential exists to increase the size of the open wetland by burning portions of the adjacent wet forest.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The site warrants protection as a significant rare plant habitat and remnant boggy wetland.

REFERENCES:



SITE NAME: EMPORIA POWERLINE BOG
QUADRANGLE: EMPORIA

DOUBLE BRIDGE

SIZE: ca. 100 acres **BIODIVERSITY RANK:** B2

LOCALITY: Greensville County and Sussex County

QUADRANGLE: Purdy **QUADRANGLE CODE:** 3607775

LOCATION: The site is centered on Double Bridge and encompasses riverine habitat upstream and downstream of Route 619 along the Nottoway River.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
animals:						
AMBLOPLITES CAVIFRONS	ROANOKE BASS	G3	S2S3	-	-	B
ELLIPTIO LANCEOLATA	YELLOW LANCE	G4	S2	2	-	C
LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL	G4	S2	2	-	C
PERCINA REX	ROANOKE LOGPERCH	G2	S1S2	LE	LE	A

SITE DESCRIPTION: In the vicinity of Double Bridge the Nottoway River is characterized by a moderate gradient, silt-free gravelly to cobbly substrates, and a luxuriant growth of the aquatic macrophyte, riverweed (Podostemum ceratophyllum). The riffle habitats support a thriving population of the Roanoke logperch (Percina rex). This federally endangered fish species is confined to the Roanoke and Chowan River drainages. Its populations are usually small and separated by long segments of river or large impoundments (Burkhead and Jenkins 1991). Two rare mussel species also are present, which suggests well-oxygenated water. A bridge crossing and a boat launching area are two minor disturbances at the site.

BOUNDARY JUSTIFICATION: The boundary encompasses the known habitat for the three rare aquatic species and a modest amount of upland buffer. This boundary should protect the natural heritage resources from immediate on-site threats such as dams, bank stabilization, and intensive shoreline development. The boundary does not address impacts of land use activities throughout the Nottoway River drainage. These impacts should be monitored, evaluated, and if necessary, mitigated.

THREATS: Threats include major watershed perturbations such as new dams, accelerated ditching or deforestation, point-source pollution, and large-scale water withdrawal. Such activities would likely degrade water quality or alter the river's natural flow regime. Mussels require certain fish hosts for their early growth, so changes in the fishery could directly affect the mussel populations.

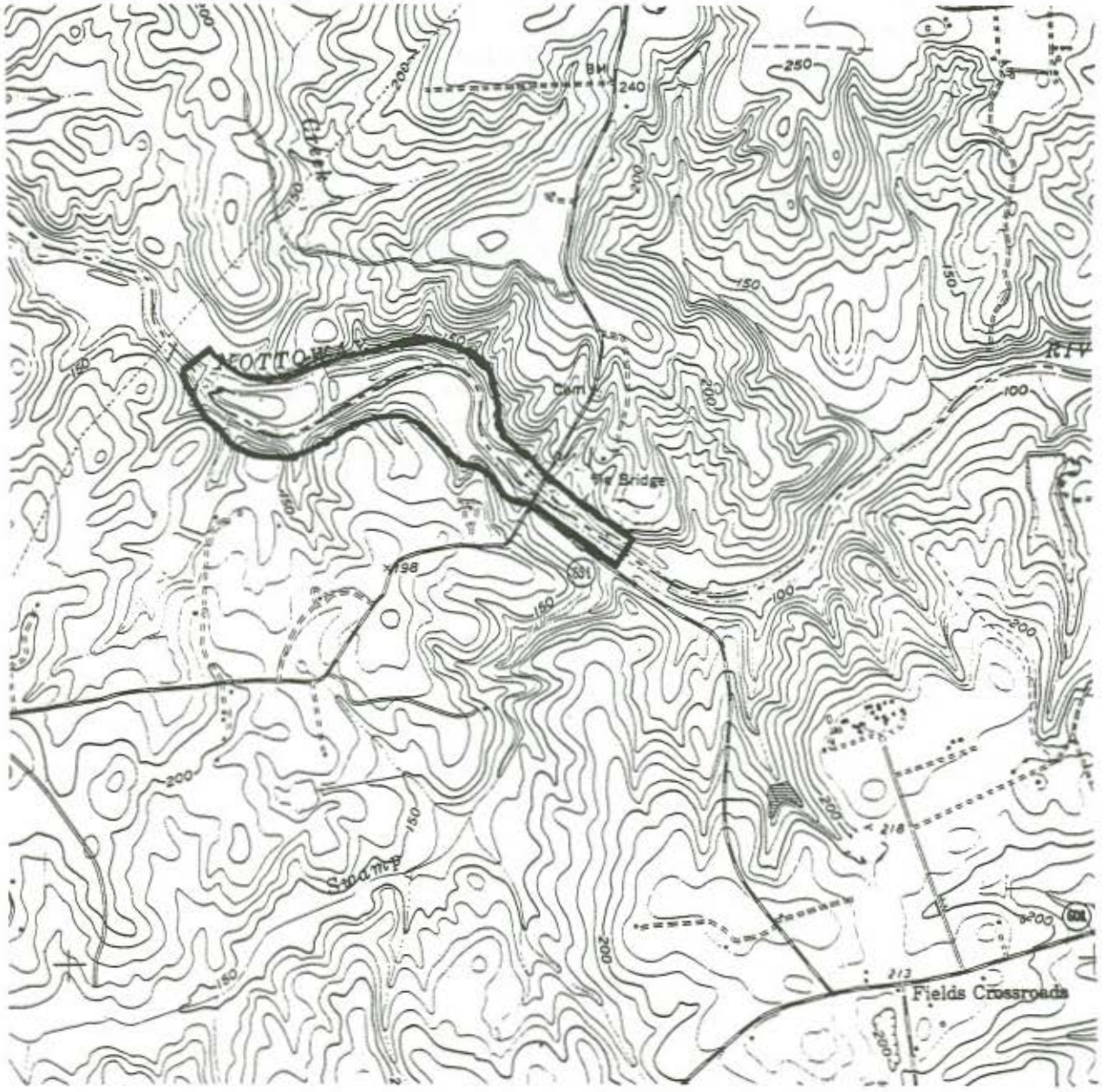
MANAGEMENT RECOMMENDATIONS: The aquatic habitat and adjacent uplands are in good natural condition and appear to require no active management. The rare species populations should be monitored to detect any change in status. Ideally, water quality monitoring should also be conducted to detect and trace to their source pollutants which might negatively impact the aquatic species.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The site warrants strong protection because it supports a thriving population of the endangered Roanoke logperch. Riparian development projects in the vicinity of Double Bridge should involve highly effective silt-control practices.

REFERENCES:

Burkhead, N.M. and R.E. Jenkins. 1991. Roanoke logperch Percina rex (Jordan and Evermann). Pages 395-397 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: DOUBLE BRIDGE
QUADRANGLE: PURDY

HALEYS BRIDGE

SIZE: ca. 1570 acres **BIODIVERSITY RANK:** B2

LOCALITY: Greensville County and Southampton County

QUADRANGLE: Margarettesville **QUADRANGLE CODE:** 3607753

LOCATION: The site encompasses a large region of bottomland along the Meherrin River north and south of Rt. 730.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
SCIRPUS FLACCIDIFOLIUS	RECLINING BULRUSH	G1?Q	S1	2	-	AB
SCIRPUS FLACCIDIFOLIUS	RECLINING BULRUSH	G1?Q	S1	2	-	C
CAREX CRUS-CORVI	RAVENFOOT SEDGE	G5	S1S2	-	-	A

SITE DESCRIPTION: This section of the Meherrin river valley is a broad mosaic of swampy bottomland and slightly higher upland habitats. Logging has recently altered a portion of the site, and the remaining bottomland forest is not considered old growth. An abandoned railroad grade bisects the area. The depressions and lowland flats experience pronounced seasonal water level fluctuation. Swamp forest vegetation is prevalent, but a few of the deeper depressions lack trees and support a lush herbaceous layer consisting of Louisiana sedge (Carex louisianica), cattail sedge (Carex typhina), halberd-leaved rose mallow (Hibiscus laevis), and the rarities ravenfoot sedge (Carex crus-corvi) and reclining bulrush (Scirpus flaccidifolius). Both of these rarities also thrive in a clear-cut area, which suggests that these species are tolerant of disturbance and respond favorably to certain forms of anthropogenic disturbance. The taxonomic status of reclining bulrush is somewhat unclear. If it is indeed a distinct species, as suggested by Schuyler (1967), then it is extremely rare globally and is a priority for conservation attention.

BOUNDARY JUSTIFICATION: The boundary includes the rare plant populations, additional potential habitat for these species, and various upland habitats which interdigitate with the wetland habitats. A 190-acre area of agricultural land and residences within the overall site boundary is excluded. The boundary is not intended to protect the site from large-scale perturbations which might affect the Meherrin River and the natural hydrology of the area.

THREATS: The rare plants evidently responded favorably to the openings created by logging. This activity is not a direct threat, although haul road

and culvert construction could alter the hydrologic regime of the wetland and degrade the rare species populations. Another threat, aggravated by logging disturbance, is the spread of exotic species. Marsh dayflower (Murdannia keisak) and Japanese honeysuckle (Lonicera japonica) both do well in logged clearings. In time they might suppress seedling establishment of the rarities. Lastly, a subpopulation of the rare bulrush near Rt. 624 could be threatened by certain roadway maintenance activities such as herbiciding, ditching, and culvert construction.

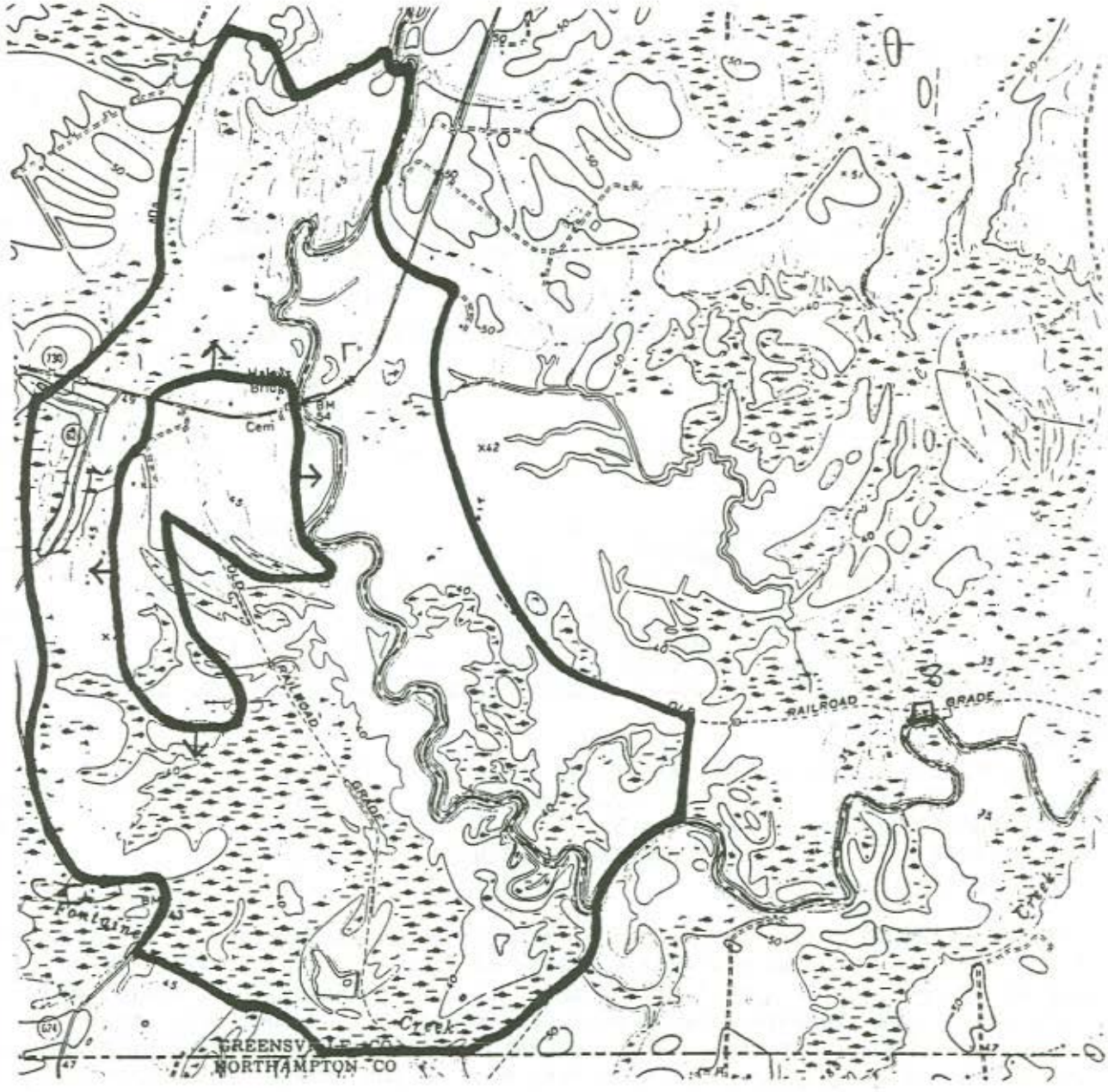
MANAGEMENT RECOMMENDATIONS: The bulrush should be the focus of management activities at the site. However, the species is poorly known and autecological research should precede management. The effects of exotic species, logging disturbance, and succession are topics worthy of study.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The site should be protected from activities which result in draining or impounding portions of this wetland. An intensive conservation effort might be delayed pending clarification of the bulrush taxonomic issue.

REFERENCES:

Schuyler, A.E. 1967. A new status for an eastern North Anmerican Scirpus. Rhodora 69:198-202.



SITE NAME: HALEYS BRIDGE
QUADRANGLE: MARGARETTESVILLE

SCALE 1:24 000

1 MILE 0

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER 0 1

N

VIRGINIA

QUADRANGLE LOCATION

PINEY GROVE

SIZE: ca. 98 acres **BIODIVERSITY RANK:** B4

LOCALITY: Sussex County

QUADRANGLE: Manry **QUADRANGLE CODE:** 3607781

LOCATION: The site lies 0.5 mile north-northwest of Piney Grove Church along the powerline right-of-way west of Route 460 and the railroad tracks.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
ASCLEPIAS RUBRA	RED MILKWEED	G4G5	S2S3	-	-	C
CAREX BARRATTII	BARRATT'S SEDGE	G3	S1S2	3C	-	CD
PLATANTHERA BLEPHARIGLOTTIS	WHITE-FRINGE ORCHIS	G4G5	S2	-	-	CD
SARRACENIA PURPUREA	NORTHERN PITCHER-PLANT	G5	S2	-	-	BC
SCLERIA MINOR	SLENDER NUTRUSH	G4G5	S2	-	-	BC
SPHAGNUM CAROLINIANUM	CAROLINA PEATMOSS	G3	S1	-	-	U
ZIGADENUS GLABERRIMUS	LARGE-FLOWERED CAMASS	G5	S1	-	-	D
animals:						
FLETCHERIMYIA FLETCHERI	PITCHER-PLANT FLY	G5	S1	-	-	C
METRIOCNEMUS KNABI	PITCHER-PLANT MIDGE	G5	S1	-	-	BC
NEONYMPHA AREOLATUS	GEORGIA SATYR	G5T4	S2S4	-	-	B
WYEOMYIA SMITHII	PITCHER-PLANT MOSQUITO	G5	S1	-	-	BC

SITE DESCRIPTION: Fire-maintained open boggy wetlands have nearly disappeared from Virginia's coastal plain as a result of fire suppression. Fortunately, bog plants persist in wet clearings maintained along powerlines, roads, and railroads. Three separate boggy wetlands are present on the Piney Grove powerline. Soils here are perennially saturated due to groundwater seepage, and sphagnum moss (Sphagnum spp.) covers much of the ground. Periodic mowing and brush removal have greatly benefited the seven rare plant species. Without these activities, woody growth would have eliminated most or all of the rarities.

Many insects require particular plant species for food and other life history needs. When a plant is rare, highly dependent insects will most likely also be rare. Such a relationship is evident at Piney Grove. Three rare insect species were found living in the water-filled leaves of the northern pitcher-plant (Sarracenia purpurea), a rare species in Virginia. Never before had these insects been collected in the state. This ecological relationship provided an insight into the complexity of natural systems and

reaffirmed that natural areas are best evaluated when using the combined talents and perceptions of an interdisciplinary scientific team.

BOUNDARY JUSTIFICATION: The boundary includes the three boggy wetlands, their immediate drainages, and sufficient upland area to protect the wetlands from detrimental off-site impacts.

THREATS: Threats include construction of ditches, widespread application of herbicides, disturbance from off-road vehicles, development of adjacent land, and removal of pitcher-plants by carnivorous plant enthusiasts.

MANAGEMENT RECOMMENDATIONS: Regular mowing has maintained the open condition of the wetland vegetation which, in turn, has enabled the rare plants to persist in the absence of competitive woody growth. Mowing or prescribed burning should continue at this site, and herbicides should not be used in this area. The amount of open wetland habitat could be enlarged by burning portions of the adjacent wet forest. Fire represents a natural process which should be restored to the site.

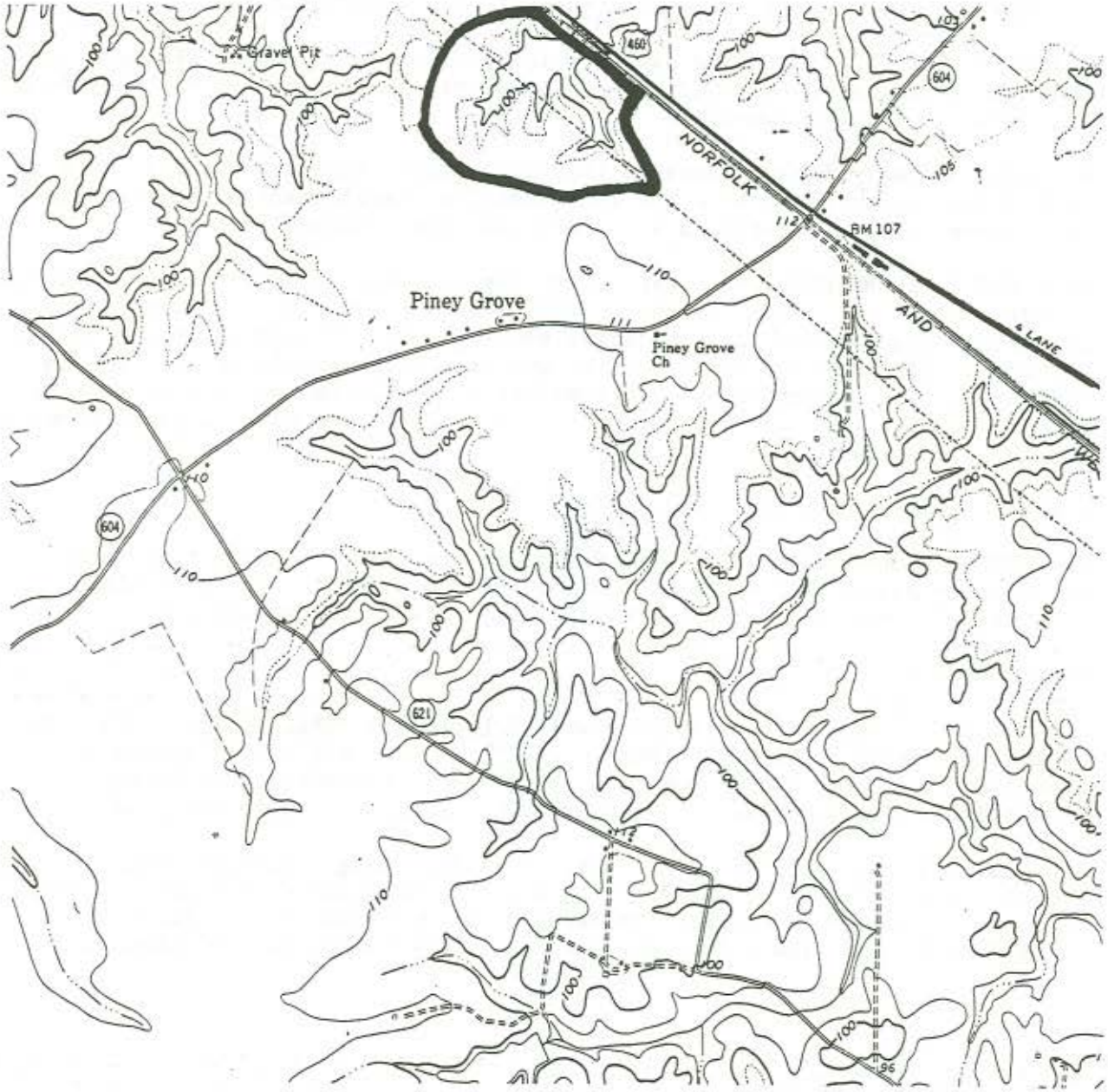
CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The Piney Grove wetlands offer a tremendous opportunity for natural area protection and enhancement. The ecological benefits of prescribed burning would likely exceed all expectation.

REFERENCES:

Ludwig, J.C. 1991. White fringed orchid Habenaria blephariglottis (Willdenow) Hooker. Pages 92-93 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Stevens, C.E. and T.F. Wieboldt. 1991. Barratt's sedge Carex barrattii Schweinitz and Torrey. Pages 70-71 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: PINEY GROVE
QUADRANGLE: MANRY

SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

VIRGINIA

QUADRANGLE LOCATION

N

MANRY 604-606

SIZE: ca. 2780 acres **BIODIVERSITY RANK:** B3

LOCALITY: Sussex County

QUADRANGLE: Manry **QUADRANGLE CODE:** 3607781

LOCATION: The site includes mature pine forest, roadside habitats, and small wetlands located north and south of Route 604, east of the junction of Routes 604 and 606.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
SEYMERIA CASSIOIDES	SEYMERIA	G5	S1S2	-	-	AB
SPHAGNUM CAROLINIANUM	CAROLINA PEATMOSS	G3	S1	-	-	U
animals:						
PICOIDES BOREALIS	RED-COCKADED WOODPECKER	G2	S1	LE	LE	C
SCIURUS NIGER NIGER	FOX SQUIRREL	G5T?	S1	-	-	U

SITE DESCRIPTION: The Manry 604-606 site is the best of three remaining nesting habitats for the federally endangered Red-cockaded Woodpecker (Picoides borealis) in Virginia. The mature, widely-spaced loblolly pines (Pinus taeda) are ideal for this cavity-nesting bird, but there is concern that understory trees have become too large and have diminished the quality of the woodpecker habitat. The site is also significant for its phenomenal population of seymeria (Seymeria cassioides), a plant indicative of prime pine barren habitats. All of the seymeria at the site is presently restricted to roadsides and a utility line right-of-way.

BOUNDARY JUSTIFICATION: The boundary includes the known rare species occurrences and, in the case of the Red-cockaded Woodpecker, enough land for foraging and brood rearing activity. The foraging range of Red-cockaded Woodpecker family groups in Virginia averages 120 hectares (Bradshaw 1990). Additional forest land is included to mitigate impacts from off-site land use activities, and to permit the option of prescribed burning as a management technique.

THREATS: Threats include land development, clear-cutting, roadside herbiciding, and habitat degradation resulting from continued fire suppression and unchecked understory growth.

MANAGEMENT RECOMMENDATIONS: This site, if managed for natural heritage resources, could become one of the ecological jewels of southeastern Virginia. Not only could the habitat for Red-cockaded Woodpeckers be improved through the use of prescribed burning, but a pine savanna approximating original forest conditions could be created.

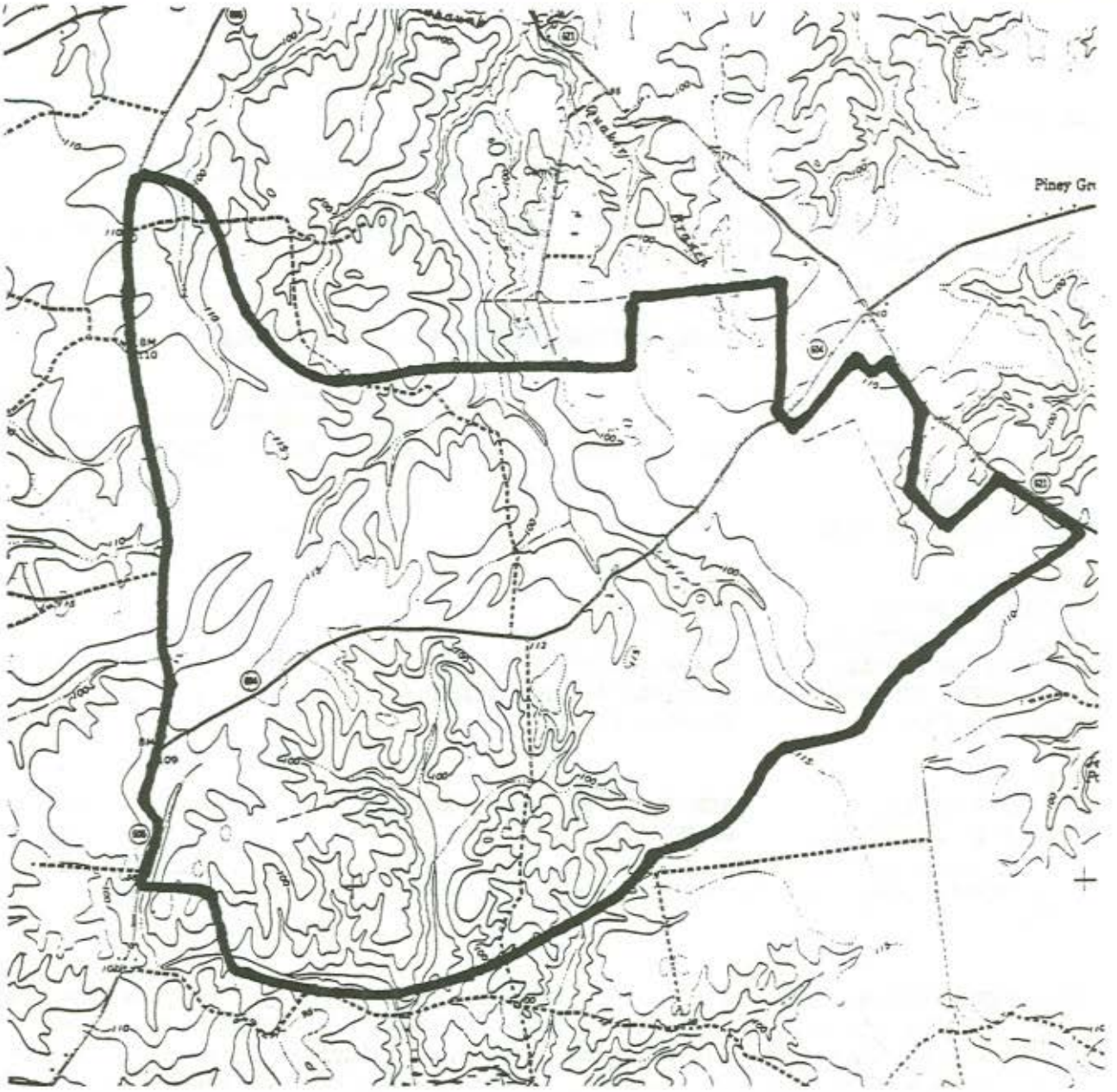
CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site represents a high priority for conservation attention in southeast Virginia.

REFERENCES:

Beck, R. A. 1991. Red-cockaded woodpecker Picoides borealis (Vieillot). Pages 513-514 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Bradshaw, D.S. 1990. Habitat quality and seasonal foraging patterns of the red-cockaded woodpecker (Picoides borealis) in southeastern Virginia. M.S. Thesis, The College of William and Mary in Virginia, Williamsburg.



SITE NAME: MANRY 604-606
QUADRANGLE: MANRY

SCALE 1:24 000

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

KILOMETER

N

VIRGINIA

QUADRANGLE LOCATION

MANRY-WAKEFIELD SITE

SIZE: ca. 300 acres **BIODIVERSITY RANK:** B3

LOCALITY: Sussex County

QUADRANGLE: Manry **QUADRANGLE CODE:** 3607781

LOCATION: The site lies south/west of Rt. 460, south of Rt. 604, and north of Brittles Millpond. It is bisected by the Norfolk and Western Railroad.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC FOREST		-	-	-	-	BC
plants [1] :						
ASCLEPIAS RUBRA	RED MILKWEED	G4G5	S2S3	-	-	CD
CTENIUM AROMATICUM	TOOOTHACHE GRASS	G5	S1	-	-	U
DROSERA BREVIFOLIA	DWARF SUNDEW	G5	S2	-	-	C
SARRACENIA PURPUREA	NORTHERN PITCHER-PLANT	G5	S2	-	-	C
SCLERIA MINOR	SLENDER NUTRUSH	G4G5	S2	-	-	D
animals:						
PICOIDES BOREALIS	RED-COCKADED WOODPECKER	G2	S1	LE	LE	U
NEONYMPHA AREOLATUS	GEORGIA SATYR	G5T4	S2S4	-	-	B

[1] Asclepias rubra, Sarracenia purpurea, and Scleria minor have multiple occurrences here.

SITE DESCRIPTION: A stand of mature loblolly pine (Pinus taeda), visible from Route 460, is the most conspicuous feature of the site. Until very recently the federally endangered Red-cockaded Woodpecker (Picoides borealis) occurred here. Dana S. Bradshaw, an authority on the ecology of this woodpecker species, surmises that the woodpecker family group from this site moved a short distance to the Manry 604-606 site. The pine woodland represents ideal woodpecker habitat, so the site might yet again support this rare bird.

Five rare plant species occur primarily alongside the railroad and in the powerline right-of-way. These species require open, wet-soil habitats, and consequently are scarce in the shaded forested habitat.

BOUNDARY JUSTIFICATION: The site includes the mature pine stand, wet-soil habitats along the railroad and powerline right-of-way, and additional lands needed to sustain foraging activity of the Red-cockaded Woodpecker.

THREATS: Because the site borders Route 460, a major highway, the threat of land development is a real concern. Clear-cutting also constitutes an obvious threat to the woodpecker habitat.

MANAGEMENT RECOMMENDATIONS: In the past, the forest was managed using prescribed fire. This activity suppressed the growth of understory hardwood trees and created the beautiful open pine stand. Continued use of prescribed burning is recommended for this site. Burning should greatly benefit the rare plant species and maintain the woodpecker habitat.

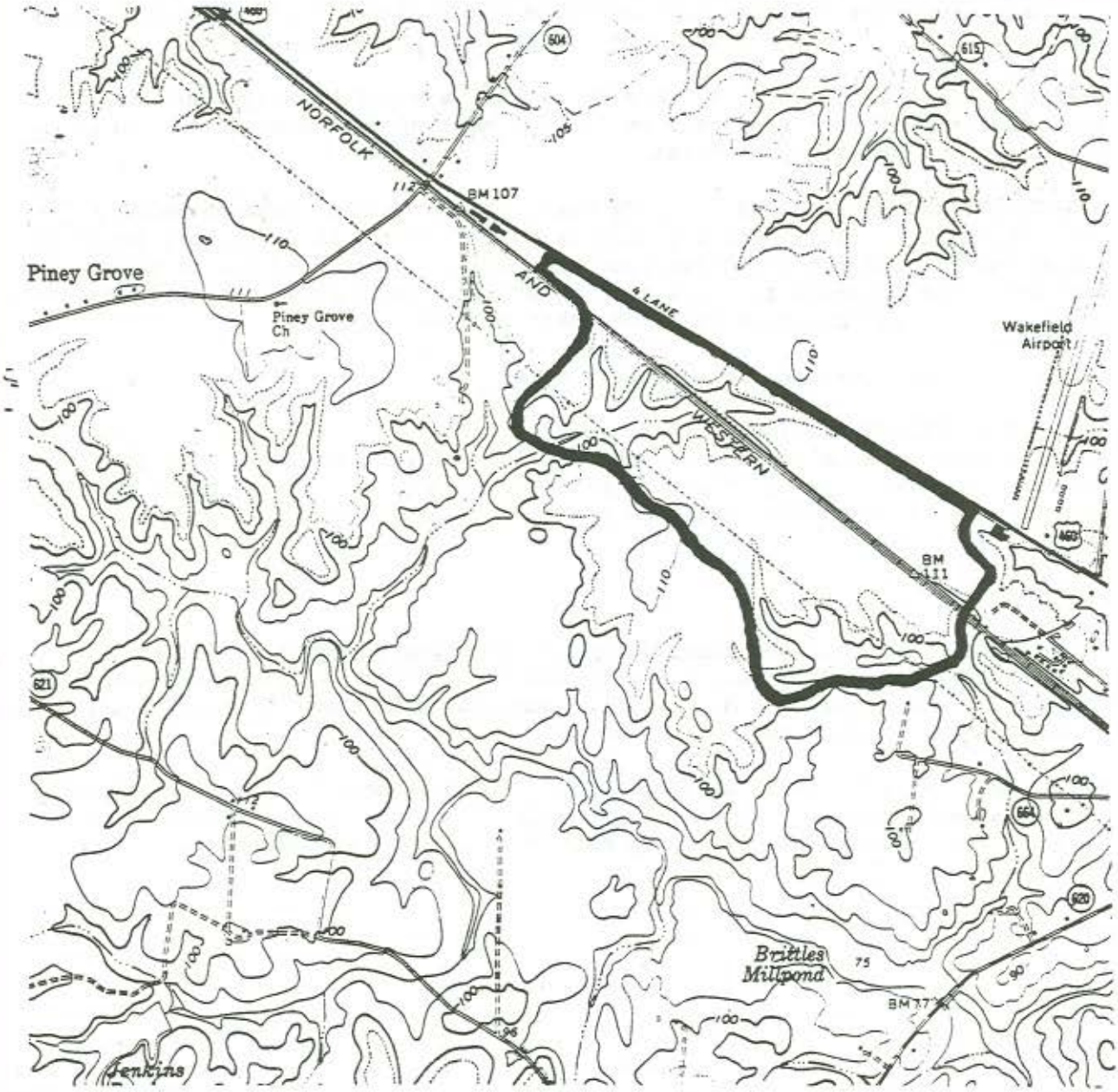
CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Because of its proximity to Route 460, this site could become an accessible and highly visible natural heritage demonstration area. Selective logging of mature pines would not necessarily be in conflict with the best management practices for the natural heritage resources.

REFERENCES:

Beck, R. A. 1991. Red-cockaded woodpecker Picoides borealis (Vieillot). Pages 513-514 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Bradshaw, D.S. 1990. Habitat quality and seasonal foraging patterns of the red-cockaded woodpecker (Picoides borealis) in southeastern Virginia. M.S. Thesis, The College of William and Mary in Virginia, Williamsburg.



SITE NAME: MANRY-WAKEFIELD SITE
QUADRANGLE: MANRY

SUSSEX SCHOOLHOUSE

SIZE: ca. 1225 acres **BIODIVERSITY RANK:** B3

LOCALITY: Sussex County

QUADRANGLE: Sussex **QUADRANGLE CODE:** 3607783

LOCATION: The site is located south of Rt. 40 at the junction of Rt. 641 and Cabin Point Swamp.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
CAREX BARRATTII	BARRATT'S SEDGE	G3	S1S2	3C	-	B
animals:						
PICOIDES BOREALIS	RED-COCKADED WOODPECKER	G2	S1	LE	LE	U

SITE DESCRIPTION: The site is significant because it supports large, old-growth loblolly pines (Pinus taeda) and the federally endangered Red-cockaded Woodpecker (Picoides borealis). A globally rare sedge occurs in the forested wetland of Cabin Point Swamp.

BOUNDARY JUSTIFICATION: The boundary includes the known rare species occurrences and, in the case of the Red-cockaded Woodpecker, enough land for foraging and brood rearing activity. The foraging range of Red-cockaded Woodpecker family groups in Virginia averages 120 hectares (Bradshaw 1990). Additional forest land is included to mitigate impacts from off-site land use activities, and permit the option of prescribed burning as a management technique.

THREATS: Clear-cutting is the most serious threat. A clear-cut immediately north of the site may have already diminished the viability of the woodpecker population by eliminating a large amount of foraging habitat. Another threat to the woodpecker is habitat degradation resulting from unchecked growth of understory hardwood trees.

MANAGEMENT RECOMMENDATIONS: The management objective for Red-cockaded Woodpeckers is to create and maintain an open, park-like stand of mature pine trees. Prescribed burning is the recommended technique for achieving this objective, although stand thinning by mechanical methods could also be used.

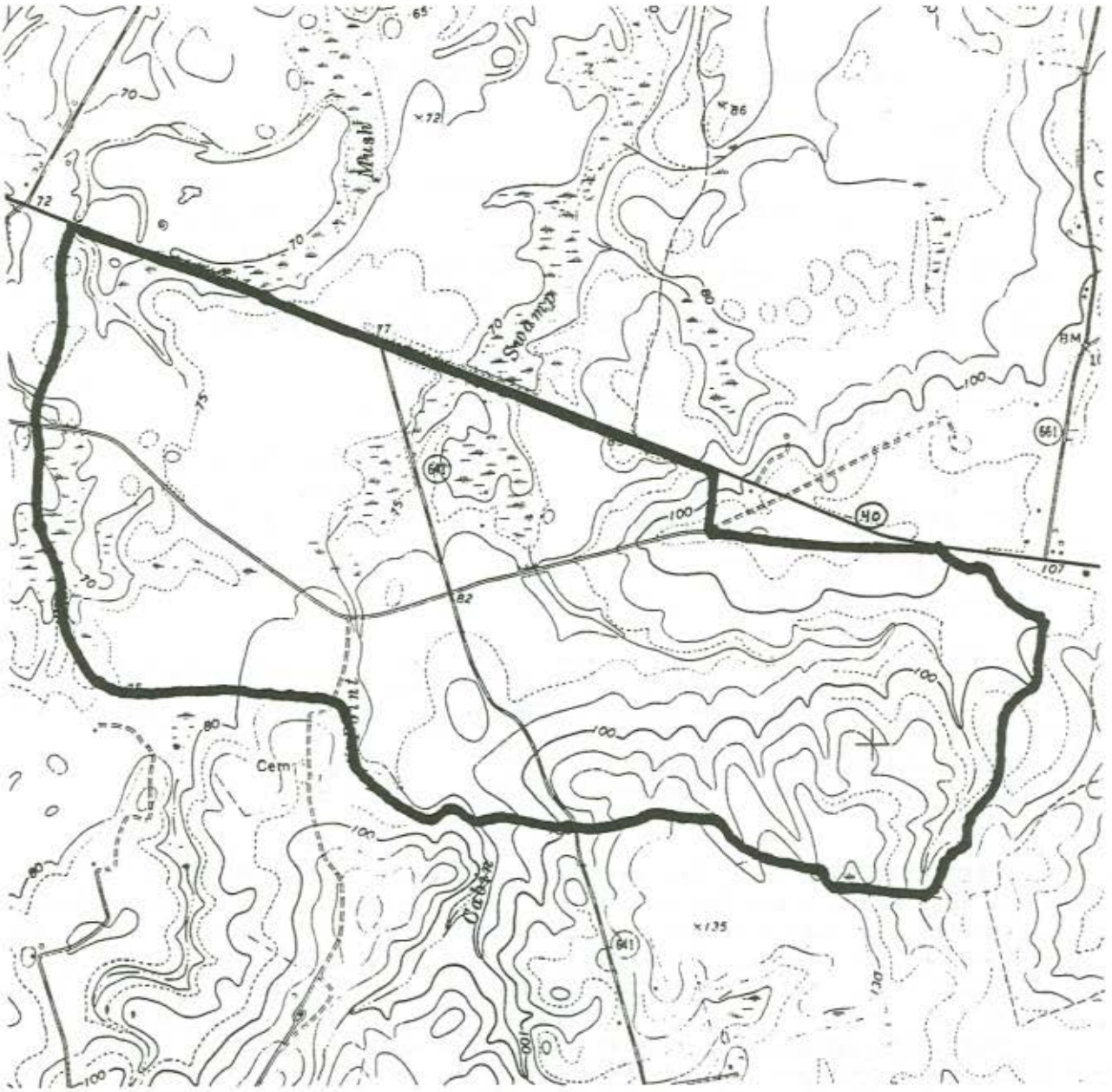
CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Because of recent clear-cutting and habitat fragmentation, the long-term viability of the woodpecker population here is in question. Nevertheless, the site should be protected from further degradation and managed in an environmentally sensitive manner.

REFERENCES:

Beck, R. A. 1991. Red-cockaded woodpecker Picoides borealis (Vieillot). Pages 513-514 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Bradshaw, D.S. 1990. Habitat quality and seasonal foraging patterns of the red-cockaded woodpecker (Picoides borealis) in southeastern Virginia. M.S. Thesis, The College of William and Mary in Virginia, Williamsburg.



SITE NAME: SUSSEX SCHOOLHOUSE
QUADRANGLE: SUSSEX, VA.

CHUB SANDHILL

SIZE: ca. 825 acres **BIODIVERSITY RANK:** B3

LOCALITY: Sussex County

QUADRANGLE: Sebrell **QUADRANGLE CODE:** 3607772
Littleton 3607782

LOCATION: The site lies on both sides of Route 631, centered near the junction of Routes 631 and 607. It extends north nearly to the Nottoway River, and south along Route 607 to the Virginia Department of Forestry tree nursery facility.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC WOODLAND	-	-	S1	-	-	C
plants:						
DESMODIUM STRICTUM	PINELAND TICK-TREFOIL	G3G4	S2	-	-	C
LITHOSPERMUM CAROLINIENSE	GOLDEN PUCCOON	G4G5	S1	-	-	B
PEDIOMELUM CANESCENS	HOARY SCURFPEA	G2G4	S1	-	-	D
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	C
STILLINGIA SYLVATICA	QUEEN'S DELIGHT	G4G5	S1	-	-	C

SITE DESCRIPTION: This site features a series of low sandhills on an upland plain just east of the Nottoway River. Much of the original native sandhill vegetation has been converted to agricultural fields, sand pits, roads, and dwellings. Fortunately, a few small tracts of natural woodland remain. From a botanical perspective, the Chub Sandhill is highly significant and somewhat enigmatic. Botanists are most intrigued by the presence of golden puccoon (Lithospermum caroliniense), a species disjunct from South Carolina. The plant was discovered here by eminent botanist M.L. Fernald more than 50 years ago. The sandhill vegetation has affinity to that known to support the puccoon in South Carolina and Georgia. Species such as sand post oak (Quercus margarettae), eastern prickly-pear (Opuntia humifusa), queen's delight (Stillingia sylvatica), wooly three-awn (Aristida lanosa), and risky tread-softly (Cnidoscolus stimulosus) are shared in common. The Chub Sandhill once burned frequently, but because it has not burned in many years, the puccoon and other fire-dependent rarities are declining. The conservation of this site is paramount.

BOUNDARY JUSTIFICATION: To form a viable natural area at this site, the conservation planning boundary includes not only the remaining tracts of natural woodland, but some additional lands needed mitigate negative impacts

from adjacent land uses. Sufficient land is also included to permit the safe application of prescribed burning management.

THREATS: Threats are severe. Sand mining, agriculture, forest conversion to pine plantations, and various developments have already destroyed or degraded most of the original natural woodland. These activities are pervasive in southeastern Virginia and they pose threats to this highly significant natural area. An additional threat comes from the use of herbicides in conjunction with agriculture or right-of-way maintenance.

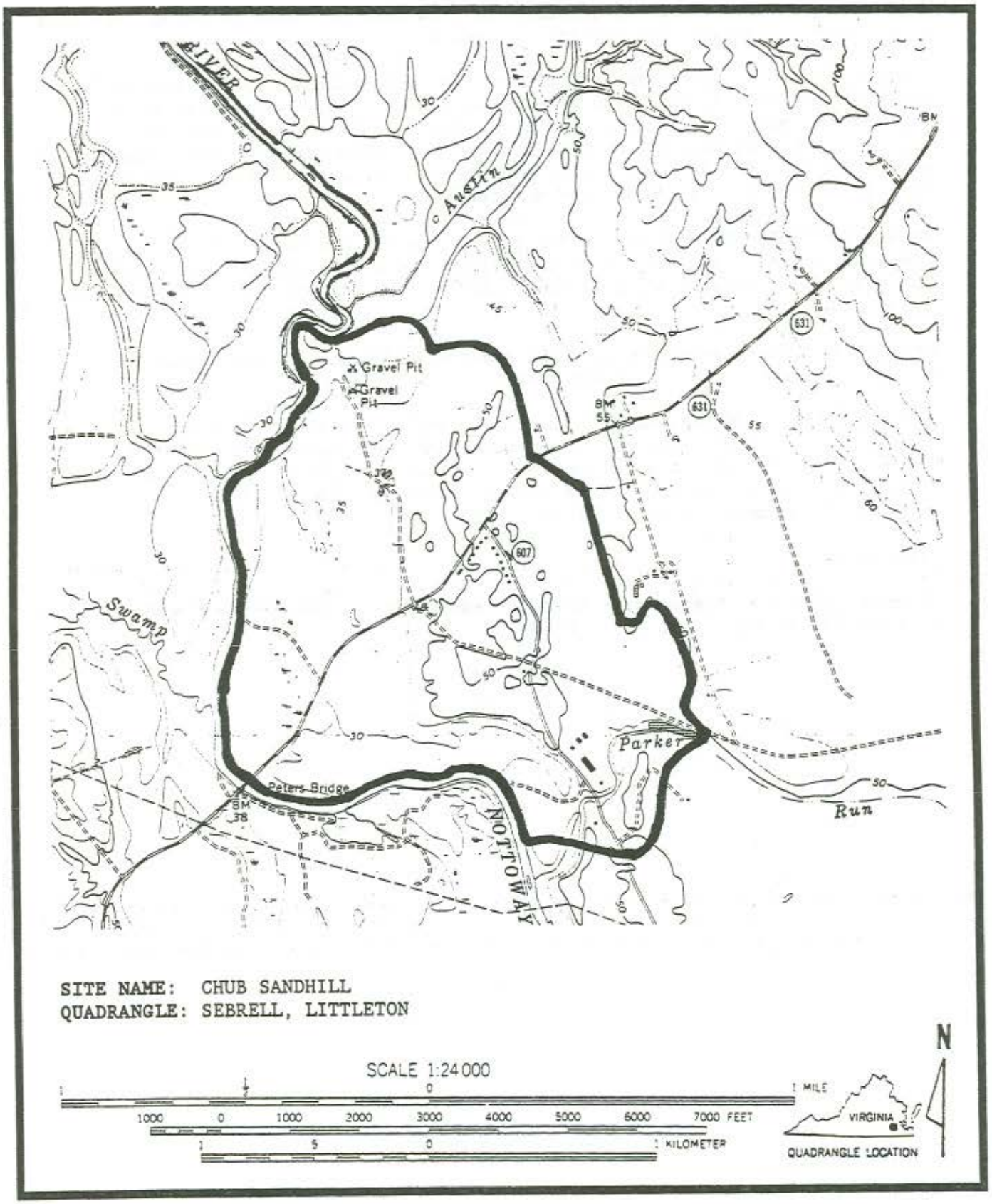
MANAGEMENT RECOMMENDATIONS: After key tracts are protected in some manner, the most urgent management need is to initiate a prescribed burning program. The rare plant species will no doubt flourish in the openings created by the fire.

CURRENT STATUS: Except for a small area owned by the Virginia Department of Forestry, the site is privately owned.

PROTECTION RECOMMENDATIONS: This site warrants immediate conservation attention, primarily because it supports two plant species found nowhere else in Virginia. If the site is destroyed, citizens of Virginia lose two beautiful wildflowers from their natural heritage, and biologists lose a superlative example of plant disjunction.

REFERENCES:

Fernald, M.L. 1941. Another century of additions to the flora of Virginia. Rhodora 43:485-665. (see pp. 498-499)



SITE NAME: CHUB SANDHILL
QUADRANGLE: SEBRELL, LITTLETON

HUSKE FLATWOODS

SIZE: ca. 690 acres **BIODIVERSITY RANK:** B4

LOCALITY: Sussex County

QUADRANGLE: Stony Creek **QUADRANGLE CODE:** 3607784

LOCATION: The site lies 1.75 miles south of Stony Creek, between the Seaboard Coast Railroad and Rt. 301.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC SEMIPERMANENTLY FLOODED SCRUB		-	-	-	-	B
plants:						
CAREX BARRATTII	BARRATT'S SEDGE	G3	S1S2	3C	-	C

SITE DESCRIPTION: This site embraces a diverse assemblage of wetland habitats including marshy oxbow ponds, shrub swamp, and deciduous swamp forest. Water levels which fluctuate with the seasons inhibit tree growth in the deepest depressions, and maintain open habitats for the rare plant species, Barratt's sedge (Carex barrattii). The shrub swamp represents an exemplary community. It covers about 10 acres and is in relatively pristine condition. Dominant and noteworthy plants include swamp rose (Rosa palustris), black willow (Salix nigra), buttonbush (Cephalanthus occidentalis), button sedge (Carex bullata), bladderworts (Utricularia spp.), and globe-fruited false-loosestrife (Ludwigia sphaerocarpa). The potential for rare aquatic insects is excellent.

BOUNDARY JUSTIFICATION: The boundary includes the mosaic of wetland and upland habitats east of the railroad. It does not include agricultural and residential lands along Route 301.

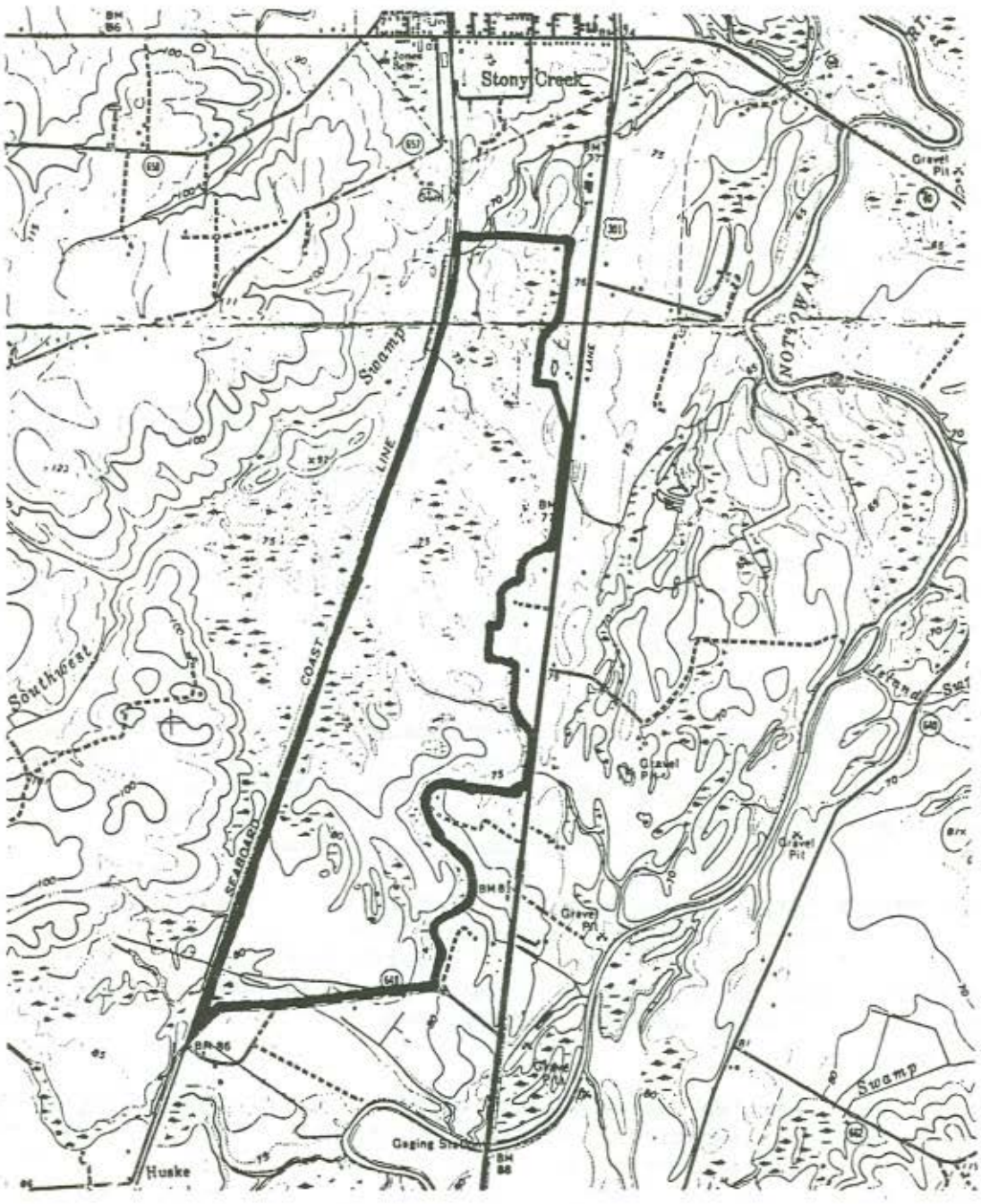
THREATS: Drainage is an ever-present threat at a wetland such as this. Ditching might occur along the railroad tracks or in conjunction with forestry practices. Culvert enlargement also could lead to drainage.

MANAGEMENT RECOMMENDATIONS: No active management of the site appears to be necessary. The rare species should be monitored, however, to detect and correct future ecological problems at the site.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site would make a fine conservation area. It supports rare plant species and appears to be unusually productive for wetland wildlife.

REFERENCES:



SITE NAME: HUSKE FLATWOODS
QUADRANGLE: STONY CREEK

STONY CREEK TOWN

SIZE: ca. 21 acres **BIODIVERSITY RANK:** B3

LOCALITY: Sussex County

QUADRANGLE: Stony Creek **QUADRANGLE CODE:** 3607784

LOCATION: The site currently extends from Stony Creek mile 1.1 to 1.6 in the vicinity of the I 95 bridge.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
animals:						
AMBLOPLITES CAVIFRONS	ROANOKE BASS	G3	S2S3	-	-	U
NECTURUS PUNCTATUS	DWARF WATERDOG	G4	SU	-	-	U
PERCINA REX	ROANOKE LOGPERCH	G2	S1S2	LE	LE	U
SIREN LACERTINA	GREATER SIREN	G5	SU	-	-	U

SITE DESCRIPTION: Four rare aquatic vertebrates have been documented from Stony Creek in the vicinity of the Interstate 95 bridge. The rarest species, the Roanoke logperch (Percina rex), has not been seen here since 1970, but because large sections of Stony Creek have not been field checked due to difficult access, this species is presumed to be extant.

BOUNDARY JUSTIFICATION: The boundary of this site is preliminary because additional field work is needed upstream and downstream to determine the full extent of the rare species populations. Nevertheless, the boundary serves as a "red flag" noting the occurrence of rare aquatic species in Stony Creek, and illustrating the need to exercise environmentally sensitive land use planning in this area.

THREATS: Channelization, water quality degradation, siltation, and hydrologic regime perturbations constitute threats. Ecological problems may also arise from accidental spills along I 95.

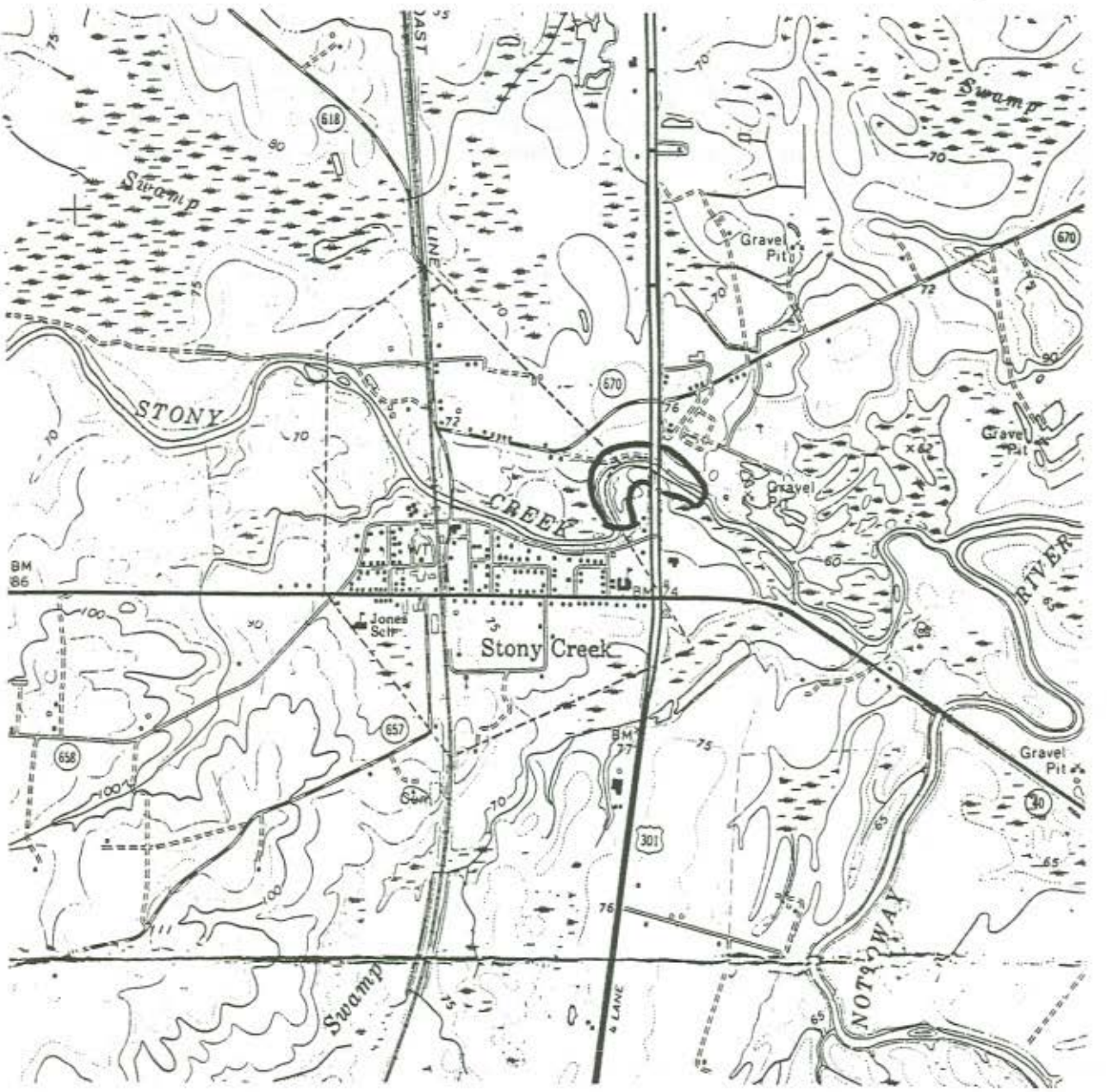
MANAGEMENT RECOMMENDATIONS: Additional field work is needed here to ascertain management needs. At the very least, the rare species should be monitored.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Protecting and maintaining water quality in Stony Creek is the key to conserving the rare aquatic organisms. Any on-site land protection activities should await the outcome of additional field survey efforts.

REFERENCES:

Burkhead, N.M. and R.E. Jenkins. 1991. Roanoke logperch Percina rex (Jordan and Evermann). Pages 395-397 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: STONY CREEK TOWN
QUADRANGLE: STONY CREEK

SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER

N

VIRGINIA
QUADRANGLE LOCATION

SOUTH JARRATT MEADOWS

SIZE: ca. 48 acres **BIODIVERSITY RANK:** B3

LOCALITY: Sussex

QUADRANGLE: Jarratt **QUADRANGLE CODE:** 3607774

LOCATION: The site borders the railroad tracks south of Jarratt, west of Route 301 and the Chapel Hill Church.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC SATURATED HERBACEOUS VEGETATION		G2?	-	-	-	C
plants:						
BUCHNERA AMERICANA	BLUE-HEARTS	G3G4	S1	-	-	B
CAREX BARRATTII	BARRATT'S SEDGE	G3	S1S2	3C	-	BC
CAREX VESTITA	A SEDGE	G5	S1	-	-	C
CIRSIUM VIRGINIANUM	VIRGINIA THISTLE	G3G4	S2	-	-	B
ERYNGIUM YUCCIFOLIUM	RATTLESNAKE-MASTER	G5	S2	-	-	C

SITE DESCRIPTION: Through various accidents of history, small wet meadows have been preserved and maintained alongside the railroad south of Jarratt. These parcels of land were generally too close to the railroad to be farmed, or occurred as tracts too narrow for building sites. Coal burning trains of yesteryear regularly spawned fires which burned the meadows, and unburned sections were cleared of brush. The resulting wet meadows are prairie-like and exceedingly rich in plant species. They appear to represent a globally rare community type. One of the rarer plants ever collected in Virginia, chaffseed (Schwalbea americana), came from this site, but this species has not been seen since 1938. Five rare plant species are still present however, including the globally rare Barratt's sedge (Carex barrattii).

BOUNDARY JUSTIFICATION: The boundary includes three discreet areas which support rare plant species. Ideally additional buffer land would be included in the natural area boundary, but this was not possible considering the proximity of the railroad tracks and roads.

THREATS: The rare plants at this site are extremely vulnerable to threats such as herbicides, ditching, road expansion and off-road vehicle use. The largest and best meadow was mowed in 1991 and 1992. While this activity benefits the grassland by suppressing woody plant growth, the timing of the

mowing should be adjusted so that the rare plants are able to produce and disperse seeds.

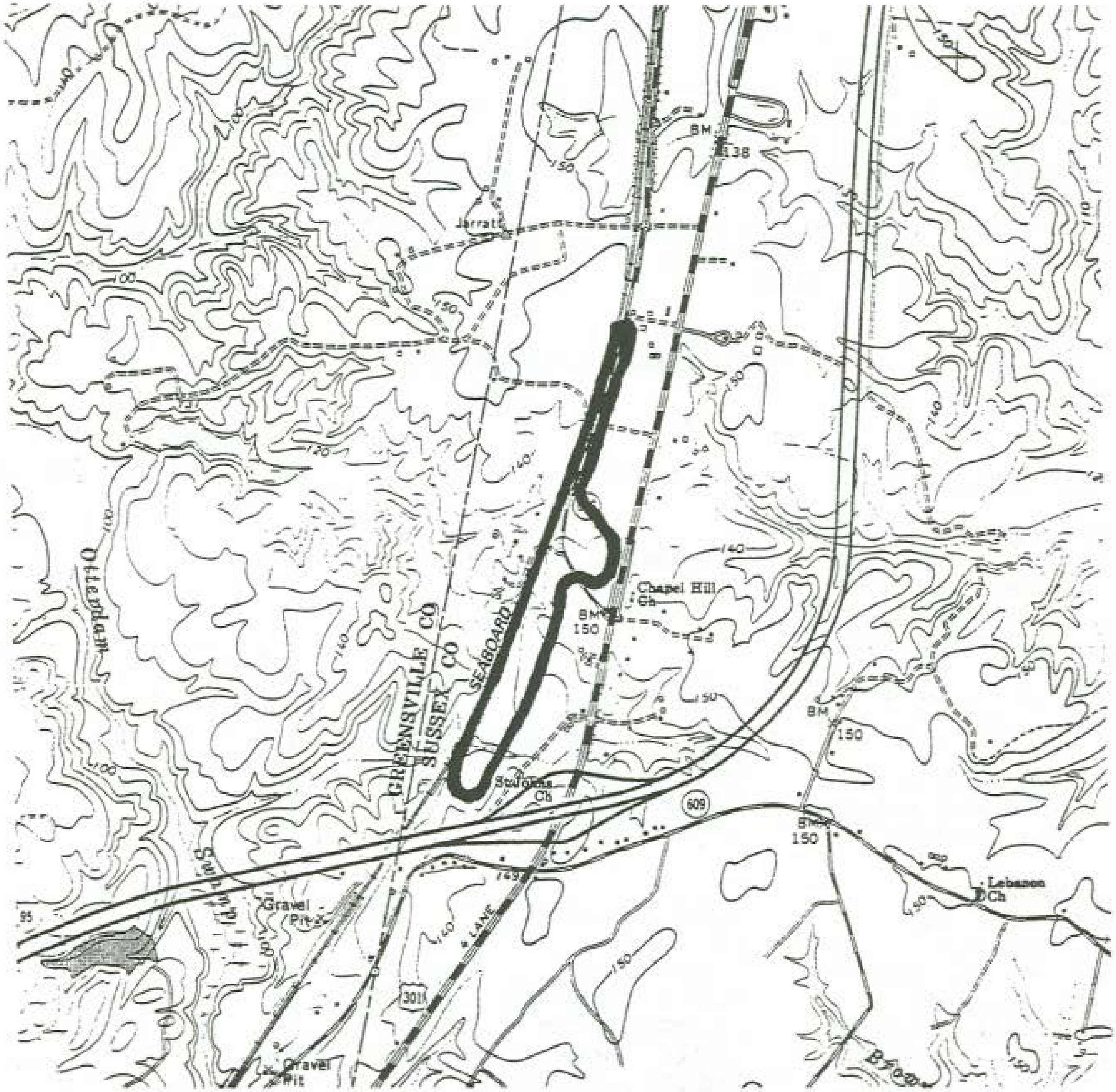
MANAGEMENT RECOMMENDATIONS: Ideally, these grasslands should be managed using prescribed burning. All of the rare plant species are well adapted to fire and they should increase dramatically. Some wetland scrub and wetland forest habitat near the meadows should be managed with fire to create additional meadow vegetation and rare species habitat. Chaffseed is absolutely dependent on fire. We hope that its seeds are still viable in the soil, and that it reappears at the site following fire.

CURRENT STATUS: The site is privately owned.

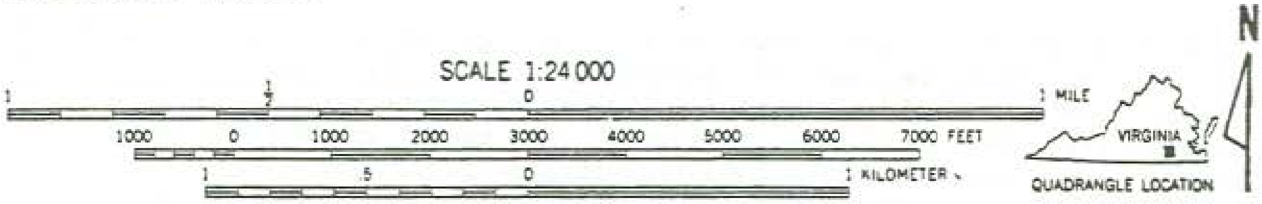
PROTECTION RECOMMENDATIONS: Protection of this small, vulnerable and highly significant area is strongly recommended.

REFERENCES:

Stevens, C.E. and T.F. Wieboldt. 1991. Barratt's sedge Carex barrattii Schweinitz and Torrey. Pages 70-71 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: SOUTH JARRATT MEADOWS
QUADRANGLE: JARRATT



NOTTOWAY BLUFFS

SIZE: ca. 3746 acres **BIODIVERSITY RANK:** B3

LOCALITY: Sussex County and Southampton County

QUADRANGLE: Sebrell **QUADRANGLE CODE:** 3607772

LOCATION: This large site extends from Peters Bridge to Careys Bridge along the Nottoway River. It includes the river, the bottomland, steep bluffs, and dissected uplands west of the river.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
EUTROPHIC SEASONALLY FLOODED FOREST		-	-	-	-	AB
OLIGOTROPHIC FOREST		-	-	-	-	B
PERMESOTROPHIC FOREST		-	-	-	-	B
SUBMESOTROPHIC FOREST		-	-	-	-	B
plants:						
CAREX RENIFORMIS	RENIFORM SEDGE	G4?	S1	-	-	U
DESMODIUM STRICTUM	PINELAND TICK-TREFOIL	G3G4	S2	-	-	D
JUSTICIA OVATA	OVATE WATER-WILLOW	G5	S1	-	-	A
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	C
VIOLA ESCULENTA	SALAD VIOLET	G4G5	S1	-	-	A
animals:						
AMBYSTOMA MABEEI	MABEE'S SALAMANDER	G4	S1	-	LT	C
CORDULEGASTER FASCIATA	A DRAGONFLY	G3Q	S1	-	-	C
ELLIPTIO LANCEOLATA	YELLOW LANCE	G4	S2S3	-	-	H
EPITHECA SPINOSA	ROBUST BASKETTAIL	G3G4	S1	-	-	B
FUSCONAIA MASONI	ATLANTIC PIGTOE	G2	S2	2	LT	D
LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL	G4	S2	2	-	D
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	G5	S2	-	-	C
PERCINA REX	ROANOKE LOGPERCH	G2	S1S2	LE	LE	U
PICOIDES BOREALIS	RED-COCKADED WOODPECKER	G2	S1	LE	LE	C

SITE DESCRIPTION: The Nottoway River is recognized as one of the nation's significant inland wetlands (Goodwin and Niering 1975). This section of the river contains exemplary riverine, palustrine, and terrestrial natural communities. The river supports several rare mussel species, as well as the federally endangered Roanoke logperch (Percina rex). The bottomlands are extensive and truly impressive. Large old-growth trees are present, including state-champions. A portion of the bottomland with old growth bald cypress

(Taxodium distichum), water tupelo (Nyssa aquatica), and sweet gum (Liquidambar styraciflua) is protected as a natural area by Union Camp Corporation. A mature loblolly pine (Pinus taeda) forest and the federally endangered Red-cockaded Woodpecker (Picoides borealis) are present on the western uplands. The pines are tall and well-formed. In the past, understory hardwoods were removed, which helped maintain a woodland, rather than forest, vegetation structure.

Exemplary terrestrial communities range from dry oligotrophic forests on well-drained alluvial sediments, to permesotrophic forests on steep, fertile bluffs of marl. A great number of vascular plant species occur here because of the diversity of habitats. This large area requires further inventory.

BOUNDARY JUSTIFICATION: The boundary represents a rough approximation of lands necessary to protect the significant natural features of the site. More detailed boundaries should be drawn following additional intensive on-the-ground inventory. The western uplands are included to protect foraging habitat for the Red-cockaded Woodpecker.

THREATS: Logging is the most serious threat to the old-growth forests, their associated rare plants, and the Red-cockaded Woodpecker. Water quality degradation is a threat to the aquatic species.

MANAGEMENT RECOMMENDATIONS: Most of site requires little or no active management, but rare plant habitat within the dry oligotrophic forest could be greatly improved through the use of prescribed burning. Fire would also improve habitat for the Red-cockaded Woodpecker by reducing understory vegetation. The population status of the rare species should be monitored.

CURRENT STATUS: The site is privately owned.

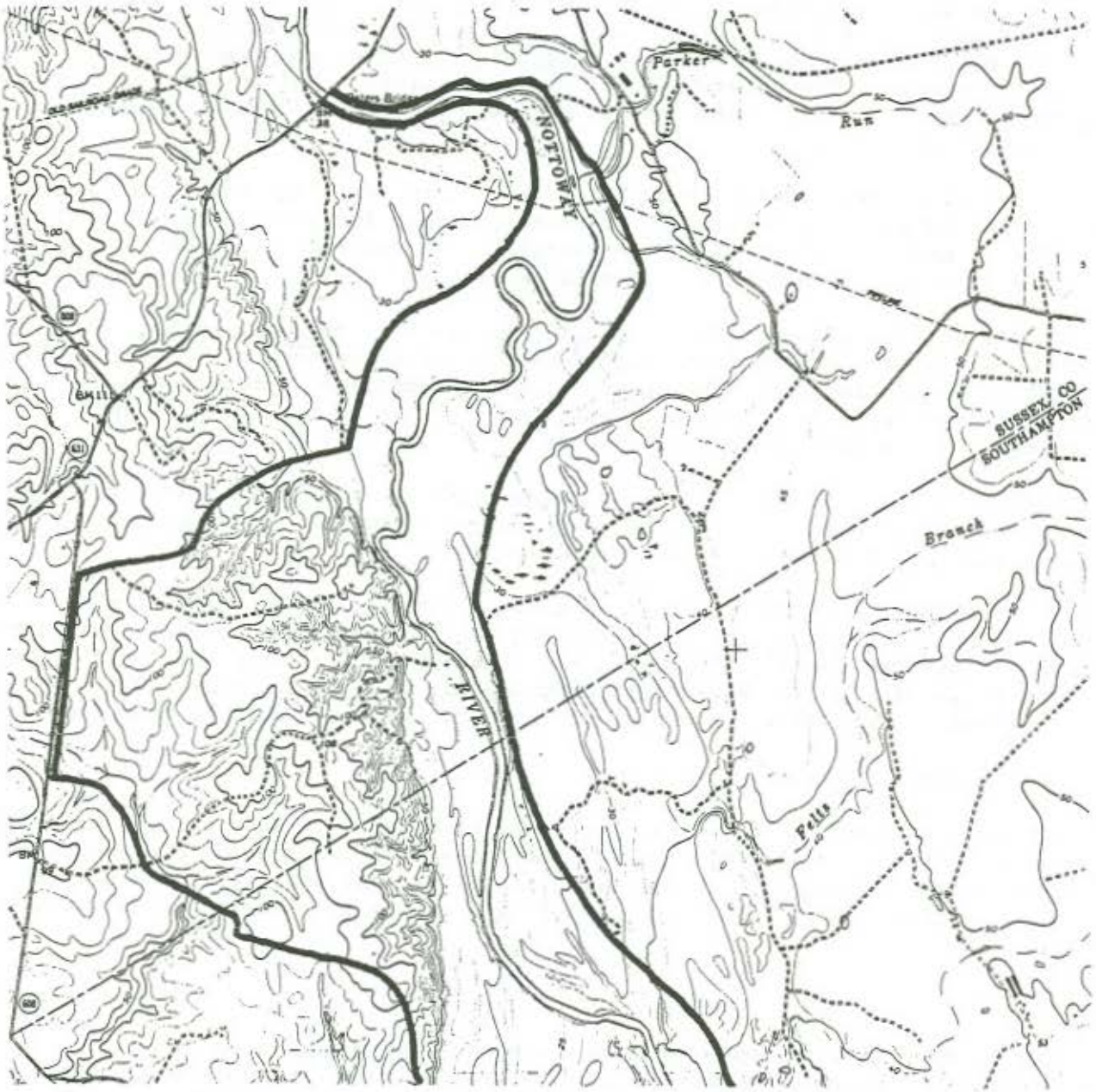
PROTECTION RECOMMENDATIONS: Strong protection for this site is recommended. Because the site is so large, any protection activities should be preceded by on-the-ground inventories to determine if the natural heritage resources are still present, and if sufficient buffer land exists to protect the rarities into the future.

REFERENCES:

Beck, R. A. 1991. Red-cockaded woodpecker Picoides borealis (Vieillot). Pages 513-514 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Bradshaw, D.S. 1990. Habitat quality and seasonal foraging patterns of the red-cockaded woodpecker (Picoides borealis) in southeastern Virginia. M.S. Thesis, The College of William and Mary in Virginia, Williamsburg.

Goodwin, R,H. and W.A. Niering. 1975. Inland wetlands of the United States evaluated as potential registered natural landmarks. National Park Service Natural History Theme Studies No. 2., Washington D.C.



SITE NAME: NOTTOWAY BLUFFS (northern portion)
QUADRANGLE: SEBRELL

SCALE 1:24 000

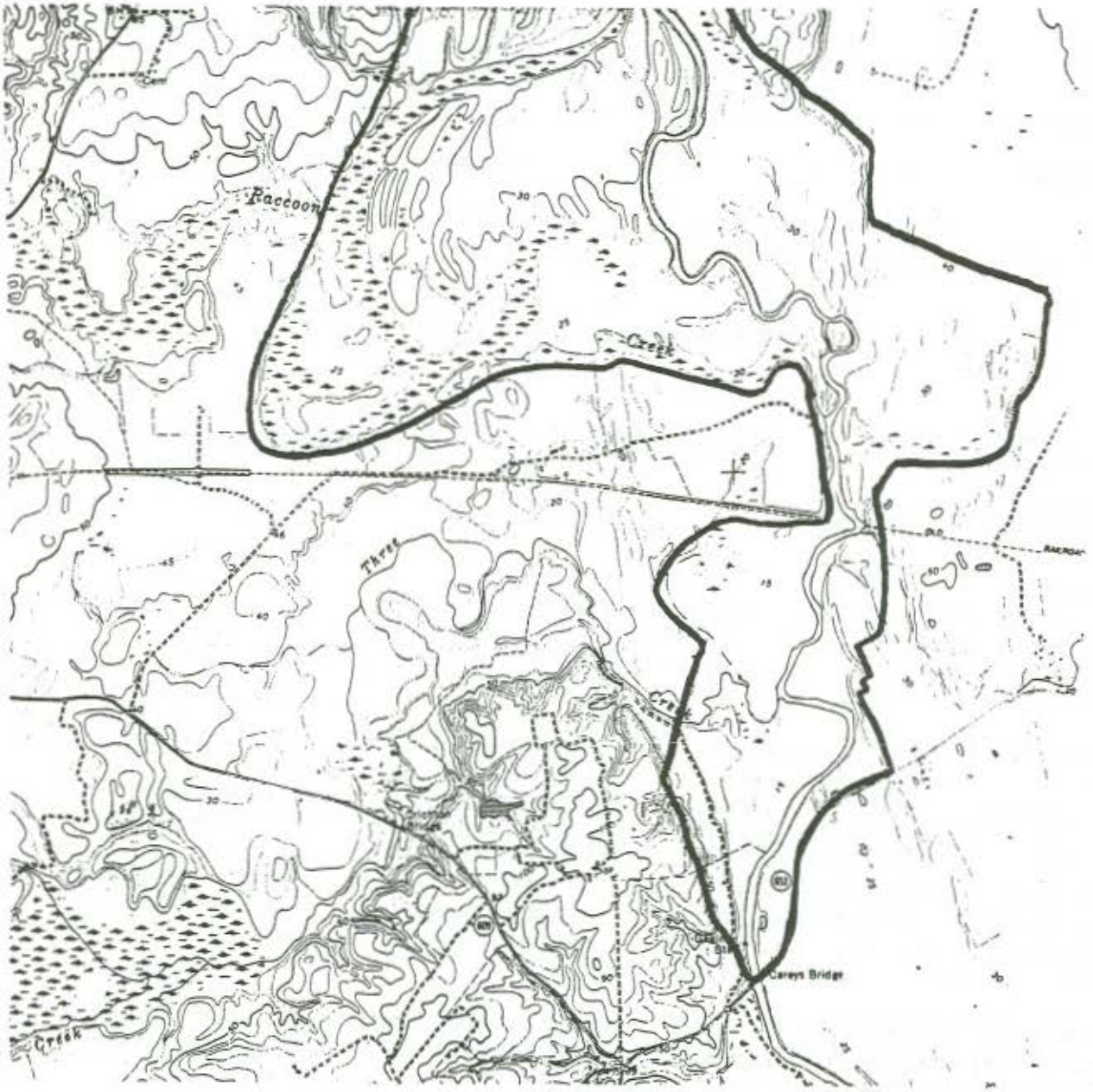
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

KILOMETER

N

VIRGINIA

QUADRANGLE LOCATION



SITE NAME: NOTTOWAY BLUFFS (southern portion)
QUADRANGLE: SEBRELL

ASSAMOOSICK SANDHILL

SIZE: ca. 60 acres **BIODIVERSITY RANK:** B4

LOCALITY: Southampton County

QUADRANGLE: Vicksville **QUADRANGLE CODE:** 3607771

LOCATION: The site is located on the east side of Assamoosick Creek, south of Route 35 in the vicinity of the bridge crossing.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC WOODLAND	-	-	-	-	-	B
plants:						
CENCHRUS CAROLINIANUS	COAST SANDBUR	G5	S1	-	-	C
QUERCUS HEMISPHAERICA	DARLINGTON'S OAK	G5	S2	-	-	D
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	B

SITE DESCRIPTION: The woodland at Assamoosick Sandhill is relatively pristine, but somewhat small. Loblolly pine (Pinus taeda), southern red oak (Quercus falcata), and water oak (Quercus nigra) fail to form a closed tree canopy here due to the extremely droughty sandy soils. The dry openings support a rich variety of sandhill plants such as wooly three-awn (Aristida lanosa), wavy-leaf noseburn (Tragia urens), baldwin's nailwort (Paronychia baldwinii), southern morning-glory (Stylisma humistrata), and sundial lupine (Lupinus perennis). The area was cleared long ago, and the vegetation has now returned to a natural condition.

BOUNDARY JUSTIFICATION: The boundary includes the entire sandhill woodland, plus a modest amount of additional land intended to mitigate future impacts to the woodland from off-site land use activities.

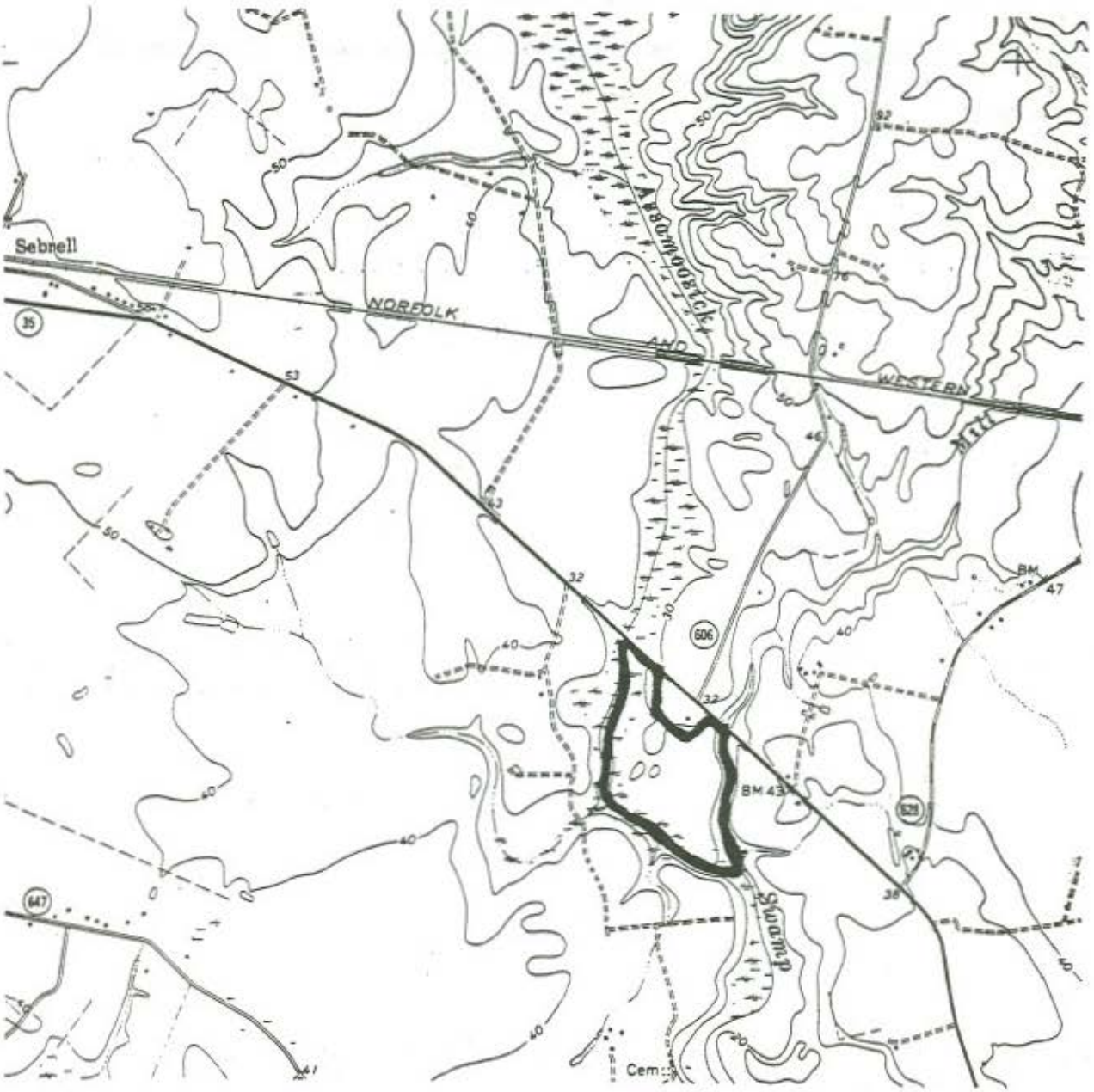
THREATS: Threats include residential development, sand mining, logging, and conversion to pine plantation. A short distance to the south lies a similar sandhill which has been severely degraded by clearing and subsequent conversion to pine plantation. To the north, yet another sandhill has been recently clear-cut, and further disturbed by bulldozer activity.

MANAGEMENT RECOMMENDATIONS: The rare and noteworthy sandhill plants tend to decline unless woody vegetation is kept in check. The best way to accomplish this is through prescribed burning. The burning would also create a more open and more pleasing savanna-like natural environment.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This small site would make a fine natural area.

REFERENCES:



SITE NAME: ASSAMOOSICK SANDHILL
QUADRANGLE: VICKSVILLE

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

VIRGINIA
QUADRANGLE LOCATION

N

ROUND GUT SANDHILL

SIZE: **BIODIVERSITY RANK:** B4

LOCALITY: Southampton County

QUADRANGLE: Riverdale **QUADRANGLE CODE:** 3607658

LOCATION: The site lies east and southeast of Round Gut, bordering Routes 687 and 689.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC FOREST		-	-	-	-	BC
plants:						
ASIMINA PARVIFLORA	DWARF PAW-PAW	G5	S2S3	-	-	CD
CALLISIA GRAMINEA	GRASS-LIKE ROSELINGS	G5	S1	-	-	BC
CARPHEPHORUS BELLIDIFOLIUS	SANDY-WOODS CHAFFHEAD	G4	S1	-	-	D
DESMODIUM STRICTUM	PINELAND TICK-TREFOIL	G3G4	S2	-	-	C
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	BC

SITE DESCRIPTION: Round Gut Sandhill is the name given to the series of low sandhills occurring alongside Route 687. Away from Route 687 vast clearcuts have degraded a considerable amount of former sandhill habitat. Plantations of loblolly pine (Pinus taeda) occur on most of the site, and on the driest soils the trees grow slowly. Some of the rare plants occur within the pine plantations, but the rarities are most frequent in the open habitats maintained along Route 687. Sandhills such as this used to burn regularly, and the rarities are well-adapted to thrive in the open habitats maintained by fire. Unfortunately, this site has not burned in many years. Consequently, the rare plants are in decline.

BOUNDARY JUSTIFICATION: The boundary includes the sandhill habitats known to support rare species, plus a modest amount of additional land which may be suitable for restoration to sandhill woodland vegetation through the use of prescribed burning.

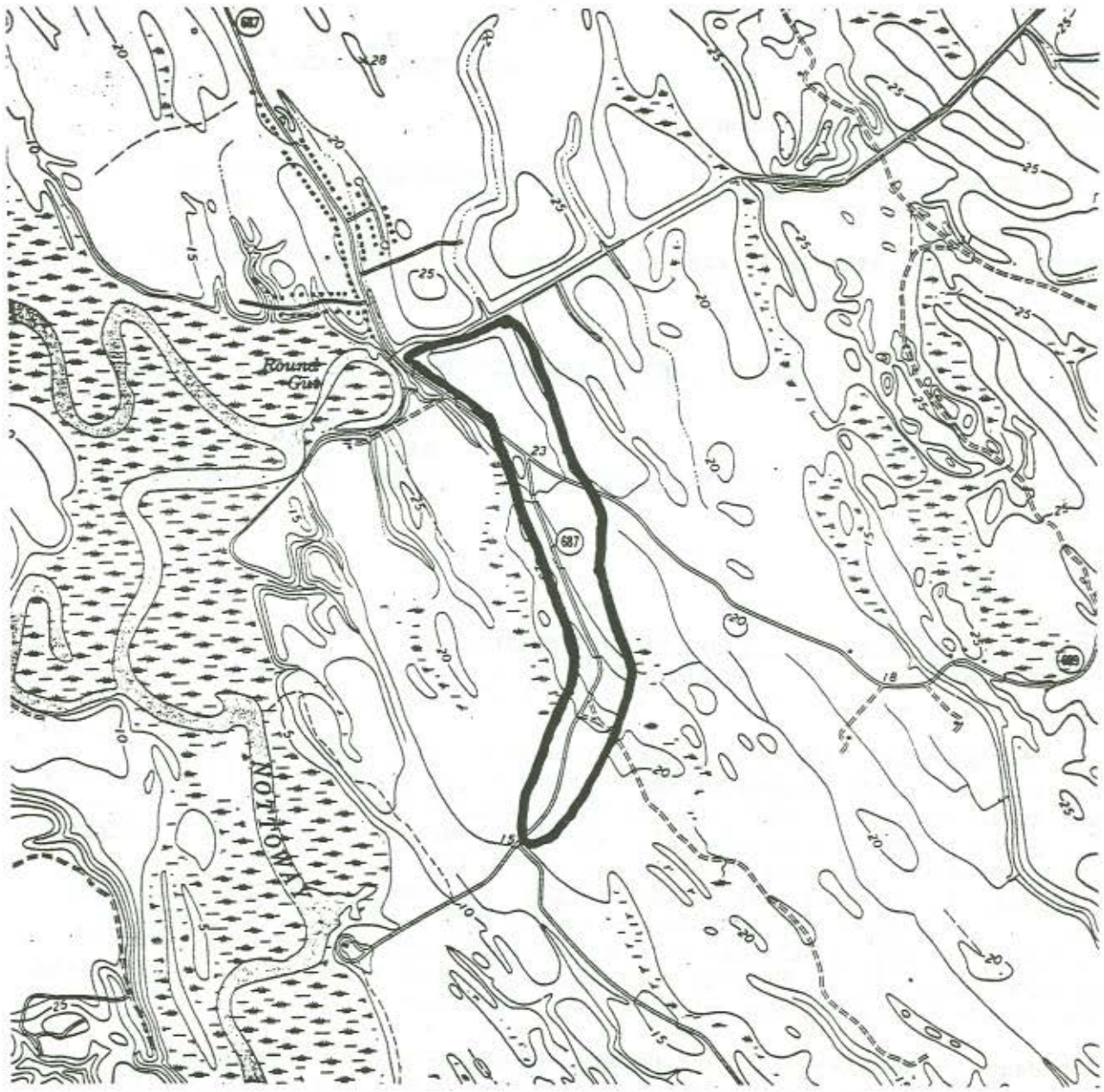
THREATS: The site faces the most serious threats from development, logging, and sand mining. Another threat is the on-going suppression of fire, which is indirectly degrading the rare plant populations. The rare plants occurring alongside Route 687 are threatened by road maintenance or improvement activities.

MANAGEMENT RECOMMENDATIONS: If this site is protected, prescribed burning management should be initiated as soon as possible. Regular burning should greatly improve the rare plant populations. Burning could also be used to restore some of the degraded, clear-cut sandhill habitats.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Considering the rapid loss of sandhill habitats in Southampton County, the protection of this site is very important.

REFERENCES:



SITE NAME: ROUND GUT SANDHILL
QUADRANGLE: RIVERDALE

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

VIRGINIA
QUADRANGLE LOCATION

N

PLEASANT PINES

SIZE: ca. 165 acres **BIODIVERSITY RANK:** B4

LOCALITY: Southampton County

QUADRANGLE: Riverdale **QUADRANGLE CODE:** 3607658
Franklin 3607668

LOCATION: The site is located east of Route 687 and about a mile northeast of Round Gut.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC FOREST		-	-	-	-	B
plants:						
DESMODIUM STRICTUM	PINELAND TICK-TREFOIL	G3G4	S2	-	-	B
QUERCUS LAEVIS	TURKEY OAK	G5	S2	-	-	D

SITE DESCRIPTION: Pleasant Pines is the name given to an exemplary tract of dry sandhill woodland east of Route 687. So much sand mining, clear-cutting, and agriculture has taken place in the immediate area that Pleasant Pines is now a veritable oasis of natural vegetation. Mature loblolly pines (Pinus taeda) dominate the site, while small sandy clearings support the rarities pineland tick-trefoil (Desmodium strictum) and turkey oak (Quercus laevis). The site displays a full complement of characteristic sandhill plants, including a large population of the strikingly beautiful sundial lupine (Lupinus perennis). The potential for rare animal species here is good, and the woodland is altogether pleasant and attractive.

BOUNDARY JUSTIFICATION: The boundary was drawn largely from aerial photographs and includes areas known and suspected to be exemplary sandhill woodland. A modest amount of additonal land is included to mitigate impacts to the sandhill woodland from adjacent land uses.

THREATS: Threats are severe. They include sand mining, logging, residential development, and conversion for agricultural purposes. The rate of natural area destruction in Southampton County is extremely rapid; during the past three years most of the known sandhill habitats have been destroyed or severely degraded. Another threat at this particular site is on-going fire suppression. Fire is a natural and formerly frequent process in woodlands such as this. Fire sets back natural succession and maintains open habitats required by many of the rare and specialized plants.

MANAGEMENT RECOMMENDATIONS: If protected from the many and varied threats, management of this site would involve the use of prescribed burning to clear out the underbrush and create open, sandy habitats for the rare and specialized plants.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Considering the rapid loss of sandhill habitats in Southampton County, urgent protection of this site is needed.

REFERENCES:

SITE NAME: PLEASANT PINES
QUADRANGLE: RIVERDALE, FRANKLIN

BLACKWATER CEDAR SWAMP

SIZE: ca. 440 acres **BIODIVERSITY RANK:** B4

LOCALITY: Southampton County

QUADRANGLE: Riverdale **QUADRANGLE CODE:** 3607658

LOCATION: The site lies east of Route 258 and west of the Blackwater River, about a mile northwest of Cherry Grove.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC SEASONALLY FLOODED FOREST		-	-	-	-	AB
plants:						
CALYCANTHUS FLORIDUS	SWEET-SHRUB	G5T4T5	S2?	-	-	BC
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G4	S2	-	-	B
KALMIA ANGUSTIFOLIA	SHEEP LAUREL	G5	S2S3	-	-	D
SARRACENIA PURPUREA	NORTHERN PITCHER-PLANT	G5	S2	-	-	D
ZENOBIA PULVERULENTA	DUSTY ZENOBIA	G5	S1	-	-	U

SITE DESCRIPTION: The site supports one of Virginia's finest Atlantic white cedar (Chamaecyparis thyoides) swamps. This type of swamp, sometimes classified as "pocosin", occurs on deep peat. Ericaceous shrubs are prevalent, including two rare species, dusty zenobia (Zenobia pulverulenta) and sheep laurel (Kalmia angustifolia). Walking through the swamp is exceedingly difficult due to the thick tangle of tall shrubs and laurel-leaf greenbrier (Smilax laurifolia); this latter species is locally known as "throat-slasher". The rare species here are generally not thrifty. The small-stature rarities are being shade-suppressed by the larger plants, while the splendid Atlantic white cedars are dying and not being replaced by new cohorts. The pocosin and its rarities can only be restored by reintroducing fire to the wetland system. Fires originating in the dry turkey oak (Quercus laevis) vegetation to the west no doubt once regularly burned into the pocosin. Presently, almost all of this turkey oak vegetation has been destroyed, and with it, the original fire regime.

BOUNDARY JUSTIFICATION: The primary consideration in drawing the boundary for this site is to include sufficient land to permit safe prescribed burning. Because this pocosin has not burned in several decades, a tremendous amount of fuel is present, and any future fire would likely be catastrophic unless very carefully managed.

THREATS: Threats include logging, ditching, and continued lack of fire. If the surrounding uplands are developed further, prescribed burning may not be possible here.

MANAGEMENT RECOMMENDATIONS: Pocosin vegetation requires fire to maintain its characteristic flora and structure. Prescribed burning is obviously needed here, but because of high fuel levels, nearby residences, and a nearby highway, burning at this site might not be prudent for public safety reasons. If attempted, burning should be conducted by only highly qualified and experienced individuals.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The site represents a significant natural area, but if prescribed burning is not possible here, full protection of the pocosin vegetation and its rarities might not be achieved.

REFERENCES:

Frost, C.C. 1989. History and status of remnant pocosin, canebrake and white cedar wetlands in Virginia. Unpublished report on file with the Virginia Natural Heritage Program, Richmond. 130 pp.

SITE NAME: BLACKWATER CEDAR SWAMP
QUADRANGLE: RIVERDALE

SOUTH QUAY PINE BARRENS

SIZE: ca. 3640 acres **BIODIVERSITY RANK:** B2

LOCALITY: City of Suffolk

QUADRANGLE: Riverdale **QUADRANGLE CODE:** 3607658

LOCATION: The site is located in extreme southwestern Suffolk, roughly encompassing land east of the Blackwater River and west of the large industrial pond. The southern boundary coincides with the Virginia-North Carolina state line.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC WOODLAND	-	G4T1	S1	-	-	A
OLIGOTROPHIC SATURATED WOODLAND		-	-	-	-	U
plants:						
AGALINIS VIRGATA	PINE-BARREN GERARDIA	G3G4	S1	-	-	U
CALOPOGON PALLIDUS	PALE GRASS-PINK	G4G5	SH	-	-	-
CAREX STRIATA	A SEDGE	G4	S1S2	-	-	U
CARPHEPHORUS BELLIDIFOLIUS	SANDY-WOODS CHAFFHEAD	G4	S1	-	-	U
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G4	S2	-	-	U
CHELONE CUTHBERTII	CUTHBERT TURTLEHEAD	G3	S2	-	-	U
CLEISTES DIVARICATA	SPREADING POGONIA	G4	S1	-	-	U
CROTALARIA ROTUNDIFOLIA	PROSTRATE RATTLE-BOX	G5	S1	-	-	U
DROSERA BREVIFOLIA	DWARF SUNDEW	G5	S2	-	-	U
JUNCUS ABORTIVUS	PINE BARREN RUSH	G4G5	S1	-	-	U
KALMIA ANGUSTIFOLIA	SHEEP-LAUREL	G5	S2S3	-	-	U
LACHNOCAULON ANCEPS	BOG-BUTTONS	G5	S2	-	-	U
LILIUM CATESBAEI	SOUTHERN RED LILY	G4	S1	-	-	U
PINUS PALUSTRIS	LONG-LEAF PINE	G4G5	S2	-	-	U
PLATANTHERA BLEPHARIGLOTTIS	WHITE-FRINGE ORCHIS	G4	S2	-	-	U
PYXIDANTHERA BARBULATA	FLOWERING PIXIE-MOSS	G4	S1	-	-	U
QUERCUS LAEVIS	TURKEY OAK	G5	S2	-	-	U
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	U
RHYNCHOSPORA FASCICULARIS	FASCICULATE BEAKRUSH	G4?	S1	-	-	U
RHYNCHOSPORA PALLIDA	PALE BEAKRUSH	G2G3	SH	-	-	U
RHYNCHOSPORA SCIRPOIDES	LONG-BEAKED BEAKRUSH	G4	S1	-	-	U
SARRACENIA FLAVA	YELLOW PITCHER-PLANT	G4G5	S1	-	-	U
SCLERIA MINOR	SLENDER NUTRUSH	G4G5	S2	-	-	U
SEYMERIA CASSIOIDES	SEYMERIA	G5	S2	-	-	U
SPHENOPHOLIS FILIFORMIS	LONG-LEAF WEDGESCALE	G3G4	SH	-	-	U
TOFIELDIA RACEMOSA	COASTAL FALSE-ASPHODEL	G5	S1	-	-	U
VACCINIUM CRASSIFOLIUM	CREEPING BLUEBERRY	G4G5	S1	-	-	U

XYRIS CAROLINIANA	CAROLINA YELLOW-EYED-GRASS	G4G5	S1	-	-	U
ZENOBIA PULVERULENTA	DUSTY ZENOBIA	G5	S1	-	-	U
ZIGADENUS GLABERRIMUS	LARGE-FLOWERED CAMASS	G5	S1	-	-	U
animals:						
ZANTHOGNATHA GYPSALIS	A NOCTUID MOTH	G4	SU	-	-	U
ZANTHOGNATHA SP 2	A NOCTUID MOTH	G4	SU	-	-	U

SITE DESCRIPTION: South Quay Pine Barrens supports Virginia's largest and most significant long-leaf pine (Pinus palustris) barren. From all written accounts and historic records of rare species, this site is an ecological treasure. Review of recent aerial photographs revealed several hundred acres of pine barren vegetation interdigitating with wetland habitats known to support pocosin rarities such as Atlantic white cedar (Chamaecyparis thyoides) and dusty zenobia (Zenobia pulverulenta). A rather large portion of the original pine barren acreage has been destroyed or degraded by industrial pond facilities, roads, pine plantations, and clear-cutting. When discovered by eminent botanist M.L. Fernald in 1939, the barrens occupied more than 12 square miles. Fernald wrote (1940):

> "In five minutes we were in such a pine barren as we had not imagined. ... For three days we explored this area and I shall make no effort to follow exact chronology in enumerating the specialties. Sharing the damp sands and peats with Pyxidanthera were solid carpets of a trailing evergreen Vaccinium... This could be nothing but Vaccinium crassifolium Andr., a very local Carolina species heretofore unknown north of central-eastern North Carolina. There are many square miles of it here."

The site was evaluated as a potential registered natural landmark by Goodwin and Neiring (1975) whose brief description of the site follows:

> "Bogs and pine barrens with Chamaecyparis, longleaf pine, and many rare bog plants as well as xerophytic plants on well-drained sands. Both northern and southern relicts occur."

The South Quay Pine Barrens is situated on a huge deposit of eolian sand which extends southward along the eastern side of the Blackwater and Chowan Rivers into North Carolina. There it also supports pine barren vegetation at a conservation site called the Chowan Sand Banks (Frost et al. 1990).

BOUNDARY JUSTIFICATION: The boundary encompasses lands known or presumed to support pine barren vegetation or pocosin. Additional lands are included to mitigate future negative impacts from adjacent land uses. The boundary is preliminary and should be refined following an on-site inventory.

THREATS: The site has already been severely impacted by land clearing, industrial pond construction, and roads. These land developments still pose a threat to the site. Logging, especially if followed by conversion to pine plantations, is a serious threat. Lastly, virtually all of the pine barren rarities depend on fire for population maintenance and growth; lack of fire therefore constitutes a threat.

MANAGEMENT RECOMMENDATIONS: Management recommendations should await the results of an on-site natural heritage inventory.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The long-leaf pine barren ecosystem is endangered in Virginia, and this site contains most of the known remaining acreage. Based upon available information, the South Quay Pine Barrens represents the single most important biological conservation priority within the APES region of southeastern Virginia.

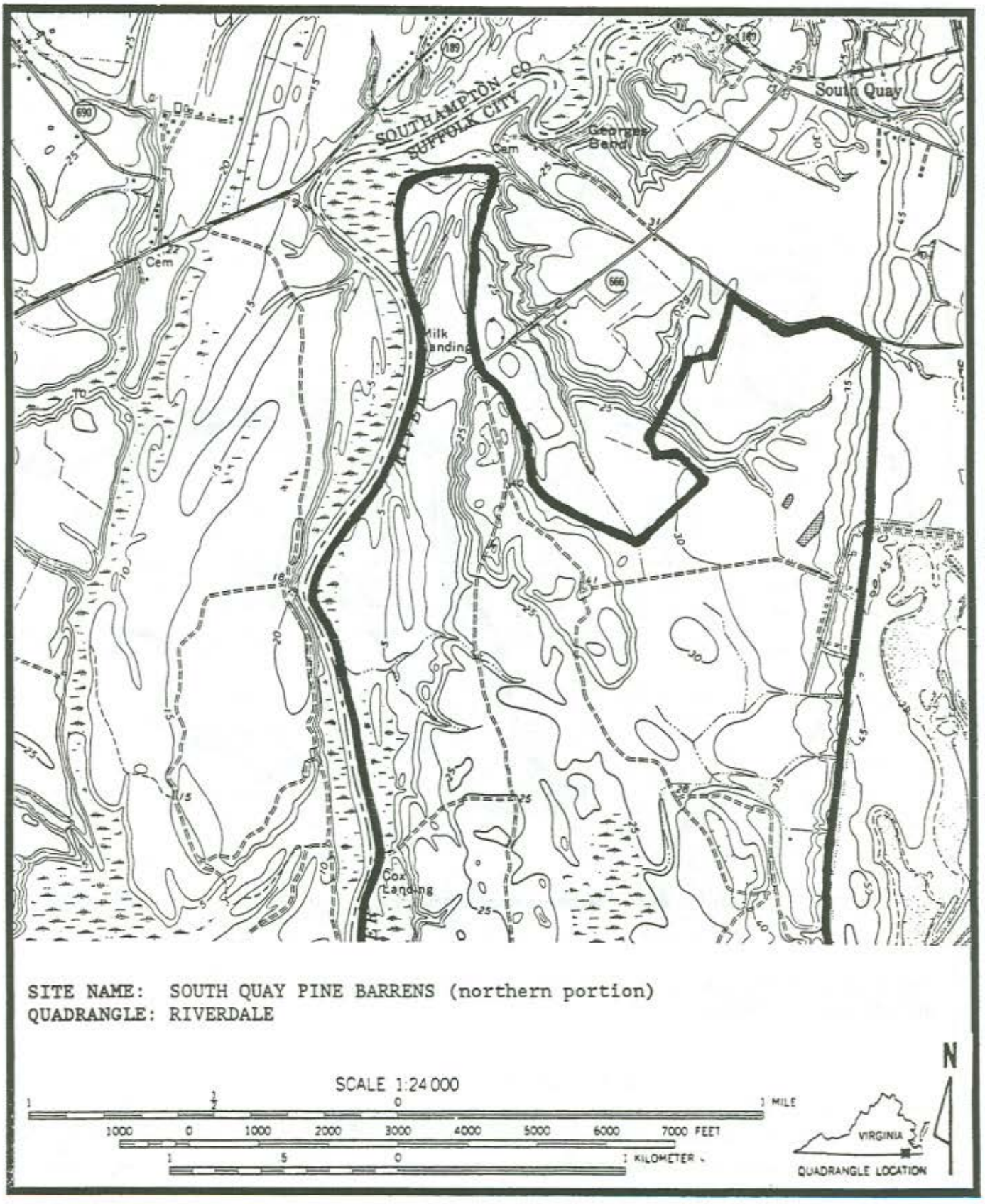
REFERENCES:

Fernald, M.L. 1940. A century of additions to the flora of Virginia. Rhodora 42:355-530. (see pages 377-380)

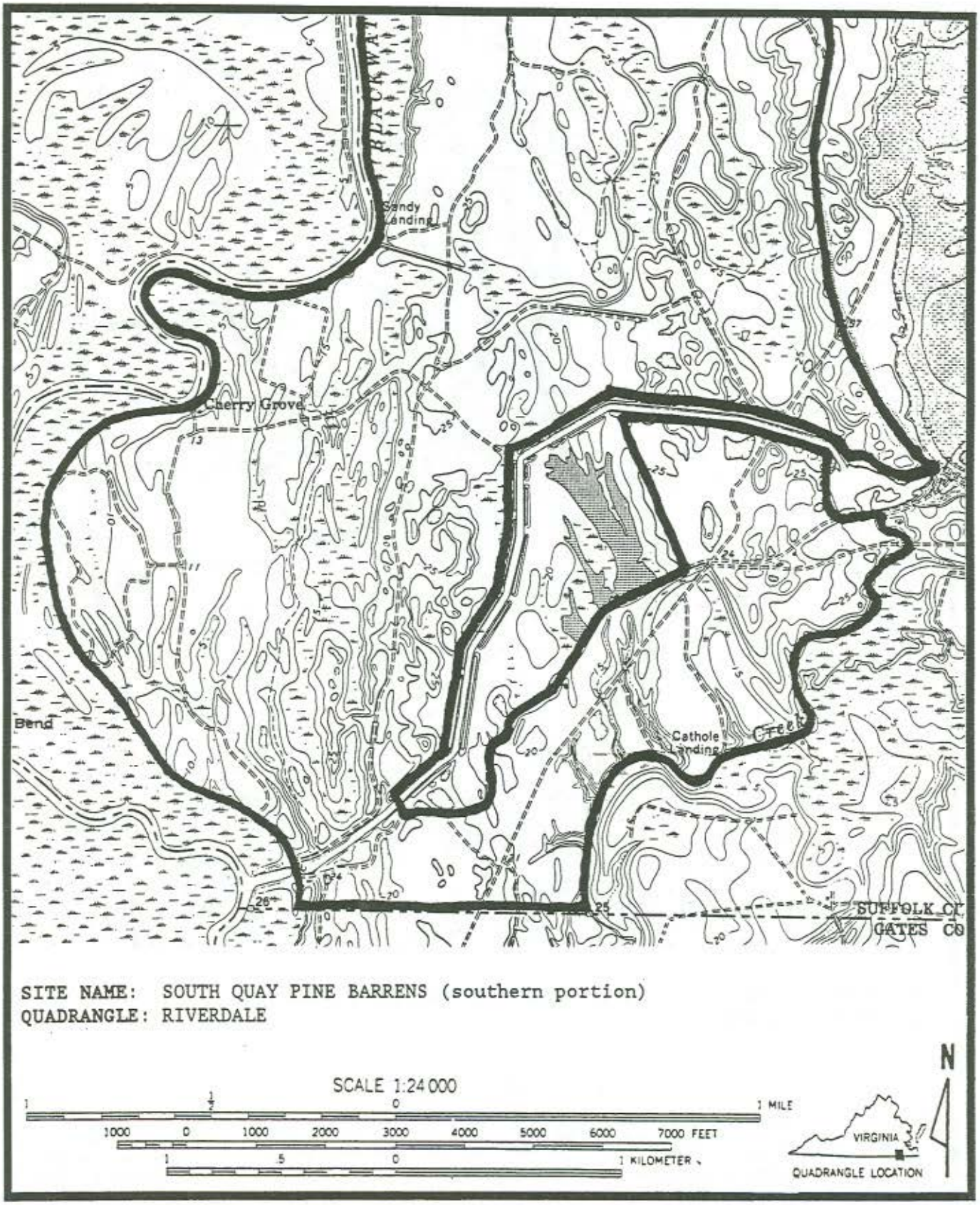
Frost, C.C., H.E. LeGrand, Jr. and R.E. Schneider. 1990. Regional inventory for critical natural areas, wetland ecosystems, and endangered species habitats of the Albemarle-Pamlico estuarine region: Phase 1. Albemarle-Pamlico Study Project No. 90-01. North Carolina Natural Heritage Program, Raleigh. 462 pp.

Goodwin, R,H. and W.A. Niering. 1975. Inland wetlands of the United States evaluated as potential registered natural landmarks. National Park Service Natural History Theme Studies No. 2., Washington D.C.

Porter, D.M. 1991. Trumpets Sarracenia flava Linnaeus. Pages 111-112 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: SOUTH QUAY PINE BARRENS (northern portion)
QUADRANGLE: RIVERDALE



SITE NAME: SOUTH QUAY PINE BARRENS (southern portion)
QUADRANGLE: RIVERDALE

Figure 4. Endangered long-leaf pine barren. A total of 30 rare plant species have been documented from the South Quay Pine Barrens.

BALM OF GILEAD FLATWOODS

SIZE: **BIODIVERSITY RANK:** B4

LOCALITY: City of Suffolk

QUADRANGLE: Suffolk **QUADRANGLE CODE:** 3607665

LOCATION: The site lies north of Balm of Gilead Church in the vicinity of two powerline rights-of-way.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
CAREX STRIATA	A SEDGE	G4	S1S2	-	-	C
CLEISTES DIVARICATA	SPREADING POGONIA	G4	S1	-	-	C
GENTIANA AUTUMNALIS	PINE-BARREN GENTIAN	G3	S1	3C	-	C
ILEX CORIACEA	BAY-GAIL HOLLY	G5	S1	-	-	C
RHEXIA PETIOLATA	CILIATE MEADOWBEAUTY	G3G5	S1	-	-	CD
SCLERIA MINOR	SLENDER NUTRUSH	G4G5	S2	-	-	D
animals:						
ERYTHRODIPLAX CONNATA MINUSCULA	BLUE DRAGONLET	G5T?	S2	-	-	U
NEONYMPHA AREOLATUS	GEORGIA SATYR	G5T4	S2S4	-	-	CD
SYMPETRUM AMBIGUUM	BLUE-FACED MEADOWFLY	G5	S1	-	-	U

SITE DESCRIPTION: This site contains a seasonally wet flatwoods dominated by loblolly pine (Pinus taeda) and pond pine (Pinus serotina). Ericaceous shrubs are abundant in the understory, as is cane (Arundinaria tecta). The rare southern shrub, bay-gail holly (Ilex coriacea), is present as widely scattered individuals. Additional rare plant and insect species occur in the wet grassy vegetation beneath two large power lines. These species require open, boggy wetland habitats which once were prevalent in the Dismal Swamp region when fire occurred frequently. Presently, these species are rare because fire suppression has permitted woody species to dominate the former bogs and savannas.

BOUNDARY JUSTIFICATION: The site includes the two powerline rights-of-way and adjacent pine forest, which, if managed with fire, could become pond pine savanna and excellent rare species habitat.

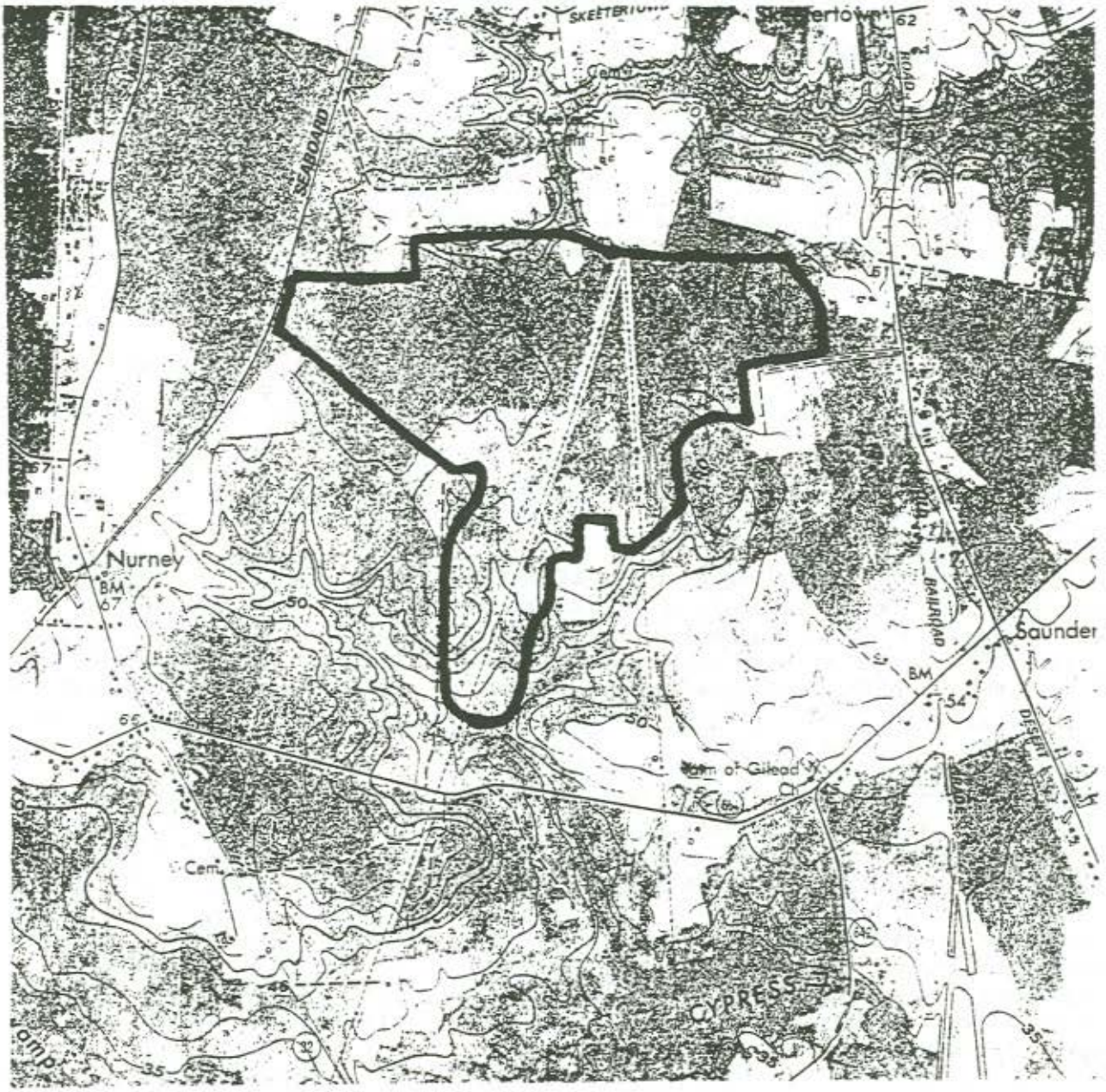
THREATS: The primary threat appears to be clear-cutting and subsequent conversion to pine plantations. Other threats are ditching, continued lack of fire, and herbiciding along the rights-of-way.

MANAGEMENT RECOMMENDATIONS: With frequent prescribed burning, this site could become a superlative pond pine savanna and exceptional rare species habitat. Most of the rare species are currently restricted to the powerline clearings, and occur in small numbers. The goal of prescribed burning management is to create additional open habitats for these species away from the powerlines. Representatives of the utility company have expressed a willingness to manage the rights-of-way in an environmentally sensitive manner.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: If protected in some manner and managed with prescribed burning, this site likely would resemble the wet savannas which existed here prior to colonial settlement.

REFERENCES:



SITE NAME: BALM OF GILEAD FLATWOODS
QUADRANGLE: SUFFOLK

SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

VIRGINIA

QUADRANGLE LOCATION

N

DISPUTANTA

SIZE: ca. 50 acres **BIODIVERSITY RANK:** B2

LOCALITY: Prince George County

QUADRANGLE: Disputanta North **QUADRANGLE CODE:** 3707622

LOCATION: The site is located at the headwaters of Otterdam Swamp along Hines Road (Rt. 625) approximately 1 mile southwest of Lebanon Church.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
RUDBECKIA HELIOPSIDIS	SUN-FACING CONEFLOWER	G2	S1	2	-	B

SITE DESCRIPTION: The cleared right-of-way along this stretch of Hines Road provides habitat for Virginia's only known population of the globally-rare sun-facing coneflower (Rudbeckia heliopsidis), a species unknown north of this site. The habitat is seasonally inundated, and organic soils exist over a clay-rich substratum. The herbaceous vegetation at the site is very diverse with 72 species noted by Wright (1989). Cut-over pine-oak flatwoods and pine plantations surround the site.

BOUNDARY JUSTIFICATION: The conservation planning boundary includes the rare plant population, its habitat, and surrounding buffer which may provide additional habitat for the coneflower. The forested land within the boundary was delineated using NHAP color-infrared photography, #509-52 taken on 4/2/84.

THREATS: Roadside mowing by the Virginia Department of Transportation (VDOT) periodically reduces the amount of woody vegetation present at the site, and this activity appears to be somewhat beneficial to the coneflower. Succession to woody vegetation is therefore a threat, as are ditching, herbicide spraying, and collection.

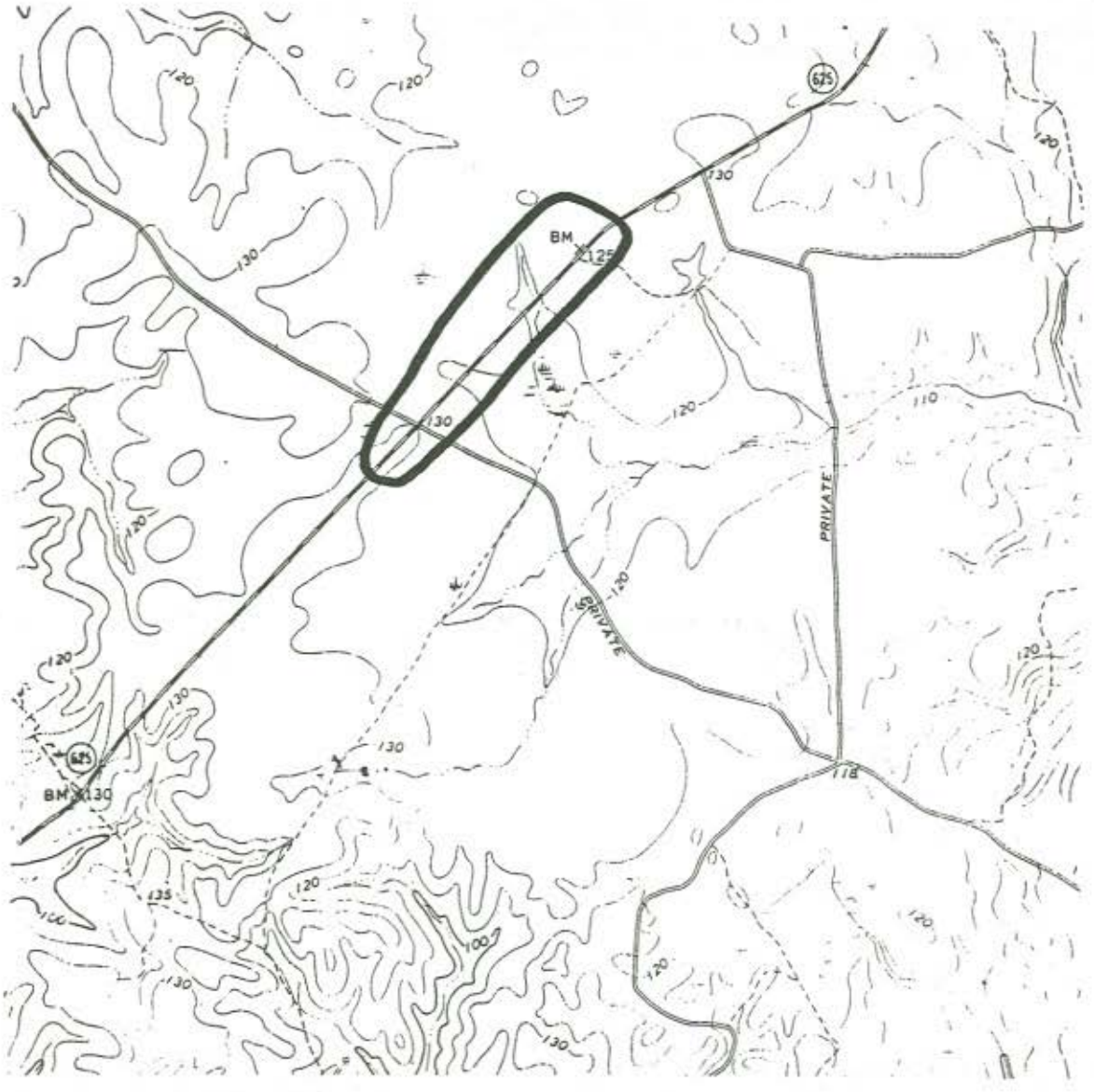
MANAGEMENT RECOMMENDATIONS: Monitor roadside management activities to ensure the health of the coneflower population. Investigate the use of prescribed burning as a management technique.

CURRENT STATUS: The site is privately owned, but the roadside is managed by VDOT.

PROTECTION RECOMMENDATIONS: Frequent contact with VDOT personnel and the landowner is needed to ensure that right-of-way management or other activities do not harm the rare coneflower population. Strong levels of protection are recommended for this site.

REFERENCES:

Wright, R.A.S. 1989. Field survey for the sun-loving coneflower, Rudbeckia heliopsidis Torrey and Gray in Virginia. unpublished rep. submitted to The Nature Conservancy through the Virginia Natural Heritage Prog., Richmond.



SITE NAME: DISPUTANTA
QUADRANGLE: DISPUTANTA NORTH

SCALE 1:24 000

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER

1 MILE

VIRGINIA

QUADRANGLE LOCATION

N

BLACKWATER RIVER - BELOW ROUTE 603

SIZE: ca. 620 acres **BIODIVERSITY RANK:** B2

LOCALITY: Surry County and Sussex County

QUADRANGLE: Dendron **QUADRANGLE CODE:** 3707618

LOCATION: The site is located along the Blackwater River between the Route 603 bridge and the Route 31 bridge. The Surry - Sussex County line follows the course of the Blackwater River through the middle of the site.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURENCE RANK
communities:					
EUTROPHIC SEMIPERMANENTLY FLOODED PALUSTRINE FOREST		S3?	-	-	A

SITE DESCRIPTION: According to Gary Williamson, recognized authority on wetland forest vegetation, this site has more pristine bald cypress (Taxodium distichum) and water tupelo (Nyssa aquatica) vegetation than any other area encountered in Virginia. In fact, very few old growth cypress swamps in all the United States can compare with this site. Canopy trees are consistently over 100 feet tall for a distance of two miles along the Blackwater River. Larger cypress trees are 180 to 200 cm diameter at breast height, and such trees are estimated to be at least 600 years old. The swamp shows only occasional signs of disturbance from logging, and much of it is virgin forest.

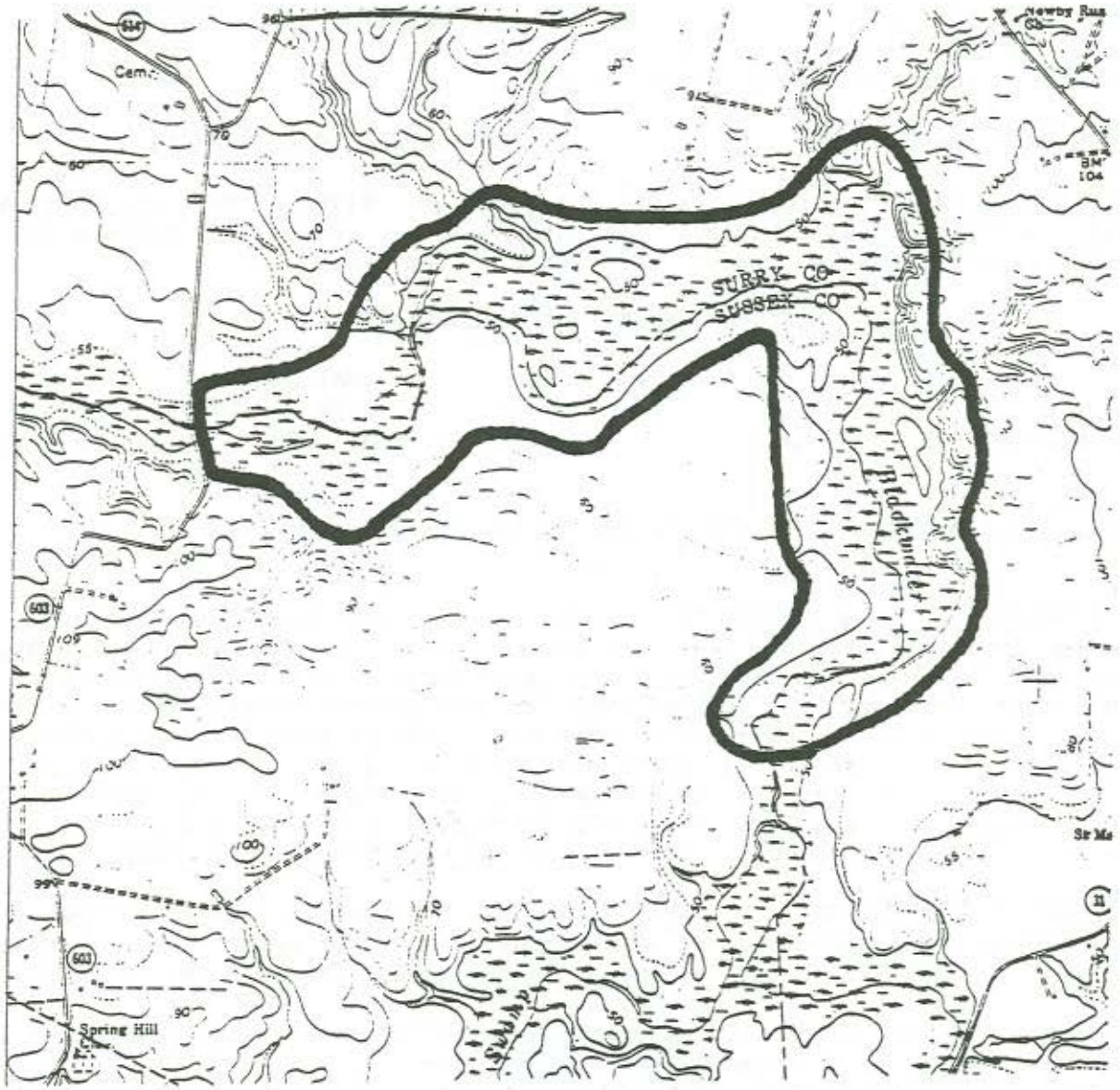
BOUNDARY JUSTIFICATION: The conservation planning boundary contains the extraordinary old growth forest plus a modest amount of upland buffer land necessary to mitigate negative impacts to the forest from adjacent land uses.

THREATS: Logging, ditching, and disruptions of the natural flow regime of the Blackwater River constitute threats to this site.

MANAGEMENT RECOMMENDATIONS: No active management is needed, but the general health and vitality of the forest should be monitored to permit early detection of perturbations.

CURRENT STATUS: Most of the site is privately owned. A 19 acre tract is state-owned and managed as a natural area.

PROTECTION RECOMMENDATIONS: The site supports one of the Nation's outstanding cypress-tupelo swamps, and as such represents an irreplaceable and awe-inspiring natural treasure. A marvelous opportunity exists to expand the Charles C. Steirly Heron Rookery Natural Area to include the entire old growth forest.



SITE NAME: BLACKWATER RIVER - BELOW ROUTE 603
QUADRANGLE: DENDRON

SCALE 1:24000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

VIRGINIA
QUADRANGLE LOCATION

N

BLACKWATER RIVER - ABOVE ROUTE 620

SIZE: ca. 1000 acres **BIODIVERSITY RANK:** B2

LOCALITY: Isle of Wight County and Southampton County

QUADRANGLE: Raynor **QUADRANGLE CODE:** 3607687

LOCATION: The site inludes the Blackwater River and its associated wetlands upstream from the Route 620 bridge.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURENCE RANK
communities:					
EUTROPHIC SEMIPERMANENTLY FLOODED PALUSTRINE FOREST		S3?	-	-	A

SITE DESCRIPTION: The site encompasses a five-mile riparian corridor along the Blackwater River. It supports a large expanse of old growth bald cypress (Taxodium distichum) and water tupelo (Nyssa aquatica) bottomland forest. Four state-champion trees are here, including Virginia's largest cypress. The site is comparable to the Blackwater River site located below Route 603 (described previously in this report). Both areas are highly significant because they contain some of the better old growth cypress swamp vegetation remaining in the United States.

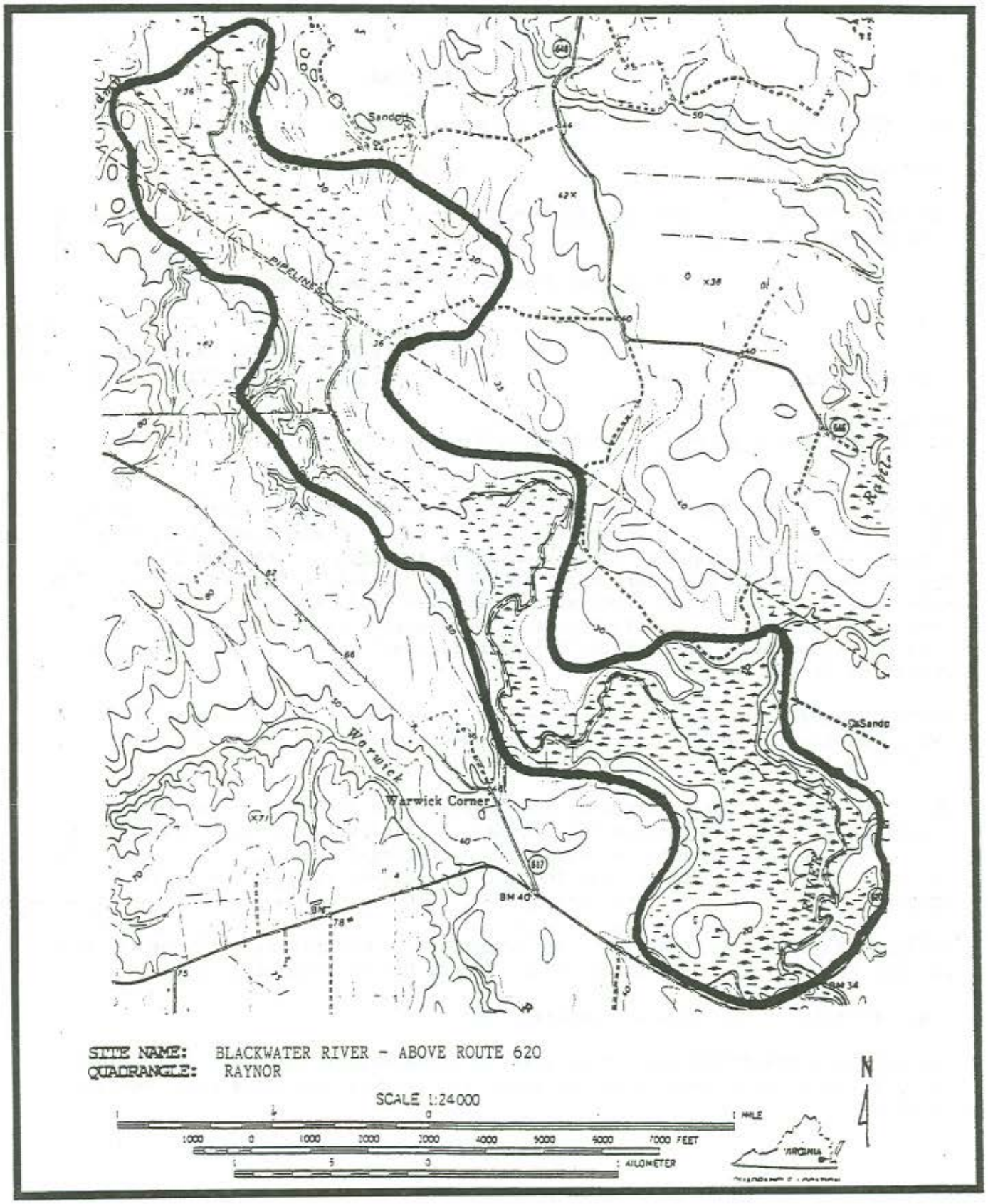
BOUNDARY JUSTIFICATION: The conservation planning boundary contains the extraordinary old growth forest plus a modest amount of upland buffer land necessary to mitigate negative impacts to the site.

THREATS: Some of the adjacent uplands were logged recently. Continued logging here would compromise the defensibility of the old growth swamp forest by increasing the frequency of blow-down, altering light regimes, encouraging the spread of exotic plants, and increasing sediment load to the wetland system.

MANAGEMENT RECOMMENDATIONS: No active management of this site is needed, but the general health and vitality of the forest should be monitored.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site is comparable to the old growth cypress swamp located below Route 603. As such, it deserves immediate conservation attention.


Sandy
PIPELINE
Warwick
Warwick Corner
BM 40
BM 34
SITE NAME: BLACKWATER RIVER - ABOVE ROUTE 620
QUADRANGLE: RAYNOR
SCALE 1:24000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER
VIRGINIA
N

ZUNI MACROSITE - SOUTH ZUNI SANDHILLS

SIZE: ca. 250 acres

BIODIVERSITY RANK: B4 *
* adjacent to a B2 site

LOCALITY: Isle of Wight County

QUADRANGLE: Zuni

QUADRANGLE CODE: 3607677

LOCATION: The site is located south of Zuni, north of Antioch Swamp, west of Route 614, and east of the Blackwater River.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURENCE RANK
communities:						
OLIGOTROPHIC WOODLAND		-	S1	-	-	C
plants:						
ASIMINA PARVIFLORA	DWARF PAW-PAW	G5	S2	-	-	CD
DESMODIUM STRICTUM	PINELAND TICK-TREFOIL	G2G4	S2	-	-	BC
QUERCUS INCANA	BLUE-JACK OAK	G5	S2	-	-	BC
QUERCUS LAEVIS	TURKEY OAK	G5	S2	-	-	AB
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	AB

SITE DESCRIPTION: This site was once a large expanse of xeric sandhill vegetation. Now it is fragmented by dirt roads, houses, agricultural fields, a power line, and cut-over forests. Turkey oak (Quercus laevis) is abundant throughout the remaining undisturbed tracts, where it is a component of a rare type of Oligotrophic Woodland. A 20 by 20 meter sample plot of this vegetation had an impressive total of six oak species, three of which are rare. Attractive wildflowers such as eastern prickly-pear (Opuntia humifusa), sundial lupine (Lupinus perennis), and grass-leaved golden-aster (Chrysopsis graminifolia) adorn the sandy roadsides. This area will likely support several rare animals, particularly moths, butterflies, and tiger beetles. Immediately south of this site lies Antioch Swamp Barrens, a B2 site.

BOUNDARY JUSTIFICATION: The conservation planning boundary includes the known tracts of Oligotrophic Woodland plus some additional surrounding lands that provide necessary buffer. The boundary was drawn from aerial photograph interpretation and limited field surveys. Some houses, fields, yards, and roads exist within the boundary - these should be excluded during conservation planning at this site.

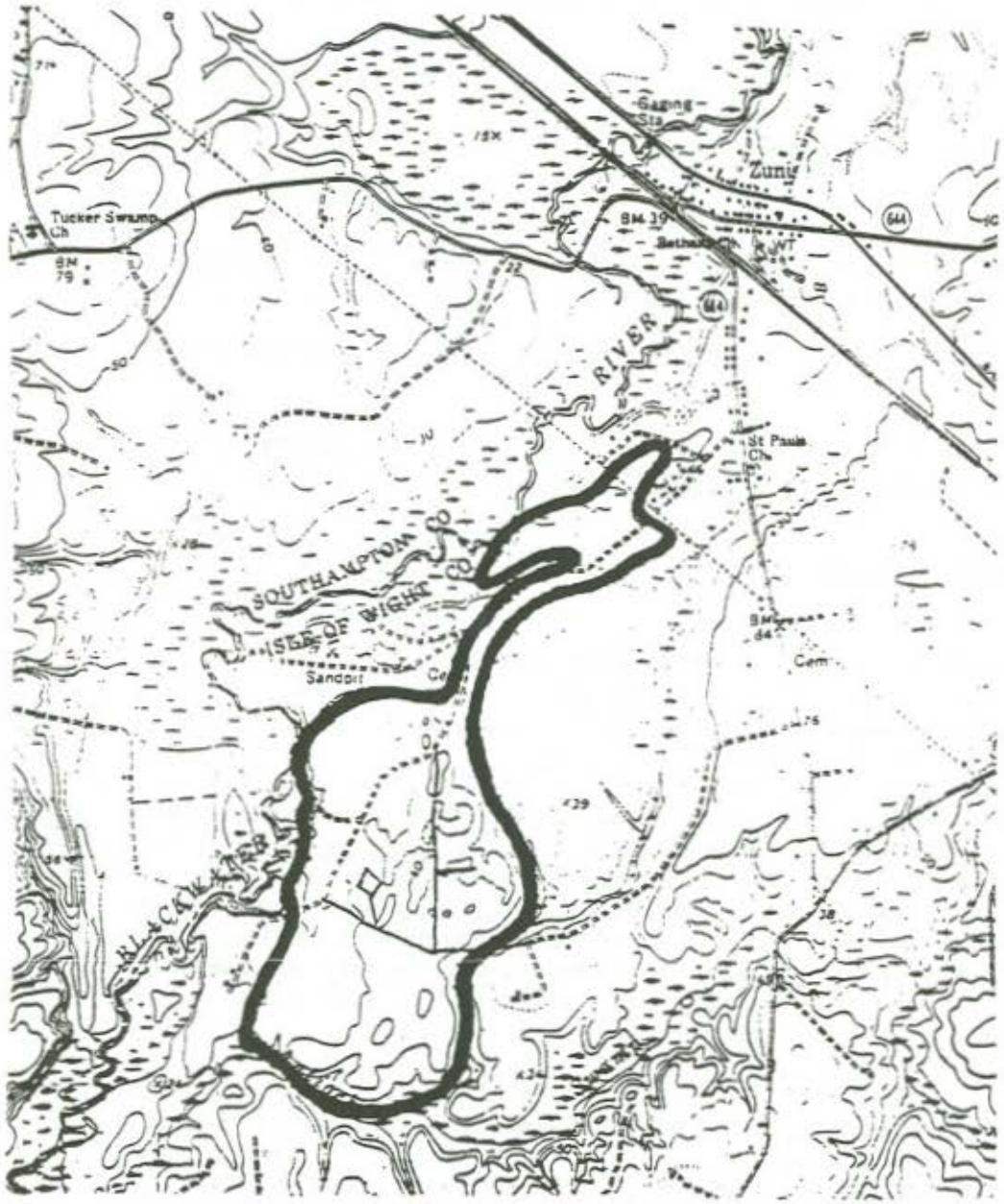
THREATS: The primary threat is continued development of undisturbed tracts for housing. Also, clear-cutting will significantly degrade the natural character of the forest and woodland vegetation, especially if followed by herbicide treatment and pine plantations. The rare plants and significant

community have been maintained in the past by fire - without continued fire the characteristic species and the community will undoubtedly be supplanted by less desireable, more common species. A small area is grazed by livestock. Increased land clearing for pasture will be detrimental to the rare species.

MANAGEMENT RECOMMENDATIONS: Management agreements and stronger levels of protection are needed for the best remaining tracts. One landowner has expressed an interest in managing natural heritage resources through the Forest Stewardship Program. Prescribed burning should be used to enhance rare species populations. Landowners might favor prescribed burning as a way of clearing undergrowth and creating greater opportunities for passive recreation in the woodlands, e.g. horseback riding.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Management agreements and stronger levels of protection are needed for the best remaining woodland tracts. Landowners should be informed about the site's significance.



SITE NAME: ZUNI MACROSITE - SOUTH ZUNI SANDHILLS
QUADRANGLE: ZUNI

SCALE 1:24000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER

VIRGINIA
QUADRANGLE LOCATION

N

ZUNI MACROSITE - ANTIOCH SWAMP BARRENS

SIZE: ca. 320 acres **BIODIVERSITY RANK:** B2

LOCALITY: Isle of Wight County

QUADRANGLE: Zuni **QUADRANGLE CODE:** 3607677

LOCATION: The site lies east of the Blackwater River, north of the Blackwater Ecologic Preserve, west of Route 614, and south of Antioch Swamp.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURENCE RANK
communities:						
OLIGOTROPHIC FOREST	-	-	S1	-	-	A
plants:						
QUERCUS INCANA	BLUE-JACK OAK	G5	S2	-	-	D
QUERCUS LAEVIS	TURKEY OAK	G5	S2	-	-	B
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	B

SITE DESCRIPTION: This site contains Virginia's best example of a mature loblolly pine (Pinus taeda) and turkey oak (Quercus laevis) forest. The pines are impressive in stature, especially considering that they inhabit dry sandhill soils. As seen from Route 614, the pines rise high above the lower hardwoods. As viewed from the adjacent Blackwater Ecologic Preserve, three rare oak species are evident. A detailed inventory of the site has not been performed. The site has a great potential for additional rarities, especially if managed by prescribed burning.

BOUNDARY JUSTIFICATION: The extent of the mature pine stand was determined from aerial photographs. Antioch Swamp is a convenient boundary separating this site from the South Zuni Sandhills Site which lies to the north. The southern boundary coincides with the northern boundary of the Blackwater Ecologic Preserve. The western border coincides with the lowland along the Blackwater River, which would serve as an effective fire break during prescribed burning.

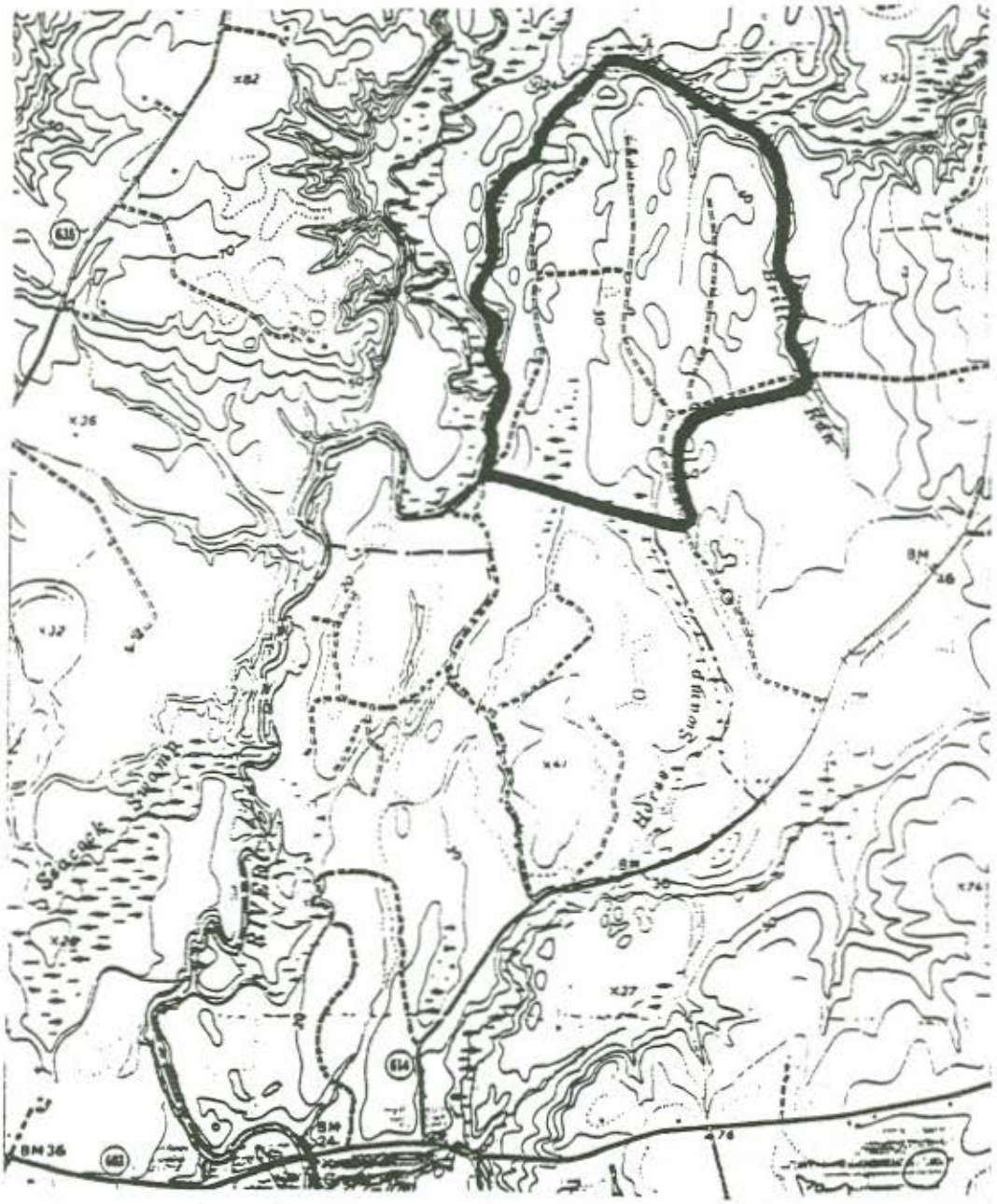
THREATS: Logging (especially if followed by herbicide treatment and conversion to pine plantation), lack of fire, and land development constitute threats to this important site.

MANAGEMENT RECOMMENDATIONS: A thorough biological inventory is recommended, to be followed by management recommendations. Because the rare oaks at the site depend on fire for their continued survival, a prescribed burning program

in the future would be highly desireable. Many additional rare plants will likely appear at the site as a result of prescribed burning management.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The site warrants the highest possible protection because of its significant natural heritage values, and also because it is adjacent to the Blackwater Ecologic Preserve. Together these two sites would form a larger, more diverse, and more defensible natural area preserve system along the Blackwater River.



SITE NAME: ZUNI MACROSITE - ANTIOCH SWAMP BARRENS
QUADRANGLE: ZUNI

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

ZUNI MACROSITE - BLACKWATER ECOLOGIC PRESERVE

SIZE: 319 acres **BIODIVERSITY RANK:** B2

LOCALITY: Isle of Wight County

QUADRANGLE: Zuni **QUADRANGLE CODE:** 3607677

LOCATION: The site lies north of Route 614 and west of Horse Swamp. The northwestern tip of the site abuts the Blackwater River, but most of the western boundary lies approximately 0.5 to 0.7 mile east of this river.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURENCE RANK
communities:						
OLIGOTROPHIC WOODLAND	-	G4T1	S1	-	-	AB
plants:						
ASIMINA PARVIFLORA	DWARF PAW-PAW	G5	S2	-	-	C
CALYCANTHUS FLORIDUS	SWEET SHRUB	G5T4T5	S2	-	-	C
CARPHEPHORUS BELLIDIFOLIUS	SANDY-WOODS CHAFFHEAD	G4	S1	-	-	B
CARPHEPHORUS TOMENTOSUS	WOOLY CHAFFHEAD	G4	S1	-	-	C
PLATANTHERA BLEPHARIGLOTTIS	WHITE-FRINGE ORCHIS	G4	S2	-	-	D
HETEROTHECA GOSSYPINA	COTTONY GOLDEN-ASTER	G5	S1	-	-	D
KALMIA ANGUSTIFOLIA	SHEEP-LAUREL	G5	S2S3	-	-	A
POLYGONELLA POLYGAMA	OCTOBER-FLOWER	G3G5	S1	-	-	A
PINUS PALUSTRIS	LONG-LEAF PINE	G4G5	S2	-	-	B
PYXIDANTHERA BARBULATA	FLOWERING PIXIE-MOSS	G4	S1	-	-	A
QUERCUS LAEVIS	TURKEY OAK	G5	S2	-	-	A
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	BC
SABATIA CALYCINA	COAST ROSE-GENTIAN	G4	S1S2	-	-	U
SARRACENIA PURPUREA	NORTHERN PITCHER PLANT	G5	S2	-	-	C
SEYMERIA CASSIOIDES	SEYMERIA	G5	S2	-	-	B
SISYRINCHIUM ALBIDUM	WHITE BLUE-EYED GRASS	G?	S1	-	-	U
VACCINIUM CRASSIFOLIUM	CREEPING BLUEBERRY	G4G5	S1	-	-	CD
XYRIS CAROLINIANA	CAROLINA YELLOW-EYED-GRASS	G4G5	S1	-	-	A
animals:						
AMBYSTOMA MABEEI	MABEE'S SALAMANDER	G4	S1	-	-	C
CHOLOGASTER CORNUTA	SWAMPFISH	G5	S3	-	-	A
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	G5	S2			
LEPTODEA OCHRACHEA	TIDEWATER MUCKET	G4	S3	-	-	D
LIGUMIA NASUTA	EASTERN PONDMUSSEL	G4	S3	-	-	U
TANTILLA CORONATA	SOUTHEASTERN CROWNED SNAKE	G5	S2?	-	-	A

Note: Several other rare species have been reported from this site. These have yet to be rediscovered.

SITE DESCRIPTION: The site contains the only protected occurrence of extremely rare long-leaf pine (Pinus palustris) - turkey oak (Quercus laevis) woodland in Virginia. The area is managed as an ecological preserve, and a large number of rare species are present, many of which have responded favorably to recent prescribed burning. Frost and Musselman (1987) provide a detailed description of this site and its vegetation.

BOUNDARY JUSTIFICATION: The conservation planning boundary coincides with the Old Dominion University property boundary. This is somewhat unusual, but in this case, the additional lands most important for the long term viability and defensibility of the Preserve have been identified in the descriptions of the two adjacent sites, Horse Swamp Barrens and Antioch Swamp Barrens.

THREATS: The primary threat to the site is insufficient fire and successional conversion to less desireable vegetation. Another serious threat is development of surrounding lands. Off-site sand mining and ditching could directly affect the natural hydrology of the preserve. If houses are built adjacent to the preserve, prescribed burning might be viewed as a hazard to public safety, and the burning activity halted. At the very least, adjacent homes would necessitate that large fire breaks be created on the preserve, and that lands near the edge of the preserve not be burned.

MANAGEMENT RECOMMENDATIONS: When first decribed by M.L. Fernald in 1936 (Fernald 1937), the site supported a phenomenal assemblage of rare plants, apparently because the area was burned frequently. Only recently has prescribed burning been reintroduced to the site, and the beneficial consequences have been dramatic. Many rare species populations have increased. However, prescribed burning needs to be continued at frequent intervals because, 1) some fire-dependent plant species noted by Fernald have yet to reappear (these may be present in the soil seed bank), 2) some rare plants at the site remain more or less restricted to sandy roadside habitats, apparently because conditions are not yet suitable in the woodland vegetation away from the roads, and 3) natural reproduction of long-leaf pine remains very spotty.

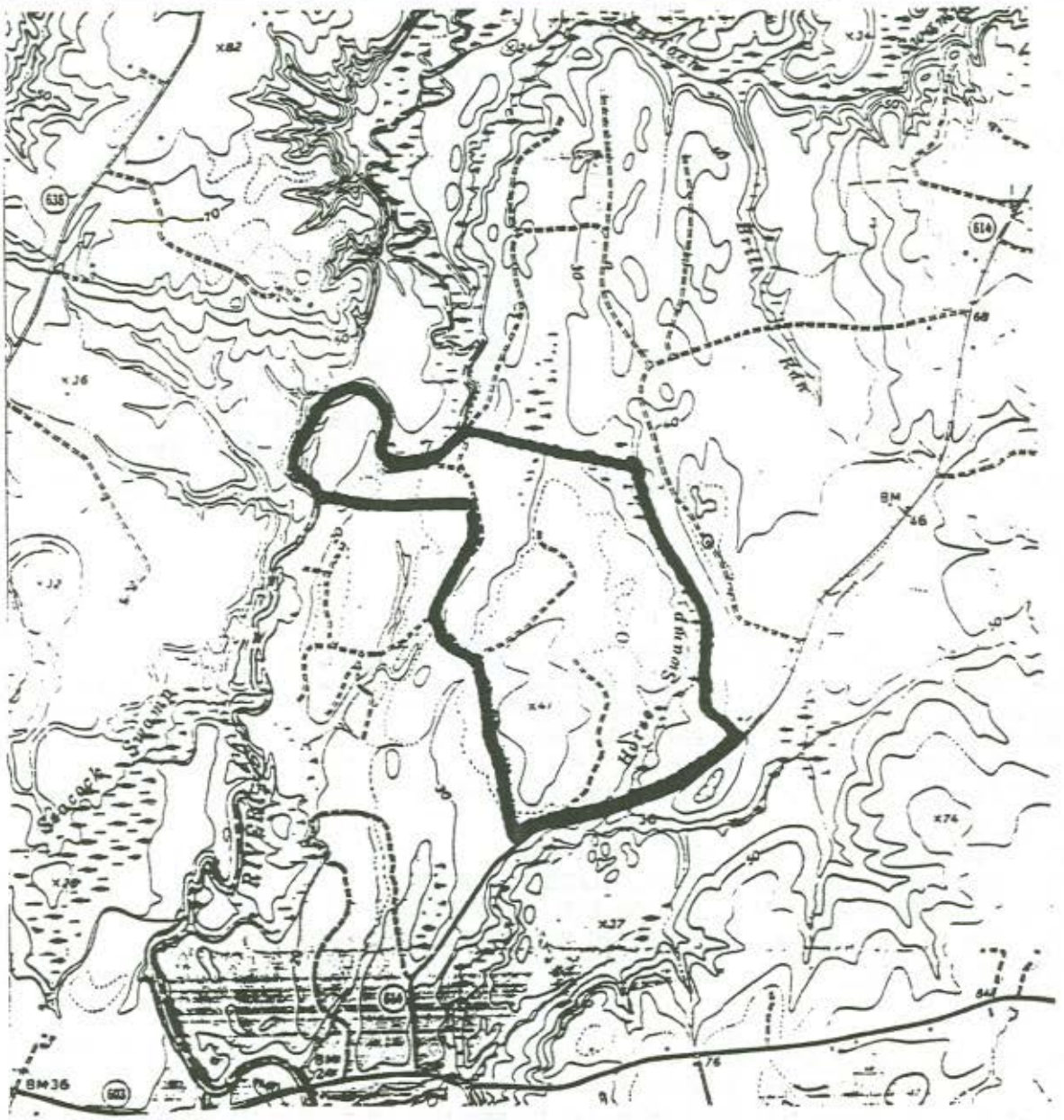
CURRENT STATUS: The site is owned by Old Dominion University, and is managed as a natural area.

PROTECTION RECOMMENDATIONS: Highly significant natural areas lie immediately to the north (Antioch Swamp Barrens) and to the south (Horse Swamp Barrens) of the Blackwater Ecologic Preserve. Every effort should be made to protect these adjacent areas to mitigate future negative impacts to the Blackwater Ecological Preserve. By doing so, a truly viable and defensible natural area preserve will be formed along this section of the Blackwater River.

REFERENCES:

Fernald, M.L. 1937. Local plants of the inner Coastal Plain of southeastern Virginia. Rhodora 39:321-366.

Frost, C.C. and L.J. Musselman. 1987. History and vegetation of the Blackwater Ecologic Preserve. Castanea 52:16-46.



SITE NAME: ZUNI MACROSITE - BLACKWATER ECOLOGIC PRESERVE
QUADRANGLE: ZUNI

ZUNI MACROSITE - HORSE SWAMP BARRENS

SIZE: ca. 643 acres **BIODIVERSITY RANK:** B2

LOCALITY: Isle of Wight County

QUADRANGLE: Zuni **QUADRANGLE CODE:** 3607677

LOCATION: The site includes the downstream section of Horse Swamp and surrounding uplands in the area north and south of Route 614. To the west lies the Blackwater River, and to the east, the Blackwater Ecologic Preserve.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURENCE RANK
communities:						
OLIGOTROPHIC FOREST	-	G4T1	S1	-	-	BC
plants:						
CARPHEPHORUS BELLIDIFOLIUS	SANDY-WOODS CHAFFHEAD	G4	S1	-	-	D
CENCHRUS CAROLINIANUS	COAST SANDBUR	G5	S1	-	-	D
JUNCUS ABORTIVUS	PINE BARREN RUSH	G4G5	S1	-	-	D
KALMIA ANGUSTIFOLIA	SHEEP-LAUREL	G5	S2S3	-	-	A
PINUS PALUSTRIS	LONG-LEAF PINE	G4G5	S2	-	-	CD
PYXIDANTHERA BARBULATA	FLOWERING PIXIE-MOSS	G4	S1	-	-	C
QUERCUS LAEVIS	TURKEY OAK	G5	S2	-	-	AB
QUERCUS MARGTARETTAE	SAND POST OAK	G5	S2	-	-	AB
RHYNCHOSPORA FASCICULATA	FASCICULATE BEAKRUSH	G5	S2	-	-	CD
TRICHOSTEMA SETACEUM	NARROW-LVD. BLUECURLS	G5	S2	-	-	C
VACCINIUM CRASSIFOLIUM	CREEPING BLUEBERRY	G4G5	S1	-	-	D
ZORNIA BRACTEATA	VIPERINA	G5?	S1	-	-	BC

SITE DESCRIPTION: The site contains an extremely rare type of Oligotrophic Forest characterized by long-leaf pine (Pinus palustris) and turkey oak (Quercus laevis). Long-leaf pine and understory plants such as creeping blueberry (Vaccinium crassifolium), flowering pixie-moss (Pyxidanthera barbulata), and sheep-laurel (Kalmia angustifolia) indicate a fire-maintained vegetation type often called a "pine barren". This example, at the northern range limit of long-leaf pine and lacking a number of southern plant species, should be regarded as a globally endangered community type. Fire has played a major role in creating and maintaining the distinctive vegetation. Unfortunately, the area has not burned for many years, and therefore the rare plants lack vigor and are reproducing poorly.

Loblolly pine (Pinus taeda) presently dominates the forest. In some places, recent selective logging has created canopy openings, which gives the

vegetation a woodland structure. In other places, clear-cut tracts still support rare species.

BOUNDARY JUSTIFICATION: The conservation planning boundary for this site encompasses the full extent of rare pine barren vegetation, plus surrounding lands which must be protected to ensure the long term viability and defensibility of the site. The boundary was drawn from aerial photograph interpretation and limited field surveys.

THREATS: Future logging likely will destroy or severely degrade this natural community and its rare plant populations. Another threat to the entire natural community is lack of fire; this is preventing long-leaf pine regeneration. Ditching and residential development are serious threats as well.

MANAGEMENT RECOMMENDATIONS: Several prescribed burns are needed to enhance the rare species populations. As fires create open soil habitats, the number of rare plant species here will likely increase dramatically. Virtually all of the rare plant species found at the adjacent Blackwater Ecologic Preserve should colonize the Horse Swamp Barrens site following prescribed burning. Lowland areas within the pine barren currently support sphagnous thickets of pond pine (Pinus serotina), laurel-leaf greenbrier (Smilax laurifolia), and sweetbay magnolia (Magnolia virginiana). With fire, these wet areas would convert to open, bog-like environments and exceptional rare plant habitat. Managers of the Blackwater Ecologic Preserve possess the technical and scientific expertise needed to manage pine barrens. If protected, the Horse Swamp Barrens could be efficiently managed in conjunction with the Blackwater Ecologic Preserve.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site is a very high priority for protection in southeastern Virginia. If protected, the site would contribute to forming a larger, more diverse, and more defensible natural area preserve system along this section of the Blackwater River.

SITE NAME: ZUNI MACROSITE - HORSE SWAMP BARRENS
QUADRANGLE: ZUNI

ROUTE 618 PINE BARRENS

SIZE: ca. 640 acres **BIODIVERSITY RANK:** B3

LOCALITY: Isle of Wight County and City of Suffolk

QUADRANGLE: Franklin **QUADRANGLE CODE:** 3607668

LOCATION: The site lies east and west of Route 618 north of the Suffolk City line and south of the junction of Routes 617 and 618.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
OLIGOTROPHIC WOODLAND	-	-	S1	-	-	B
plants:						
PINUS PALUSTRIS	LONG-LEAF PINE	G4G5	S1	-	-	U
PYXIDANTHERA BARBULATA	FLOWERING PIXIE-MOSS	G4	S1	-	-	U
QUERCUS LAEVIS	TURKEY OAK	G5	S2	-	-	BC
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	BC
SEYMERIA CASSIOIDES	SEYMERIA	G5	S1S2	-	-	U
STIPULICIDA SETACEA	PINELAND SCALY-PINK	G5	S1	-	-	U
VACCINIUM CRASSIFOLIUM	CREEPING BLUEBERRY	G4G5	S1	-	-	U

SITE DESCRIPTION: With appropriate management, this site has the potential to be one of Virginia's better remaining long-leaf pine (Pinus palustris) barrens. It was discovered in 1940 by eminent botanist M.L. Fernald who wrote the following account (Fernald 1941):

> "In early April, finding that the bridge at South Quay was being replaced and, consequently, not open to travel, we sought a new and short route back to Franklin, rather than go far out of our way by following the surfaced roads. So we took a dirt road northward from Duck's Store and very soon found ourselves skirting the eastern margin of a fine new tract of white sand and pine barren (characterized by Long-leaf Pine and Catesby's Oak) in Isle of Wight County, south of Lee's Mill and midway between that south of Zuni and the similar but larger area in Nansemond County. ...the preliminary canvas showed the typical carpets of Pyxidanthera and of Vaccinium crassifolium Andr., which meant that day after day until late autumn must be devoted to the new barrens."

Although presently fragmented by industrial ponds, roads, and utility rights-of-way, high-quality pine barren vegetation remains along Route 618. Also, an aerial photograph showed the characteristic signature of pine barren

vegetation extending away from Route 618. Three rare plant species, turkey oak (Quercus laevis), sand post oak (Quercus margarettae), and long-leaf pine can be viewed from the road. The four other rare plants probably still persist at the site because the habitat is intact; these species were collected here many years ago. Moreover, the site has the potential to support additional rarities. An on-site natural heritage inventory has not been conducted, pending landowner permission. Because long-leaf pine barren vegetation is so rare in Virginia, this site is extremely important and requires immediate protection planning.

BOUNDARY JUSTIFICATION: The boundary encompasses lands known or presumed to be pine barren vegetation, and additional natural lands intended to mitigate future negative impacts from adjacent land uses. The boundary is preliminary and should be refined following an on-site inventory.

THREATS: The site has already been severely impacted by land clearing, industrial pond construction, roads, and rights-of-way. These land developments still pose a threat to the site. Logging, especially if followed by conversion to pine plantations, is a serious threat. Lastly, all of the pine barren rarities benefit from, or depend upon, fire; lack of fire, therefore, constitutes a threat.

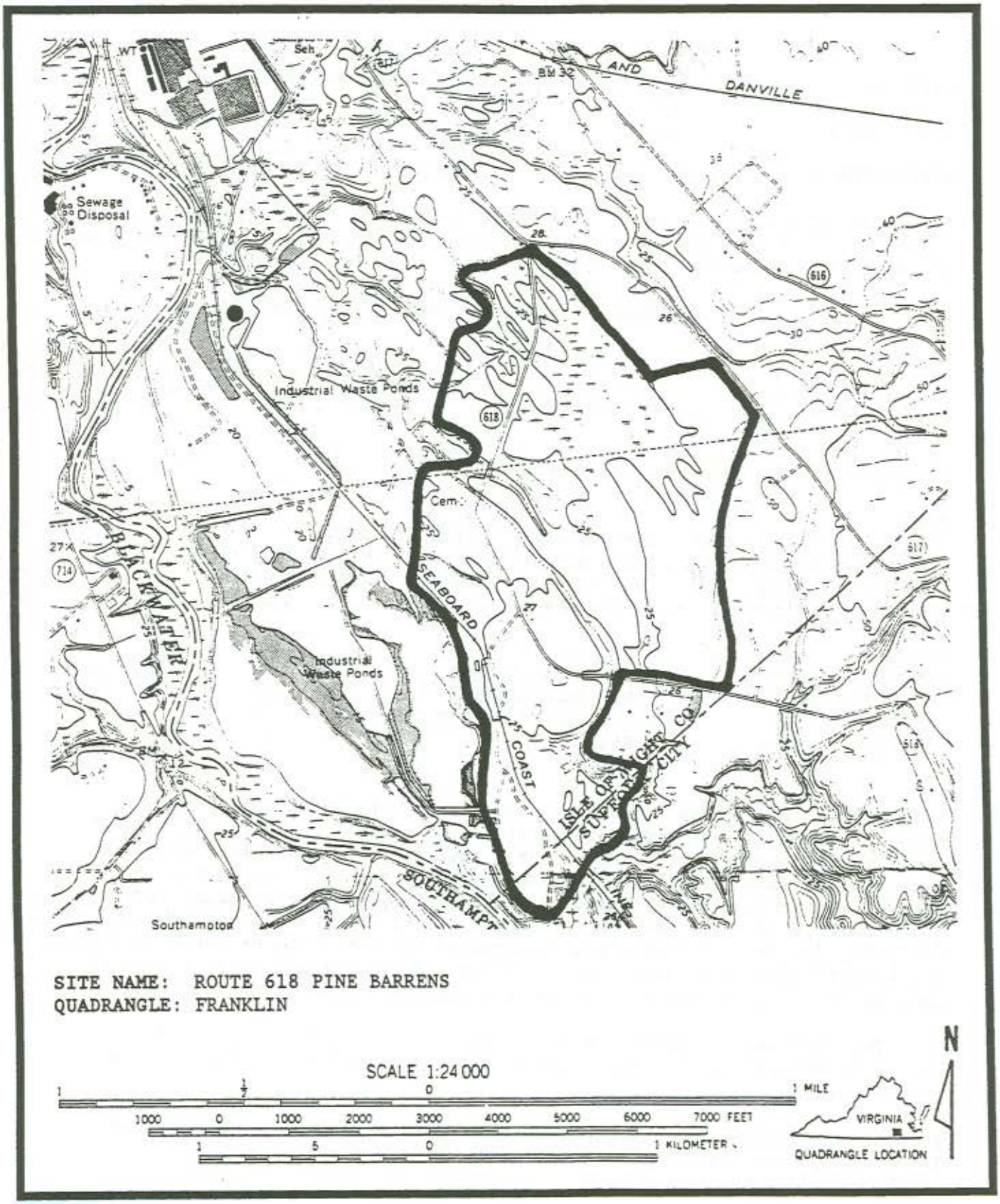
MANAGEMENT RECOMMENDATIONS: Management recommendations should await the results of an on-site natural heritage inventory.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Urgent protection of this site is recommended. Because of its proximity to the City of Franklin, the site could become a superlative demonstration area and "outdoor classroom" illustrating natural heritage resource management.

REFERENCES:

Fernald, M.L. 1941. Another century of additions to the flora of Virginia. Rhodora 43:485-665. (see pp. 487-488)


WT
Sch
BM 32
AND
DANVILLE
Sewage Disposal
Industrial Waste Ponds
Cem.
SEABOARD
COAST
Industrial Waste Ponds
BLACKWATER
SOUTHAMPT
Southampton
616
618
617
714
SITE NAME: ROUTE 618 PINE BARRENS
QUADRANGLE: FRANKLIN
SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER
N
VIRGINIA
QUADRANGLE LOCATION

CAT PONDS

SIZE: ca. 95 acres **BIODIVERSITY RANK:** B4

LOCALITY: Isle of Wight County

QUADRANGLE: Benns Church **QUADRANGLE CODE:** 3607685

LOCATION: The site is clearly named, Cat Ponds, on the topographic map. It lies approximately 1 mile northwest of Wills Corner in the area north of Route 600, east of Route 602, and west of Route 10.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURENCE RANK
communities:						
MID-HEIGHT HERBACEOUS PALUSTRINE WETLAND		G3?	S1	-	-	C
plants:						
ELEOCHARIS MELANOCARPA	BLACK-FRUITED SPIKERUSH	G4	S2	-	-	BC
ELEOCHARIS TRICOSTATA	THREE-ANGLE SPIKERUSH	G3G4	S1	-	-	D
LUDWIGIA BREVIPES	LONG BEACH SEEDBOX	G4G5	S2	-	-	D
PANICUM HEMITOMON	MAIDENCANE	G5?	S1	-	-	A
animals:						
AMBYSTOMA MABEEI	MABEE'S SALAMANDER	G4	S1	-	LT	C
AMBYSTOMA TIGRINUM	TIGER SALAMANDER	G5	S1	-	LE	C
ATLIDES HALESUS	GREAT PURPLE HAIRSTREAK	G5	S3	-	-	C
SIREN INTERMEDIA	LESSER SIREN	G5	SU	-	-	B

SITE DESCRIPTION: When discovered by botanist M.L. Fernald 54 years ago, the seasonal ponds at this site were apparently pristine and supported a great variety of rare plants (Fernald, 1938). Recently, adjacent land uses have seriously degraded the ponds. With every heavy rain, the largest and most significant pond is being filled by sediment from a ditch draining the roads and driveways of a new housing development. This pond was also deepened in the past, (perhaps to create permanent water for a fishery or for livestock), and a small dike constructed at its outlet. If this small fragile dike of sand is damaged, the entire pond would drain into an adjacent sand pit.

The next largest pond is situated next to agricultural land and is partially within a power line right-of-way. Nutrient enrichment is a serious threat here.

BOUNDARY JUSTIFICATION: The conservation planning boundary encloses the two largest and best remaining seasonal ponds, plus minimal upland buffer.

THREATS: Threats are drainage (if a small dike breaks), dredging for fishery enhancement, nutrient enrichment from agricultural lands, housing development, sand mining, power line construction and right-of-way maintenance, and sedimentation.

MANAGEMENT RECOMMENDATIONS: The many threats here have synergistically coalesced to cast a menacing shadow of doom over the entire area. If this site continues to be degraded, management will become a moot issue. Buffer strips of natural vegetation need to be established around each pond, and the condition of the small dike monitored or improved.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The long term viability of this site is doubtful. Recent logging and planned development have already doomed the ponds to the north. Protection efforts should be focused on the ditch leading into the largest pond. Buffer zones of natural vegetation should be established.

REFERENCES:

Fernald, M.L. 1938. Noteworthy plants of southeastern Virginia. Rhodora 40:364-491. (pp. 370-371)

SITE NAME: CAT PONDS
QUADRANGLE: BENNS CHURCH

SCALE 1:24000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

MUDDY CROSS PONDS

SIZE: ca. 115 acres **BIODIVERSITY RANK:** B4 or B3

LOCALITY: Isle of Wight County

QUADRANGLE: Benns Church **QUADRANGLE CODE:** 3607685

LOCATION: The site lies north of Route 644, beginning ca. 1 mile northwest of Muddy Cross. It includes several seasonal ponds which lie east of the pipeline right-of-way.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURENCE RANK
communities:						
MESOTROPHIC SEMIPERMANENTLY FLOODED PALUSTRINE FOREST		-	S1	-	-	BC
plants:						
ELEOCHARIS TRICOSTATA	THREE-ANGLE SPIKERUSH	G3G4	S1	-	-	C

SITE DESCRIPTION: The site contains five seasonal ponds which support unusual bald cypress (Taxodium distichum) vegetation. Cypress typically occurs along river bottoms, but here this species thrives in seasonal pond habitats. Evidently, the hydroperiod is similar to that found on river bottoms. The ponds are in relatively good condition, though the surrounding upland forest is young. One pond abuts Route 644.

The wetland community is difficult to evaluate because of its unusual characteristics. The task of classifying community types, distinguishing one type from another, assessing occurrence quality, and determining overall state status is formidable in cases such as this.

One rare plant, three-angle spikerush (Eleocharis tricostata), occurs at the site. A zoological inventory has not been conducted, but we strongly suspect that the wetlands will contain rare salamanders, dragonflies, or damselflies.

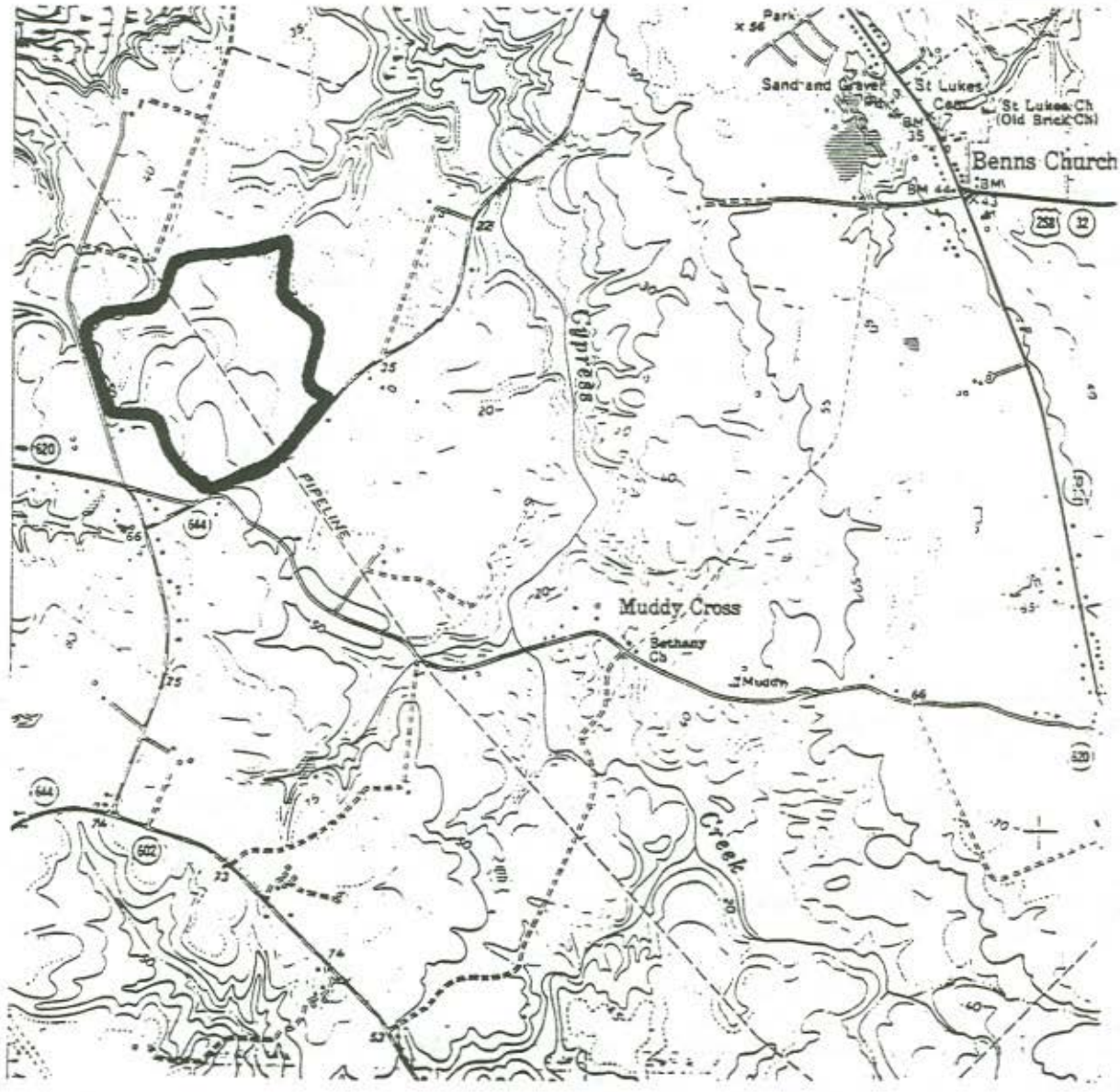
BOUNDARY JUSTIFICATION: The conservation planning boundary encompasses the cluster of seasonal ponds, plus the upslope land which drains into them. Additional upland buffer is included to mitigate future negative impacts to the site.

THREATS: Drainage, filling, siltation and water quality degradation represent the greatest threats to these wetlands. Road maintenance or expansion activities along Route 644 would impact one of the wetlands.

MANAGEMENT RECOMMENDATIONS: No active management is needed. Management in this case means protecting the site from extrinsic threat factors.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site should not be overlooked in the protection planning process. Zoological inventories will likely yield rarities, thereby increasing the significance of the site. A voluntary protection agreement with the landowner should be secured to safeguard the site's biological significance over the short term. Long-term protection options should also be explored.


Benns Church
St Lukes Ch (Old Brick Ch)
Sand and Gravel Pit
St Lukes Cem
Muddy Cross
Bethany Ch
Muddy
Cypress
Creek
PIPELINE
SITE NAME: MUDDY CROSS PONDS
QUADRANGLE: BENNS CHURCH
SCALE 1:24000
1 MILE
7000 FEET
1 KILOMETER
VIRGINIA
QUADRANGLE LOCATION
N

NORTHWEST RIVER MACROSITE - UPPER SECTION

SIZE: ca. 1285 acres **BIODIVERSITY RANK:** B4

LOCALITY: City of Chesapeake

QUADRANGLE: Moyock **QUADRANGLE CODE:** 3607652

LOCATION: The site includes the wetland adjacent to the Northwest River, upstream of Rt. 168 and downstream of Walnut Road, directly northwest of the community of Northwest.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
MID-HEIGHT HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	BC
SUBMESOTROPHIC FOREST		-	-	-	-	U
plants:						
BOLTONIA ASTEROIDES	ASTER-LIKE BOLTONIA	G5	S2	-	-	D
STEWARTIA MALACHODENDRON	SILKY CAMELLIA	G4	S2	-	-	B

SITE DESCRIPTION: Here, the Northwest River is bordered by forested wetlands dominated by bald cypress (Taxodium distichum), water tupelo (Nyssa aquatica), black gum (Nyssa biflora), loblolly pine (Pinus taeda), sweet gum (Liquidambar styraciflua), and red maple (Acer rubrum). The site is extensive and serene and provides an enjoyable canoe trip.

Within the bottomland, upland forests occur on slightly-elevated "islands". One island, approximately three acres in size, was visited and two natural heritage resources were found; silky camellia (Stewartia malachodendron), and a noteworthy Submesotrophic Forest containing an impressive total of 21 woody plant species. Evidently, these islands were never cleared for agriculture, and the forests they support probably represent, or approximate, presettlement conditions (logging has taken place, but recovery of the vegetation seems complete).

Significant herbaceous wetlands occur along the unnamed northern branch of the river. Here, among the stands of twigrush (Cladium mariscoides), grows the rarity, aster-like boltonia (Boltonia asteroides). Woody plants such as red maple and waxmyrtle (Myrica cerifera) seem to be increasing in these marshes, possibly as a result of fire suppression (Cecil Frost, personal communication).

BOUNDARY JUSTIFICATION: The conservation planning boundary includes all element occurrences, their habitat, and a buffer of adjacent land necessary to

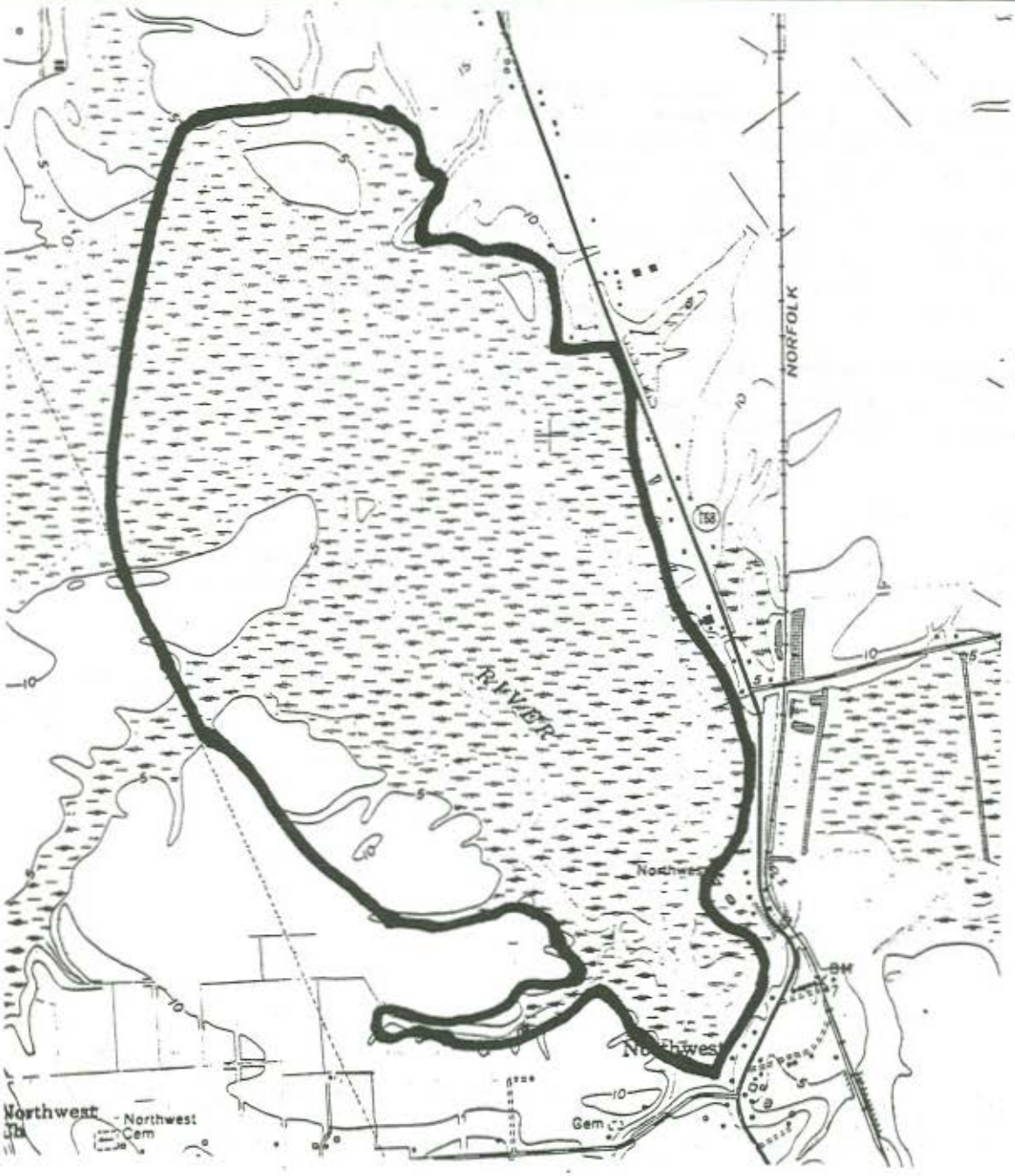
mitigate impacts from off-site land use activities. Much of the site was delineated using NHAP color-infrared photograph #325-172 taken on 4/24/82.

THREATS: Common reed (Phragmites australis), a potentially invasive grass, occurs in some of the marshes, but there is no cause for concern because here the much maligned plant appears to be a natural component of the vegetation. Common reed fails to form dense stands in this region of the Northwest River, and to the appreciative eye, the plant adds striking beauty to the marsh vegetation. If common reed does increase in these marshes, the increase will likely be the result of hydrologic perturbations or similar disturbance. Logging is a threat to the Submesotrophic Forest and the silky camellia. Woody species may be increasing in the marsh, and this is cause for concern.

MANAGEMENT RECOMMENDATIONS: Monitor the rate of woody species encroachment and possible spread of Phragmites to determine whether the rare species and marshes are threatened. Investigate the use of prescribed burning as a management technique.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The site is part of an integrated Northwest River ecosystem, and therefore protection efforts here will contribute to the protection of this larger, more significant landscape unit.



SITE NAME: NORTHWEST RIVER MACROSITE - UPPER SECTION
QUADRANGLE: MOYOCK

SCALE 1:24000

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

KILOMETER

N

NORTHWEST RIVER MACROSITE - NORTHWEST RIVER PARK

SIZE: ca. 790 acres **BIODIVERSITY RANK:** B4

LOCALITY: City of Chesapeake

QUADRANGLE: Moyock **QUADRANGLE CODE:** 3607652

LOCATION: The site includes Northwest River Park and adjacent forested tracts along the northeast side of the Northwest River, upstream from Smith Creek and downstream of Rt. 168; about 3 miles northeast of the community of Northwest.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
CAREX DECOMPOSITA	EPIPHYTIC SEDGE	G3G4	S1	3C	-	BC
STEWARTIA MALACHODENDRON	SILKY CAMELIA	G4	S2	-	-	B
animals:						
CROTALUS HORRIDUS ATRICAUDATUS	CANEBRAKE RATTLESNAKE	G5TUQ	S1	-	-	C
EUPHYES DUKESI	SCARCE SWAMP SKIPPER	G3G4	S2	-	-	U

SITE DESCRIPTION: This site includes a large forested tract in and adjacent to Northwest River Park. The upland forests are a mix of loblolly pine (Pinus taeda), oaks (Quercus spp.), and American beech (Fagus grandifolia). The rare shrub, silky camelia (Stewartia malachodendron), is found throughout portions of the forest which have not been logged in the last 60 to 100 years.

Forested wetlands bordering Indian Creek, Smith Creek, and the Northwest River adjoin the uplands. These swamps are dominated by a mixture of bald cypress (Taxodium distichum), water tupelo (Nyssa aquatica), black gum (Nyssa biflora), sweet gum (Liquidambar styraciflua), red maple (Acer rubrum), and loblolly pine. A rare plant, epiphytic sedge (Carex decomposita), grows in the swamp bordering the Northwest River. This species is known from only one other Virginia watershed, and is somewhat rare globally. Canebrake rattlesnakes (Crotalus horridus atricaudatus) are also present.

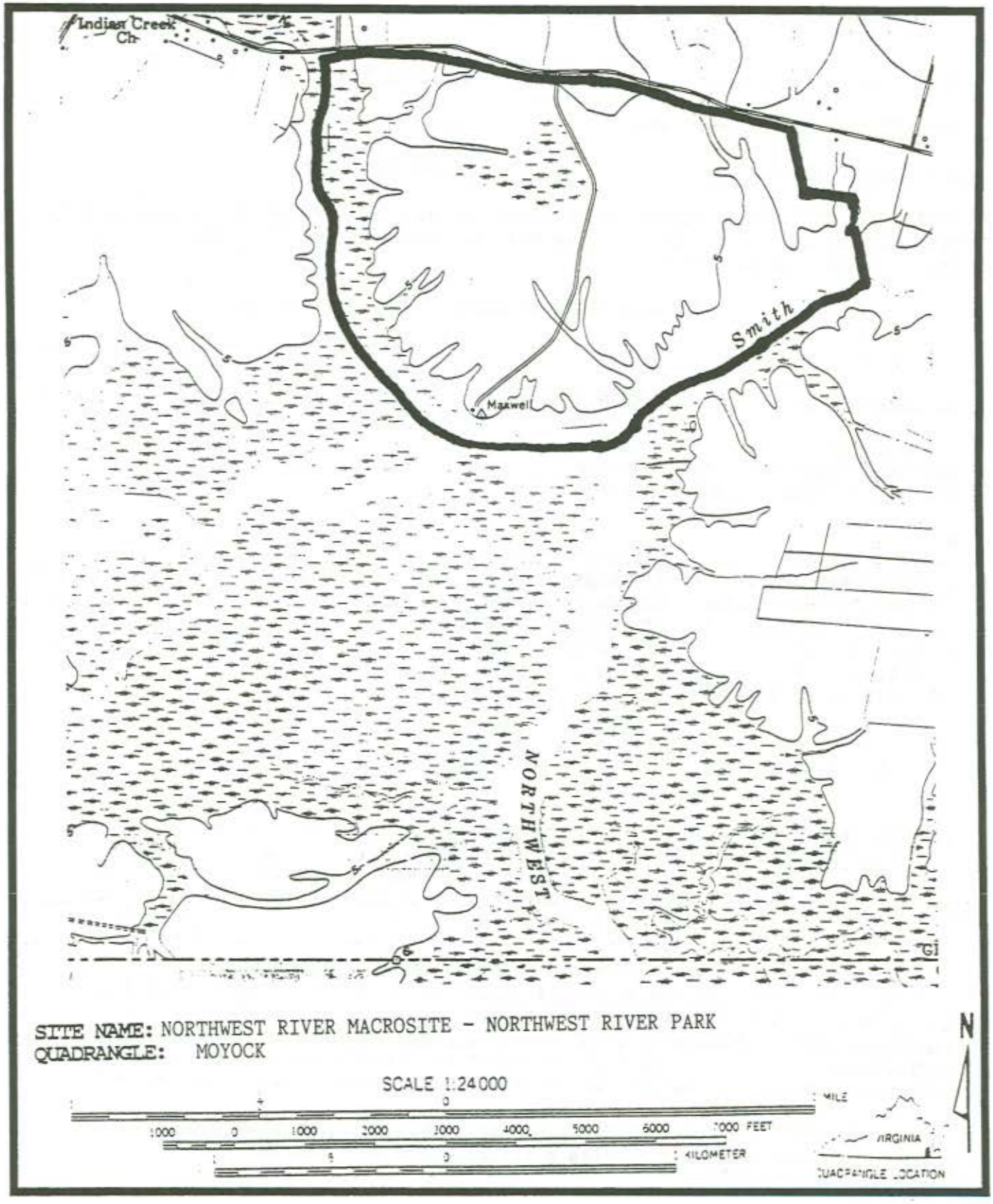
BOUNDARY JUSTIFICATION: The conservation planning boundary includes the forested habitat for the rare species in and directly adjacent to Northwest River Park. Because the Park's activities are integral to the viability of the rare species populations, park facilities are included in the boundary for this site. Forested tracts adjacent to the park were delineated with NHAP color-infrared photograph #325-172 taken on 4/24/82.

THREATS: Threats are minimal to the site and its rare species. Outdoor recreationists sometimes kill rattlesnakes; numerous "rattles" are displayed at a nearby store.

MANAGEMENT RECOMMENDATIONS: Maintain current land use.

CURRENT STATUS: Northwest River Park is managed by the City of Chesapeake as a park for nature study and low-impact recreational use. A campground and small lake are also within the park. The remainder of this site is privately owned.

PROTECTION RECOMMENDATIONS: The site is part of the Northwest River wetland ecosystem, and therefore protection efforts here will contribute to the protection of a larger, more significant landscape unit.


Indian Creek
Ch
Smith
Maxwell
NORTHWEST
SITE NAME: NORTHWEST RIVER MACROSITE - NORTHWEST RIVER PARK
QUADRANGLE: MOYOCK
SCALE 1:24000
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
KILOMETER
VIRGINIA
N

NORTHWEST RIVER MACROSITE - SOUTHWESTERN MARSHES

SIZE: ca. 1065 acres **BIODIVERSITY RANK:** B3

LOCALITY: City of Chesapeake

QUADRANGLE: Moyock **QUADRANGLE CODE:** 3607652

LOCATION: The site includes the wetland on the west side of the Northwest River, upstream of the North Carolina line and downstream of Rt. 168; about 2 miles east of the community of Northwest.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
LOW HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	C
MID-HEIGHT HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	C
plants:						
CAREX DECOMPOSITA	EPIPHYTIC SEDGE	G3G4	S1	3C	-	BC
CLADIUM JAMACIENSIS	SAWGRASS	G5	S1	-	-	BC
ELEOCHARIS ROSTELLATA	BEAKED SPIKERUSH	G5	S1	-	-	B
ERIOCAULON DECANGULARE	TEN-ANGLE PIPEWORT	G5	S1	-	-	BC
LOBELIA ELONGATA	ELONGATED LOBELIA	G3G5	S1	-	-	A
LUDWIGIA ALATA	WINGED SEEDBOX	G3G4	S1	-	-	B
PHYSOSTEGIA LEPTOPHYLLA	SLENDER-LEAVED DRAGON-HEAD	G4G5	S2	2	-	A
UTRICULARIA PURPUREA	PURPLE BLADDERWORT	G4	S2	-	-	A
UTRICULARIA VULGARIS	GREATER BLADDERWORT	G5	S2	-	-	B

SITE DESCRIPTION: This site is quite similar to the Smith Creek site across the river, but has a different suite of rare species. Along this stretch of the Northwest River, wind tides cause regular water level fluctuations and the water is fresh to very-slightly brackish. Plant species richness is high, and a mosaic of different vegetation types exists.

Robust emergent marsh covers much of the area, but certain low marshes support an interesting mix of plants including beaked spikerush (Eleocharis rostellata), ten-angle pipewort (Eriocaulon decangulare), winged seedbox (Ludwigia alata), elongated lobelia (Lobelia elongata), and twigrush (Cladium mariscoides). These low marshes represent two broad community types, Low Herbaceous Palustrine Wetland and Mid-height Herbaceous Palustrine Wetland.

Woody species such as red maple (Acer rubrum), swamp rose (Rosa palustris), and waxmyrtle (Myrica cerifera) seem to be increasing in some of

the marshes. Less frequent fire in the marshes is probably contributing to the woody plant invasion problem (Cecil Frost, personal communication).

The forested wetland at the site supports the rare plant, epiphytic sedge (Carex decomposita), a species known from only one other Virginia watershed.

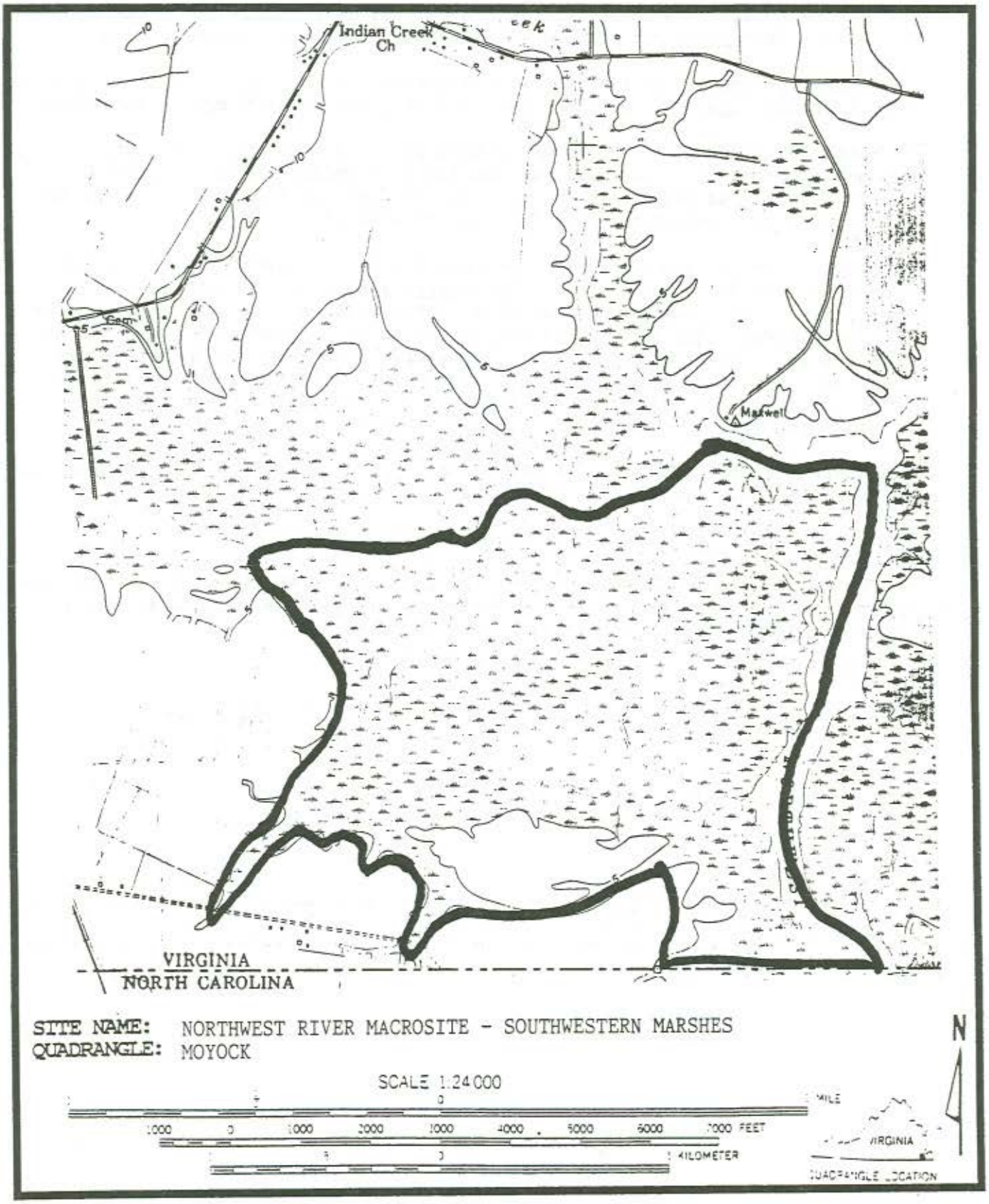
BOUNDARY JUSTIFICATION: The conservation planning boundary includes the wetland communities, rare species, and forested upland buffer. Forested tracts adjacent to the areas surveyed in the field were delineated with NHAP color-infrared photograph #325-172 taken on 4/24/82.

THREATS: Without regular fire, woody species may supplant some of the rare herbaceous species. Common reed (Phragmites australis), a potentially aggressive marsh grass, occurs in many of the marshes. In some parts of the Northwest River, this grass does not appear to be increasing, while in other sections it is forming large dense clones. This species should be closely monitored, and disturbances to the wetland vegetation - which favor common reed - avoided. Logging does not seem to be an immediate threat due to the marginal condition of the wetland timber resource.

MANAGEMENT RECOMMENDATIONS: Introduce regular prescribed burning management. Monitor the woody species and common reed in the marsh.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The site is part of the Northwest River wetland ecosystem, and therefore protection efforts here will contribute to the protection of a larger, more significant landscape unit.


Indian Creek
Ch
Maxwell
VIRGINIA
NORTH CAROLINA
SITE NAME: NORTHWEST RIVER MACROSITE - SOUTHWESTERN MARSHES
QUADRANGLE: MOYOCK
SCALE 1:24 000
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER
N
VIRGINIA
QUADRANGLE LOCATION

NORTHWEST RIVER MACROSITE - SMITH CREEK

SIZE ca. 640 acres **BIODIVERSITY RANK:** B3

LOCALITY: City of Chesapeake

QUADRANGLE: Moyock **QUADRANGLE CODE:** 3607652

LOCATION: The site includes the wetland on the east side of the Northwest River, upstream of North Carolina line and downstream of Smith Creek; about 3 miles east of the community of Northwest.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
LOW HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	C
MID-HEIGHT HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	C
plants:						
CAREX DECOMPOSITA	EPIPHYTIC SEDGE	G3G4	S1	3C	-	BC
CLADIUM JAMACIENSIS	SAWGRASS	G5	S1	-	-	BC
ERIOCAULON DECANGULARE	TEN-ANGLE PIPEWORT	G5	S1	-	-	BC
LOBELIA ELONGATA	ELONGATED LOBELIA	G3G5	S1	-	-	A
PHYSOSTEGIA LEPTOPHYLLA	SLENDER-LEAVED DRAGON-HEAD	G4G5	S2	2	-	A
UTRICULARIA VULGARIS	GREATER BLADDERWORT	G5	S2	-	-	B
animals:						
LIMNAOEDUS OCULARIS	LITTLE GRASS FROG	G5	S3	-	-	B
RANA VIRGATIPES	CARPENTER FROG	G5	S3	-	-	AB

SITE DESCRIPTION: This site is quite similar to the Southwestern Marshes site but has a different mix of rare species. Along this stretch of the Northwest River, wind tides cause regular water level fluctuations and the water is fresh to very-slightly brackish. Plant species richness is high within a mosaic of different wetland vegetation types.

Tall robust emergents such as big cordgrass (Spartina cynosuroides), common reed (Phragmites australis), broad-leaf cattail (Typha latifolia), narrow-leaf cattail (Typha angustifolia), and black needlerush (Juncus roemerianus) dominate most of the marshes. Areas of "low marsh" vegetation, occur away from creek channels. Here one finds the rare ten-angle pipewort (Eriocaulon decangulare) and elongated lobelia (Lobelia elongata).

Many of the marshes are being invaded by woody species such as red maple (Acer rubrum), swamp rose (Rosa palustris), and waxmyrtle (Myrica cerifera).

Cecil Frost (personal communication) believes that the suppression or cessation of fire in the marshes is a major cause for the woody plant increase.

The forested wetlands at the site support bald cypress (Taxodium distichum), water tupelo (Nyssa aquatica), black gum (Nyssa biflora), loblolly pine (Pinus taeda), sweet gum (Liquidambar styraciflua), and red maple. The rare plant, epiphytic sedge (Carex decomposita) occurs on the border of the swamp forest. Two rare amphibians, little grass frog (Limnaoedus ocularis) and carpenter frog (Rana virgatipes) occur throughout the wetland.

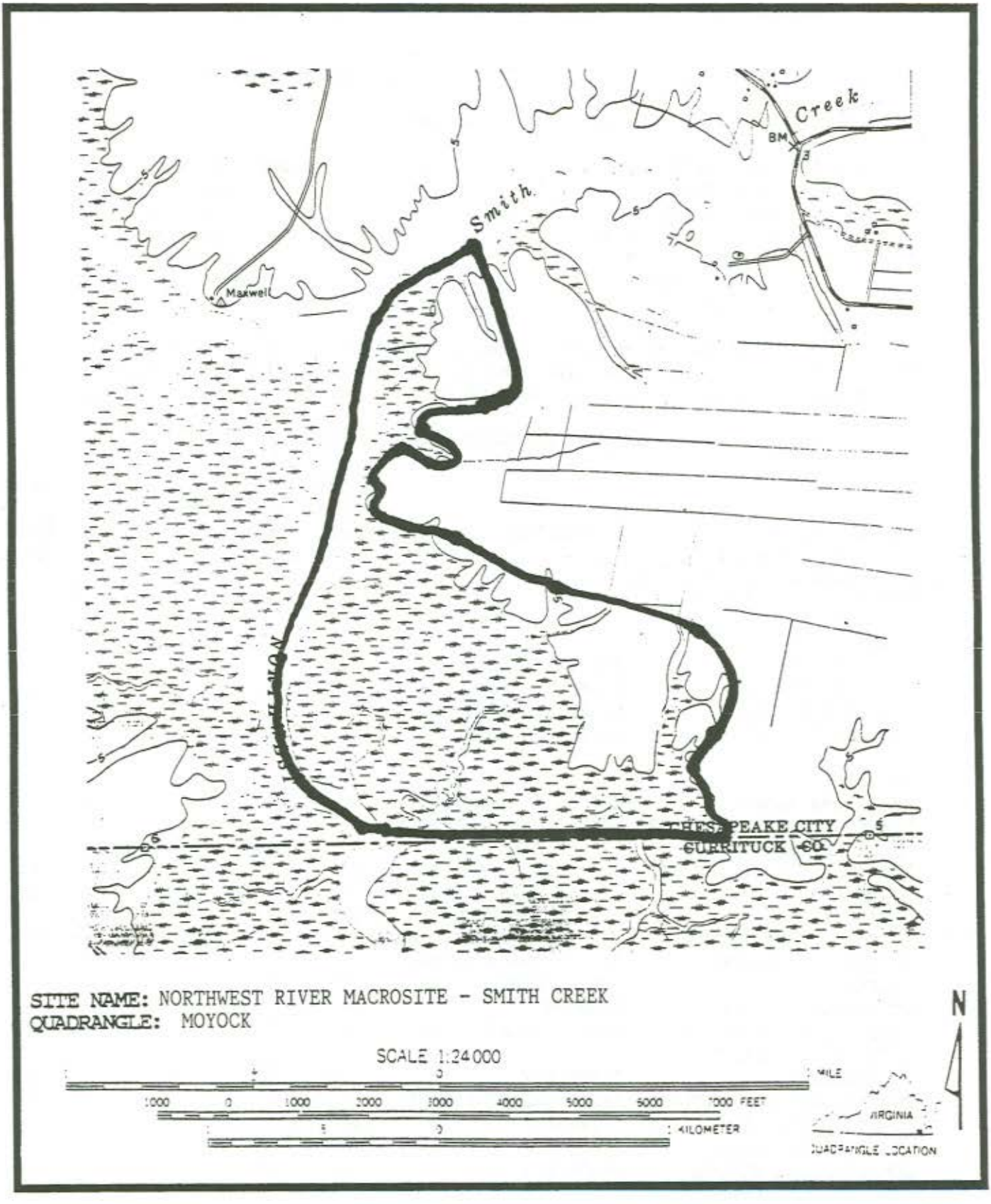
BOUNDARY JUSTIFICATION: The conservation planning boundary includes the wetland communities, the rare species, and upland buffer. Forested tracts adjacent to the areas surveyed in the field were delineated with NHAP color-infrared photograph #325-172 taken on 4/24/82.

THREATS: Lack of regular burning is an indirect threat to the marsh vegetation. Without fire, woody species may supplant some of the rare herbaceous species. Common reed (Phragmites australis), a potentially aggressive grass, occurs in many of the marshes. In some parts of the Northwest River this grass does not appear to be increasing, while in other sections it is forming large dense clones. This species should be closely monitored, and disturbances to the wetland vegetation - which favor the common reed - avoided. Logging does not seem to be an immediate threat due to the marginal condition of the wetland timber resource.

MANAGEMENT RECOMMENDATIONS: Introduce regular prescribed burning. Monitor woody species and common reed in the marsh.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: The site is part of the Northwest River wetland ecosystem. Protection efforts here will contribute to the protection of a larger, more significant landscape unit.


Creek
BM
Smith
Maxwell
CHESAPEAKE CITY
CURRITUCK CO.
SITE NAME: NORTHWEST RIVER MACROSITE - SMITH CREEK
QUADRANGLE: MOYOCK
SCALE 1:24000
MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
KILOMETER
VIRGINIA
QUADRANGLE LOCATION
N

DISMAL SWAMP MACROSITE - GREAT DISMAL SWAMP NATIONAL WILDLIFE REFUGE

SIZE: ca. 75,000 acres **BIODIVERSITY RANK:** B2

LOCALITY: City of Chesapeake and City of Suffolk

QUADRANGLE:		**QUADRANGLE CODE:**
	LAKE DRUMMOND	3607654
	CORAPEAKE	3607655
	DEEP CREEK	3607663
	LAKE DRUMMOND NW	3607664
	SUFFOLK	3607665
	BOWERS HILL	3607674
	CHUCKATUCK	3607675

LOCATION: The site covers a vast area of land between Bowers Hill and Deep Creek to the north, US Rt. 17 to the east, the North Carolina line to the south, US routes 13/58/460 to the northwest, and Suffolk City routes 642 and 604 on the west.

NATURAL HERITAGE RESOURCE SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
POCOSIN		-	S1S2	-	-	A
plants:						
ILEX CORIACEA	BAY-GAIL HOLLY	G5	S1	-	-	U
VIOLA ESCULENTA	SALAD VIOLET	G4G5	S1	-	-	U
TRILLIUM PUSILLUM	DWARF TRILLIUM	G3	S2	2	-	U
LISTERA AUSTRALIS	SOUTHERN TWAYBLADE	G4	S2S3	-	-	B
animals:						
AMBYSTOMA MABEEI	MABEES SALAMANDER	G4	S1	-	LT	X
STEREOCHILUS MARGINATUS	MANY-LINED SALAMANDER	G5	S3	-	-	C
SIREN INTERMEDIA	LESSER SIREN	G5	SU	-	-	A
LIMNOTHLYPIS SWAINSONII	SWAINSON'S WARBLER	G4	S2	-	-	B
SOREX LONGIROSTRIS FISHERI	DISMAL SWAMP SOUTH-EASTERN SHREW	G5T2	S2	LT	LT	A
PLECOTUS RAFINESQUII	EASTERN BIG-EARED BAT	G4	S1	2	LE	C
SYNAPTOMYS COOPERI HELALETES	DISMAL SWAMP SOUTHERN BOG LEMMING	G5T3	S3	3C	-	A
STYGOBROMUS ARAEUS	AMPHIPOD	G?	S2	2	-	D
CHLOROCHROA DISMALIA	DISMAL SWAMP STINKBUG	G1	S1	2	-	H
NEONYMPHA AREOLATUS AREOLATUS	DAMSELFLY	G5T4	S2S4	-	-	U
CORDULEGASTER OBLIQUUS	ARROWHEAD SPIKETAIL	G4	S1	-	-	B
CORDULEGASTER FASCIATUS	SPIKETAIL	G2?	S1	-	-	B
EPITHECA COSTALIS	DRAGONFLY	G3G4	S1	-	-	B
SOMATOCHLORA FILOSA	DRAGONFLY	G5	S1	-	-	U

SOMATOCHLORA PROVOCANS	DRAGONFLY	G3G4	S1	-	-	U
LIBELLULA AURIPENNIS	DRAGONFLY	G5	S1	-	-	U
MITOURA HESSELI	HESSEL'S HAIRSTREAK	G3G4	S2S3	3C	-	A
NASIAESCHNA PENTACANTHA	CYRANO DARNER	G5	S1	-	-	A

SITE DESCRIPTION: The Great Dismal Swamp is by far the largest contiguous tract of forest in the coastal plain of Virginia. Most of the site is forested wetland occurring on organic soils overlying nearly impermeable sands and clays of the Yorktown Formation (Oaks and Whitehead, 1979). Just north of the middle of the swamp is a 3100 acre natural lake, Lake Drummond. The surrounding land is densely vegetated in various mesophytic and wetland plant communities. Atlantic white cedar (Chamaecyparis thyoides) once dominated much of the swamp, but today, due to various human perturbations, the dominant trees are red maple (Acer rubrum) and black gum (Nyssa biflora). Bald cypress (Taxodium distichum) was also more common historically, but now it is abundant only along the lake shore and open waterways.

Other significant habitats of the Dismal Swamp include upland "islands", largely composed of American beech (Fagus grandifolia), tulip poplar (Liriodendron tulipifera), swamp white oak (Quercus michauxii), and American holly (Ilex opaca). A few tracts of rare pocosin vegetation, dominated by pond pine (Pinus serotina), inkberry (Ilex glabra), and tall ericaceous shrubs, occur here, as do small, remnant areas of canebrake. Canebrakes historically covered much of the Dismal Swamp, reflecting a history of frequent fire.

Many rare and noteworthy species inhabit the Dismal Swamp. The Dismal Swamp southeastern shrew (Sorex longirostris fisheri) is a federally threatened subspecies restricted to the Dismal Swamp area. Other local endemics include the southern bog lemming (Synaptomys cooperi haletes) and the Dismal Swamp short-tailed shrew (Blarina brevicauda telmalestes). The Swamp provides a large amount of habitat for migrating birds, such as the declining neotropical-migrant species. The rare Swainson's warbler (Limnothlypis swainsonii) is one of 84 bird species which breed here (Meanley, 1973). Black bears (Ursus americanus) are thriving in the Swamp. A population of the canebrake rattlesnake (Crotalus horridus atricaudatus), a state endangered subspecies, also occurs here.

In spite of its rather prominent place in zoological discussions, information on invertebrate life remains scanty. The Dismal Swamp green stink bug (Chlorochroa dismalia) was described from a single specimen collected in 1938 and has not been seen since. Hessell's hairstreak (Mitoura hesselli), a rare moth that feeds on Atlantic white cedar, occurs here.

BOUNDARY JUSTIFICATION: The boundary for this site includes all element occurrences and coincides with the Great Dismal Swamp National Wildlife Refuge, to the North Carolina border. Adjacent private lands, not delineated, may need to be protected to mitigate impacts from off-site land use activities.

THREATS: Most of the remaining portion of Dismal Swamp is protected within the Great Dismal Swamp National Wildlife Refuge. However, threats continue in the forms of altered hydrology, altered water quality, and disruption of a natural fire regime. Groundwater extraction is a potential threat of undetermined consequences.

MANAGEMENT RECOMMENDATIONS: Much has been written about management prescriptions for the Great Dismal Swamp (Oland 1987). To the extent possible, the natural hydrologic regime should be restored. Also, regular prescribed burning would be very beneficial to a number of rare species, and to the fire-maintained plant communities such as pocosin and Atlantic white cedar swamp.

CURRENT STATUS: Much of the area is protected within the Great Dismal Swamp National Wildlife Refuge. A 43,200 acre tract within the refuge (encompassing Lake Drummond) was declared a National Natural Landmark in 1972. Significant privately owned tracts exist along the periphery and north of the Feeder Canal.

PROTECTION RECOMMENDATIONS: Protection efforts for privately owned tracts should continue, particularly along the Suffolk Escarpment. A full array of protection tools should be applied.

REFERENCES:

Frost, C.C., H.E. LeGrand, Jr. and R.E. Schneider. 1990. Regional inventory for critical natural areas, wetland ecosystems, and endangered species habitats of the Albemarle-Pamlico estuarine region: Phase 1. Albemarle-Pamlico Study Project No. 90-01. North Carolina Natural Heritage Program, Raleigh. 462 pp.

Levy, G.F. 1991. The vegetation of the Great Dismal Swamp: a review and an overview. Virginia J. Sci. 42:411-417.

Meanley, B. 1973. Additional notes on Dismal Swamp birds. Raven 44:3-4.

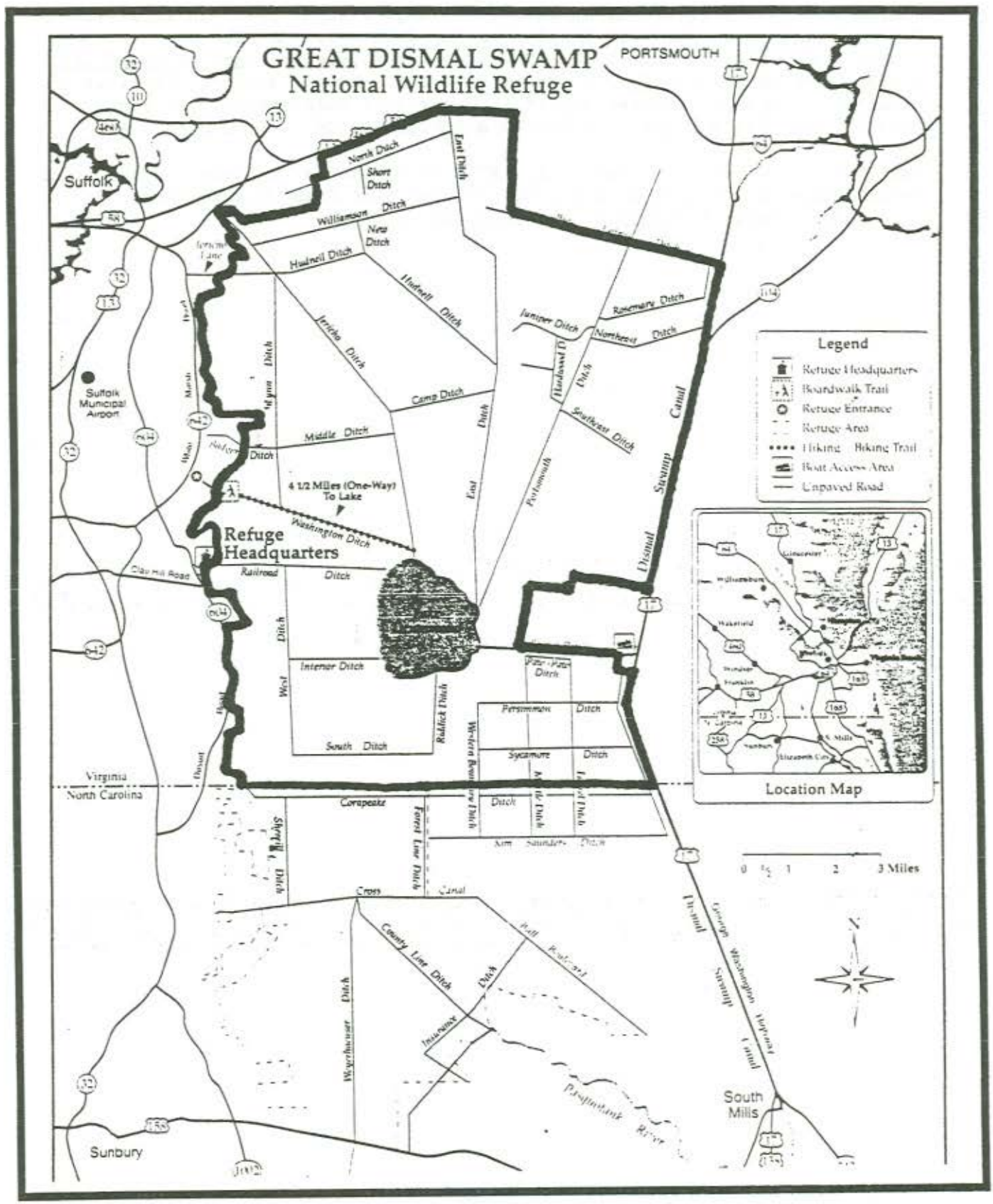
Meanley, B. 1979. An analysis of the birdlife of the Dismal Swamp. Pages 261-276 in P.W. Kirk, Jr., editor. The Great Dismal Swamp. University Press of Virginia, Charlottesville.

Mitchell, J.C., and D. Schwab. 1991. Canebrake Rattlesnake (Crotalus horridus atricaudatus Latreille). Pages 462-464 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Oaks, R.Q., Jr., and D.R. Whitehead. 1979. Geologic setting and origin of the Dismal Swamp, southeastern Virginia and northeastern North Carolina. Pages 1-24 in P.W. Kirk, Jr., editor. The Great Dismal Swamp. University Press of Virginia, Charlottesville.

Oland, J.P. 1987. Forest management plan. unpublished report on file with the Great Dismal Swamp National Wildlife Refuge, Suffolk, VA. 129 pp.
Pague, C.A., and J.C. Mitchell. 1991. Mabee's salamander (Ambystoma mabeei Bishop). Pages 427-429 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Whitehead, D.R. and R.Q. Oaks, Jr. 1979. Developmental history of the Dismal Swamp. Pages 25-43 in P.W. Kirk, Jr., editor. The Great Dismal Swamp. University Press of Virginia, Charlottesville.


GREAT DISMAL SWAMP
National Wildlife Refuge
PORTSMOUTH
Suffolk
Suffolk Municipal Airport
Refuge Headquarters
4 1/2 Miles (One-Way) To Lake
Washington Ditch
Old Mill Road
Railroad Ditch
Virginia
North Carolina
Corapeake
Sunbury
South Mills
Dismal Swamp Canal
Dismal Swamp Historical Canal
Pasquotank River
North Ditch
Short Ditch
East Ditch
Williamson Ditch
New Ditch
Hadnell Ditch
Jericho Ditch
Camp Ditch
Middle Ditch
Interior Ditch
South Ditch
Reddick Ditch
Western Boundary Ditch
Persimmon Ditch
Sycamore Ditch
Juniper Ditch
Rosemary Ditch
Northeast Ditch
Southeast Ditch
Potomac Ditch
Forest Line Ditch
County Line Ditch
Weyerhaeuser Ditch
Insurance Ditch
Legend
Refuge Headquarters
Boardwalk Trail
Refuge Entrance
Refuge Area
Hiking - Biking Trail
Boat Access Area
Unpaved Road
Location Map
0 1/2 1 2 3 Miles

DISMAL SWAMP MACROSITE - NORTHWEST SECTION

SIZE: ca. 3,500 acres **BIODIVERSITY RANK:** B3

LOCALITY: City of Chesapeake and City of Suffolk

QUADRANGLE: Bowers Hill **QUADRANGLE CODE:** 3607674
Chuckatuck 3607675

LOCATION: The site includes the forested wetland and adjacent habitats bounded by US Routes 58/13/460 on the south, the Hampton Roads Airport and Willow Lakes development on the east, the Norfolk and Southern Railroad tracks on the north, and Virginia Route 337 on the west.

NATURAL HERITAGE RESOURCE SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
animals:						
SOREX LONGIROSTRIS FISHERI	DISMAL SWAMP SOUTHEASTERN SHREW	G5T2	S2	LT	LT	A
SYNAPTOMYS COOPERI HELALETES	DISMAL SWAMP SOUTHERN BOG LEMMING	G5T3	S3	3C	-	A
CROTALUS HORRIDUS ATRICAUDATUS	CANEBRAKE RATTLESNAKE	G5T5Q	S1	-	LE	B

SITE DESCRIPTION: The site is an extension of the Great Dismal Swamp. Upland habitats support mixed pine-hardwood forest. Extensive wetland areas are dominated by black gum (Nyssa biflora), bald cypress (Taxodium distichum), and red maple (Acer rubrum). Three rare animal species occur here. The Dismal Swamp southeastern shrew (Sorex longirostris fisheri) population is one of only three known outside of the Great Dismal Swamp National Wildlife Refuge. Densities of the shrew have been shown to be high in the early successional forests surrounding the airport (Padgett, 1991). The endemic southern bog lemming (Synaptomys cooperi haletes) occupies graminoid habitats such as powerline rights-of-way, while the state-endangered canebrake rattlesnake (Crotalus horridus articaudatus) occurs throughout. Hunters who use the area reported several of these rattlesnakes during the 1980's (D. Schwab, pers. comm.), and therefore a viable population likely exists.

BOUNDARY JUSTIFICATION: The conservation planning boundary includes all element occurrences and a buffer of adjacent habitat which is needed to protect the ecological system. The forested areas included in the protection boundaries were delineated with NHAP color-infrared photographs taken in 1982-1984.

THREATS: Threats are drainage and intensive timber management. This tract was ditched in the past, but a significant amount of wetland habitat remains intact today. The canebrake rattlesnake continues to be threatened by deliberate killing.

MANAGEMENT RECOMMENDATIONS: Maintaining and enhancing the forest vegetation for the benefit of the rare species is a central management consideration. Large clear-cuts, fragmentation, and single-species plantations should be discouraged. Furthermore, to the extent possible, the natural hydrology should be restored. Fire was once a natural disturbance at this site and therefore regular prescribed burning should be used to simulate, or approximate, original forest conditions.

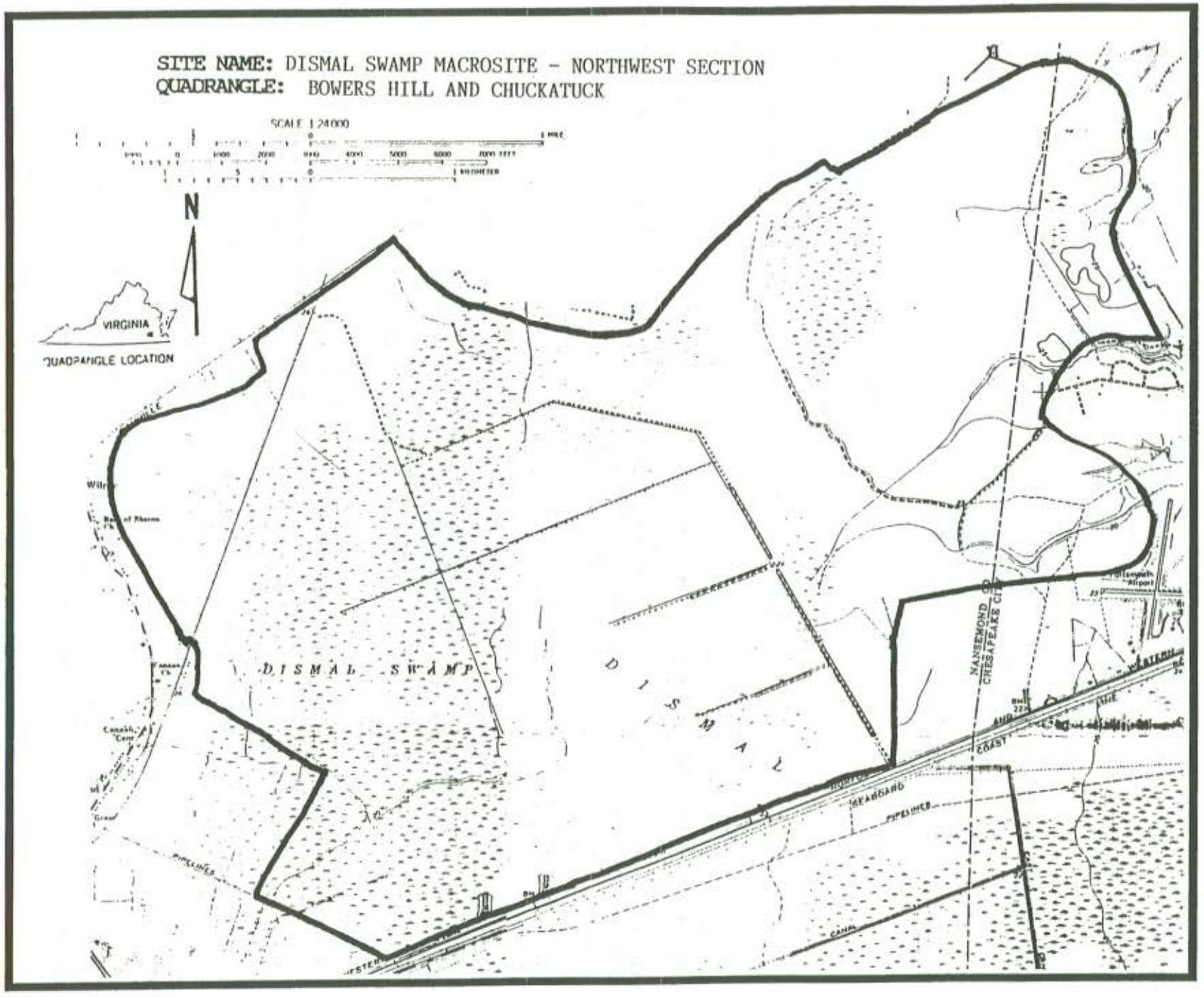
CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site should be protected and managed to ensure the continued existence of the rare animal species.

REFERENCES:

Mitchell, J. C., and D. Schwab. 1991. Canebrake Rattlesnake (Crotalus horridus atricaudatus Latreille). Pages 462-464 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Padgett, T.M. 1991. The identification, distribution, and status of the threatened Dismal Swamp shrew (Sorex longirostris fisheri). M.S. Thesis. Old Dominion University, Norfolk, Virginia. 59 pp.


SITE NAME: DISMAL SWAMP MACROSITE - NORTHWEST SECTION
QUADRANGLE: BOWERS HILL AND CHUCKATUCK
SCALE 1:24000
N
VIRGINIA
QUADRANGLE LOCATION
DISMAL SWAMP
DISMAL
SEABOARD
COAST
PIPELINES
CANAL

DISMAL SWAMP MACROSITE - SMITH RIDGE

SIZE: ca. 2,500 acres **BIODIVERSITY RANK:** B4

LOCALITY: City of Chesapeake

QUADRANGLE: Lake Drummond, SE **QUADRANGLE CODE:** 3607653

LOCATION/DIRECTIONS: From U.S. Route 17, take a farm road approximately 2 miles north of the North Carolina/Virginia state line. Drive east across the farm until a north-south ditch is encountered. Drive south until a road across the ditch is reached. The site is bounded to the north by upland vegetation, to the west by the ditch, to the south by another ditch and the state line, and to the east by the U. S. Naval Reservation.

NATURAL HERITAGE RESOURCE SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
ILEX CORIACEA	BAY-GAIL HOLLY	G5	S1	-	-	U
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G5	S2	-	-	B
animals:						
SOREX LONGIROSTRIS FISHERI	DISMAL SWAMP SOUTH-EASTERN SHREW	G5T2	S2	LT	LT	B
CROTALUS HORRIDUS ATRICAUDATUS	CANEBRAKE RATTLESNAKE	G5T5Q	S1	-	LE	B

SITE DESCRIPTION: The presettlement vegetation at this site was probably a mosaic of Atlantic white cedar (Chamaecyparis thyoides) swamp and canebrake. Some small areas of pond pine (Pinus serotina) - Atlantic white cedar pocosin and remanant stands of cane (Arundinaria gigantea) remain today amid deciduous swamp vegetation dominated by sweet gum (Liquidambar styraciflua) and red maple (Acer rubrum).

Logging took place at the turn of the century, and again about 55 years ago. Large ditches were dug around the periphery, but several square miles in the center of the natural habitat remain unditched. In addition to the significant communities, the area supports one of only four known populations of the Dismal Swamp southeastern shrew (Sorex longirostris fisheri). Canebrake rattlesnakes (Crotalus horridus atricaudatus) occur throughout the forest and are reported to be fairly common by hunters and workers on the adjacent naval reservation.

BOUNDARY JUSTIFICATION: The boundary includes all element occurrences, plus buffer to mitigate impacts from off-site land uses. NHAP color-infrared photographs taken in 1982 were used to delineate the site boundary.

THREATS: A large tract on the western border the site was converted to farmland during the 1980's. The same farm is currently proposed as a site for a regional landfill. Intensive timber management and increased drainage threaten the forest communities and the rare species. The distinctive pocosin vegetation is dependent on fire, so fire suppression constitutes a threat.

MANAGEMENT RECOMMENDATIONS: Maintenance or restoration of a natural hydrological regime and the reintroduction of fire are necessary to maintain the existing element occurrenes. Senseless killing of canebrake rattlesnakes by outdoor recreationists should be strongly discouraged.

CURRENT STATUS: A small portion of this site is publicly ownod. Most of the site is privately owned.

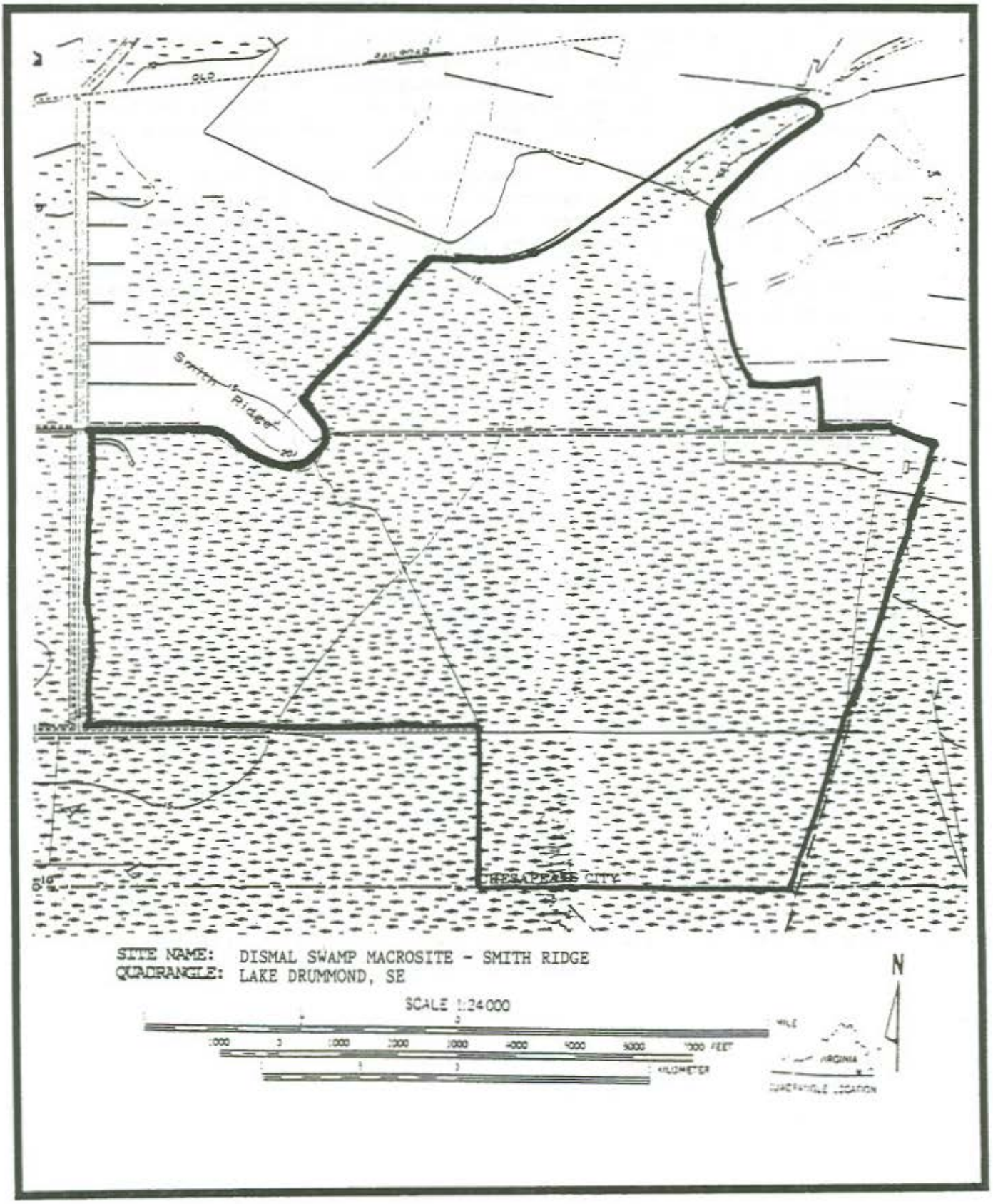
PROTECTION RECOMMENDATIONS: Any of several protection tools should be used to protect the natural heritage resources. The status of the proposed regional landfill should be closely monitored.

REFERENCES:

Frost, C.C. 1989. History and status of remnant pocosin, canebrake and white cedar wetlands in Virginia. Unpublished rep. on file with the Virginia Natural Heritage Program, Richmond. 130 pp.

Mitchell, J. C., and D. Schwab. 1991. Canebrake Rattlesnake (Crotalus horridus atricaudatus Latreille). Pages 462-464 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

Rose, R. K, T. Padgett, and C. A. Pague. 1988. Status survey of amphibians, reptiles, birds, and mammals of Naval Security Group Activity Northwest, Chesapeake, Virginia. Unpublished rep. on file with the Atlantic Division, Naval Facilities Engineering Command, Norfolk, VA. 66 pp.


Smith Ridge
CHESAPEAKE CITY
SITE NAME: DISMAL SWAMP MACROSITE - SMITH RIDGE
QUADRANGLE: LAKE DRUMMOND, SE
SCALE 1:24000
N

SEASHORE STATE PARK AND NATURAL AREA

SIZE: ca. 2220 acres **BIODIVERSITY RANK:** B2

LOCALITY: City of Virginia Beach

QUADRANGLE: Cape Henry **QUADRANGLE CODE:** 3607681

LOCATION: The site encompasses Seashore State Park and Natural Area at Cape Henry.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURENCE RANK
communities:						
OLIGOTROPHIC FOREST	-	-	S4	-	-	A
OLIGOTROPHIC WOODLAND	-	-	S2?	-	-	BC
OLIGOTROPHIC SCRUB	-	-	S2?	-	-	B
DWARF SCRUB	-	-	S1?	-	-	BC
MID-HEIGHT HERBACEOUS UPLAND VEGETATION		-	S3	-	-	B
OLIGOTROPHIC SEMIPERMANENTLY FLOODED PALUSTRINE FOREST			S3?	-	-	A
OLIGOTROPHIC SEMIPERMANENTLY FLOODED PALUSTRINE SCRUB			S3?	-	-	B
OLIGOTROPHIC SATURATED PALUSTRINE FOREST		-	S2?	-	-	BC
plants:						
CAREX WALTERIANA	WALTER'S SEDGE	G4	S1S2	-	-	B
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G4	S2	-	-	C
DESMODIUM STRICTUM	PINELAND TICK-TREFOIL	G2G4	S2	-	-	D
EUPHORBIA AMMANOIDES	A SPURGE	G3G4	S2	-	-	U
GALIUM HISPIDULUM	COAST BEDSTRAW	G5	S1S2	-	-	U
HYDROCOTYLE BONARIENSIS	A PENNYWORT	G5	S1	-	-	C
IVA IMBRICATA	SEA-COAST MARSH-ELDER	G5?	S1S2	-	-	
OSMANTHUS AMERICANUS	WILD OLIVE	G5	S1	-	-	AB
PHYSALIS VISCOSA	STICKY GROUND-CHERRY	G4G5	S2	-	-	C
PSILOCARYA SCIRPOIDES	LONG-BEAKED BALDRUSH	G4	S1	-	-	U
QUERCUS HEMISPHAERICA	DARLINGTON'S OAK	G5	S2	-	-	U
QUERCUS INCANA	BLUE-JACK OAK	G5	S2	-	-	A
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2	-	-	BC
STIPULICIDA SETACEA	PINELAND SCALY-PINK	G4G5	S1	-	-	BC
TILLANDSIA USNEOIDES	SPANISH MOSS	G5	S2S3	-	-	A
UTICULARIA GEMINISCAPA	HIDDEN-FRUITED BLADDERWORT	G4G5	S2	-	-	U
UTRICULARIA PURPUREA	PURPLE BLADDERWORT	G5	S2	-	-	U
animals:						
BRACHYMESIA GRAVIDA	FOUR-SPOTTED PENNANT	G5	S1	-	-	
DEIROCHELYS RETICULARIA	EASTERN CHICKEN TURTLE	G5T5	S1	-	LE	A
EPITHECA COSTALIS	A BASKETTAIL	G3G4	S1	-	-	
RANA VIRGATIPES	CARPENTER FROG	G5	S3	-	-	A
SATYRIUM KINGI	KING'S HAIRSTREAK	G3G4	S2S3	-	-	B

Note: Additional rare species have been reported, but these have not been reverified.

SITE DESCRIPTION: This site contains a superlative natural area with many exemplary plant communities and rare species. Sandy beaches, dune grasslands, live oak (Quercus virginiana) scrub, mature upland forest, bald cypress (Taxodium distichum) swamps, evergreen bay swamps, and interdunal ponds provide a variety of habitats for rare and unusual species, most of which are at or near their northern range limits here. Campsites, beaches, a nature center, and an extensive trail system afford many and varied recreational opportunities. The flora, fauna, and natural vegetation have been very well documented as a result of recent biological inventories.

BOUNDARY JUSTIFICATION: The conservation planning boundary coincides with the State Park boundary. This is justified because the state park is surrounded by developed or intensively utilized land.

THREATS: Expansion of recreational facilities would likely degrade the remaining coastal dune grassland and live oak thicket. Another threat is dune stabilization. In its original state, Cape Henry was an integrated landscape unit that was shaped by continuous dune formation. Presently, seaside roads and buildings, particularly at Fort Story Military Reservation, have all but halted the natural growth and spread of dunes, resulting in the rapid succession to woody vegetation. Species demanding open sandy habitats are therefore at risk because these habitats are not being replenished.

MANAGEMENT RECOMMENDATIONS: Successful management of the natural heritage resources here will rely upon careful monitoring of species population status and studies of habitat utilization. The on-going study of the eastern chicken turtle (Deirochelys reticularia) is exemplary in this regard. The study showed that this rare turtle depends upon a variety of habitats at Seashore State Park. The feeding, nesting, and over-wintering habitats must each be protected.

Monitoring programs for some of the more sensitive plants should be initiated. For instance, pennywort (Hydrocotyle bonariensis), may or may not be vulnerable to camp ground disturbance. Is the plant there because of the disturbance, or in spite of the disturbance? What should be done to enhance this population?

CURRENT STATUS: The site is publicly owned; most of the area is managed as a natural area within a registered National Natural Landmark.

PROTECTION RECOMMENDATIONS: The current balance between recreational use and natural area protection should be maintained. General management/protection recommendations from Clampitt et al. (1992) include; 1) protect groundwater quality and hydrology, 2) direct and control human access and use to minimize environmental disruption, 3) control exotic species, 4) monitor and manage natural heritage resources, and 5) continue research efforts.

REFERENCES:

Clampitt, C.A. 1991. The upland plant communities of Seashore State Park, Virginia Beach, Virginia. Virginia J. Sci. 42:419-435.

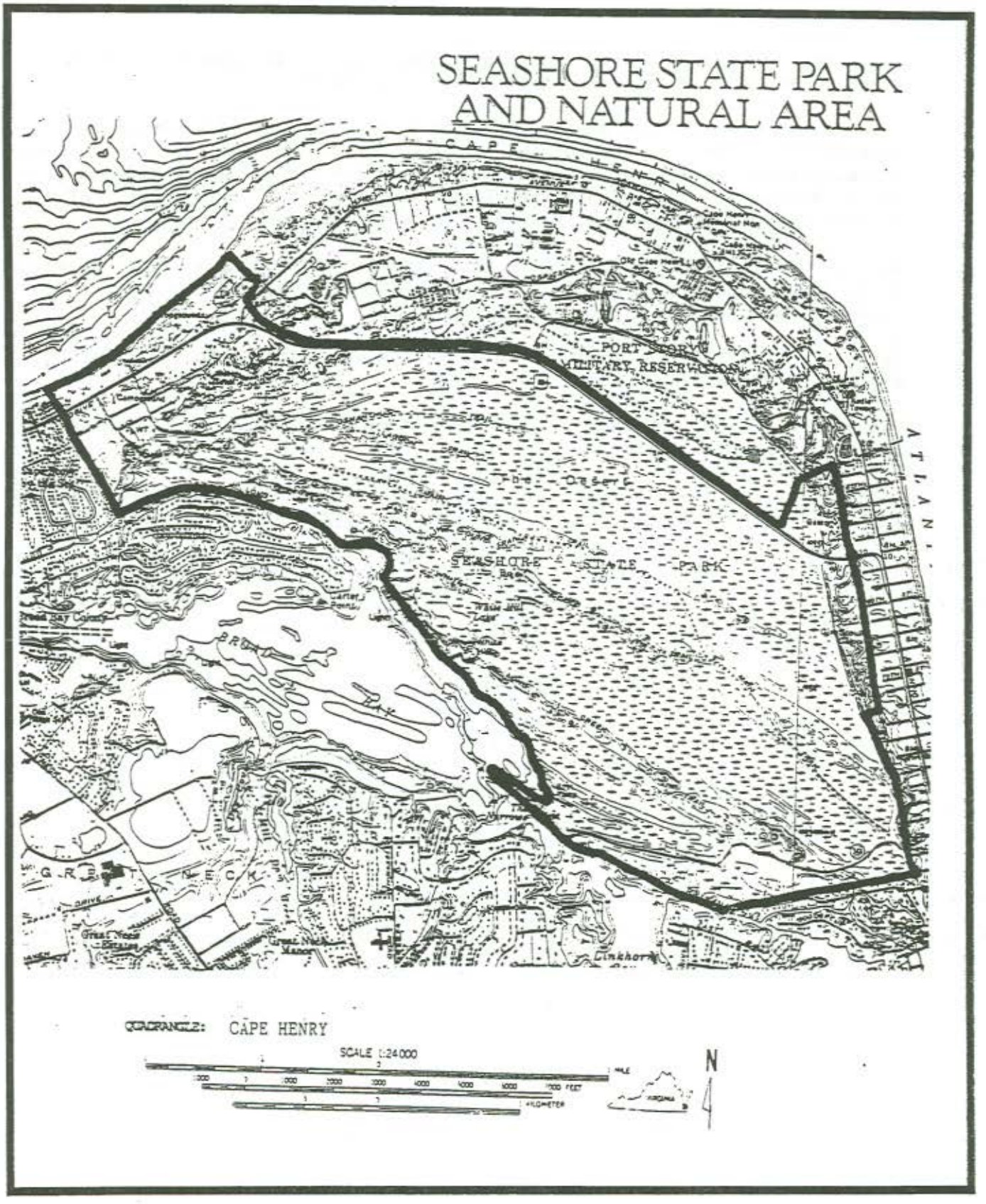
Clampitt, C.A., K.A. Buhlmann, J.C. Ludwig, C.A. Caljouw, C.A. Pague, and M.L. Lipford. 1992. An inventory of the natural communities, and rare, threatened and endangered species of Seashore State Park and Natural Area, Virginia Beach, Virginia. Natural Heritage Tech. Rep. # 92-17. Virginia Dept. of Conservation and Recreation, Div. of Natural Heritage, Richmond.

Egler, F.E. 1942. Checklist of the ferns and flowering plants of the Seashore State Park, Cape Henry, Virginia. New York State College of Forestry, Syracuse, NY. 60 pp.

Fernald, M.L. 1935. Midsummer vascular plants of southeastern Virginia. Rhodora 37:278-413, 423-454.

Fernald, M.L. and L. Griscom. 1935. Three days of botanizing in southeastern Virginia. Rhodora 37:128-157, 167-189.

Wright, J.B., L.J. Musselman, G.F. Levy, and J.L. Kernell. 1990. The vascular flora of Seashore State Park, Virginia Beach, Virginia. Rhodora 92:90-102.


SEASHORE STATE PARK
AND NATURAL AREA
CAPE HENRY
PORT STORY
MILITARY RESERVATION
SEASHORE STATE PARK
ATLANTIC
QUADRANGLE: CAPE HENRY
SCALE 1:24000
N

FALSE CAPE STATE PARK

SIZE: ca. 1750 acres

BIODIVERSITY RANK: B2

LOCALITY: City of Virginia Beach

QUADRANGLE: Knotts Island
North Bay

QUADRANGLE CODE: 3607558
3607568

LOCATION: The site includes all of False Cape State Park which is located north of the North Carolina state line and south of Back Bay National Wildlife Refuge.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
LOW HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	A
MID-HEIGHT HERBACEOUS UPLAND VEGETATION		-	-	-	-	A
MID-HEIGHT HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	A
OLIGOTROPHIC FOREST		-	-	-	-	U
OLIGOTROPHIC SCRUB		-	-	-	-	A
plants:						
ASTER ELLIOTTII	ELLIOTT'S ASTER	G3G4	S1	-	-	B
CAREX RENIFORMIS	RENIFORM SEDGE	G4?	S1	-	-	H
DICHROMENA COLORATA	WHITE-TOPPED SEDGE	G4G5	S1	-	-	AB
ELEOCHARIS HALOPHILA	SALT-MARSH SPIKERUSH	G4	S1	-	-	C
ELEOCHARIS RADICANS	ROOTED SPIKERUSH	G5	S1	-	-	H
ELEOCHARIS ROSTELLATA	BEAKED SPIKERUSH	G5	S1	-	-	C
ERIGERON VERNUS	WHITE TOP FLEABANE	G5	S1	-	-	AB
EUPHORBIA AMMANNOIDES	A SPURGE	G3G4	S1	-	-	B
FIMBRISTYLIS CAROLINIANA	CAROLINA FIMBRY	G4	S1	-	-	C
GALIUM HISPIDULUM	COAST BEDSTRAW	G5	S2	-	-	H
HETEROTHECA GOSSIPYNA	COTTONY GOLDEN ASTER	G5	S1	-	-	A
IRESINE RHIZAMATOSA	EASTERN BLOODLEAF	G5	S1S2	-	-	H
IVA IMBRICATA	SEA-COAST MARSH-ELDER	G5?	S1S2	-	-	A
JUNCUS ELLIOTTII	BOG RUSH	G4G5	S1S2	-	-	C
JUNCUS MEGACEPHALUS	BIG-HEAD RUSH	G4G5	S2	-	-	A
LILAEOPSIS CAROLINENSIS	CAROLINA LILAEOPSIS	G3	S1	-	-	A
LIMOSELLA SUBULATA	MUDWORT	G4	S1	-	-	H
LIPPIA NODIFLORA	NODDING FROG-FRUIT	G5	S1	-	-	C
LOBELIA ELONGATA	ELONGATED LOBELIA	G3G5	S1	-	-	B
LUDWIGIA ALATA	WINGED SEEDBOX	G3G4	S1	-	-	D
LUDWIGIA BREVIPES	LONG BEACH SEEDBOX	G4G5	S2	-	-	A
PASPALUM DISTICHUM	JOINT PASPALUM	G5	S1	-	-	C
PHALARIS CAROLINIANA	MAY GRASS	G5?	S1	-	-	H
PHYSALIS VISCOSA	STICKY GROUND-CHERRY	G4G5	S2	-	-	B
QUERCUS HEMISPHAERICA	DARLINGTON'S OAK	G5	S2	-	-	A

RHYNCHOSPORA FASCICULARIS	FASCICULATE BEAKRUSH	G5	S2	-	-	A
SPIRANTHES ODORATA	SWEETSCENT LADIES'-TRESSES	G5	S2	-	-	C
TILLANDSIA USNEOIDES	SPANISH MOSS	G5	S2	-	-	B
VACCINIUM MACROPCARPON	LARGE CRANBERRY	G4	S2S3	-	-	C
animals:						
ARDEA HERODIAS	GREAT BLUE HERON	G5	S3	-	-	U
CARETTA CARRETA	LOGGERHEAD SEA TURTLE	G3	S1S2	LT	LT	U
IXOBRYCHUS EXILIS	LEAST BITTERN	G5	S2	-	-	U
OPHISAURUS VENTRALIS	EASTERN GLASS LIZARD	G5	S1	-	-	U
PEROMYSCUS LEUCOPUS EASTI	PUNGO MOUSE	G5T1	S1	2	-	U

SITE DESCRIPTION: False Cape State Park is managed by the Virginia Department of Conservation and Recreation's Division of State Parks. The Park is without question an ecological treasure, and represents one of the most significant undisturbed barrier beach systems along the Atlantic coast. The northern portion of the Park is somewhat disturbed, however, as a result of intensive wildlife management practices. The vegetation forms complex patterns of interdigitating zones. Beyond the unvegetated sandy beach lies a primary dune dominated by sea oats (Uniola paniculata). The next zone is dominated by beach grass (Ammophila breviligulata), beach panic grass (Panicum amarum), seabeach evening primrose (Oenothera humifusa), and spurge (Euphorbia polygonifolia). Toward the center, a dune and swale topography creates alternating upland and wetland habitats. Active dunes here are sparsely vegetated with beach heather (Hudsonia tomentosa) and other species tolerant of the very dry, shifting sand environment. Seasonally-inundated pools, known as interdunal swales, contain a very rich assemblage of plant life. Prevalent species in these wetlands are narrow-leaved goldenrod (Euthamia tenuifolia), Carolina willow (Salix caroliniana), beak-rushes (Rhynchospora spp.), and the carnivorous plant, spatulate-leaved sundew (Drosera intermedia). Tyndall and Levy (1978) provide an excellent description of the swale vegetation. Dune scrub thickets with live oak (Quercus virginiana), waxmyrtle (Myrica cerifera), and bayberry (Myrica pensylvanica) are common between the high dunes and low swales.

A large and somewhat interrupted maritime forest dominated by loblolly pine (Pinus taeda) and live oak is interspersed with dune thicket vegetation. The maritime forest is one of the region's finest. Swamp forests with diverse woody vegetation grade into the marshes of Back Bay. The marsh vegetation indicates somewhat brackish conditions, and a variety of dominance types exist. Prevalent marsh species include big cordgrass (Spartina cynosuroides), narrow-leaved cattail (Typha angustifolia), Olney's bulrush (Scirpus olneyi), common reed (Phragmites australis), and black needlerush (Juncus roemerianus).

The botanical significance of False Cape was first noted by M.L. Fernald (1935; 1936; 1940; 1947) Presently, the large number of rare plant species recorded from the Park confirms Fernald's assessment; very few areas of similar size in Virginia can boast such a richness of rare plants (29 species

in all). Furthermore, most of the rare plant populations at False Cape are thriving, as indicated by the numerous occurrence ranks of A and B in the natural heritage resources summary table, shown above.

Rare animals include Virginia's only breeding site for the loggerhead sea turtle (Caretta caretta), one of four sites in the world for the Pungo mouse (Peromyscus leucopus easti), and the only known Virginia population of eastern glass lizards (Ophisaurus ventralis).

BOUNDARY JUSTIFICATION: The conservation planning boundary for this site includes all of False Cape State Park.

THREATS: Common reed may pose a threat to some of the the rare marsh plants. This grass quickly invades disturbed wetlands and has formed dense, scattered stands throughout the Park's marshes. Rare plants of the interdunal swales might be threatened by rooting activities of feral hogs, and grazing by deer and horses. These impacts are currently being assessed.

A long-term threat to the herbaceous vegetation and its rare plants is succession to scrub and forest vegetation. Observations suggest that sand movement and dune migration are critical processes which maintain the open, herbaceous vegetation. Any activities which interfere with these natural processes (such as berm construction) therefore constitute serious threats.

A final threat may be generally referred to as land use. False Cape State Park has tremendous recreational development potential, but intensified human use would likely place the natural heritage resources at greater risk. Fortunately, the current level of recreational use does not appear to threaten the long-term maintenance of natural heritage resources at the site.

MANAGEMENT RECOMMENDATIONS: To reduce the threat of common reed expansion, mechanical disturbance to wetland habitats should be kept at a minimum or avoided altogether; such disturbance is favorable to the rapid spread of this invasive plant. Common reed should be closely monitored. Feral hog impacts are not precisely known, but since the hogs (and horses) are not native to the barrier beach ecosystem, their activities may threaten the natural heritage resources. Currently, recreational hunting is being used to keep the hog population in check, and we recommend that this activity be continued. Adjustment to the hunting regulations may be necessary if intensified hog impacts threaten the rare plants at the site. Lastly, the interdunal swales should be monitored to determine if the herbaceous species are threatened by succession to woody vegetation.

CURRENT STATUS: False Cape State Park is managed as a park for nature study and low-impact recreation. A small number of buildings including a contact station, park personnel dwellings, and an environmental education center are located within the park. The northern portion of the site has been somewhat disturbed to enhance waterfowl habitat. The remainder of the site is remarkably pristine, except for a few sand roads, trails, and a powerline right-of-way.

PROTECTION RECOMMENDATIONS: Maintain current type and intensity of land use.

REFERENCES:

Fernald, M.L. 1935. Midsummer vascular plants of Southeastern Virginia. Rhodora 37:378-414, 423-454.

Fernald, M.L. 1936. Plants from the outer coastal plain of Virginia. Rhodora 38:376-404, 414-452.

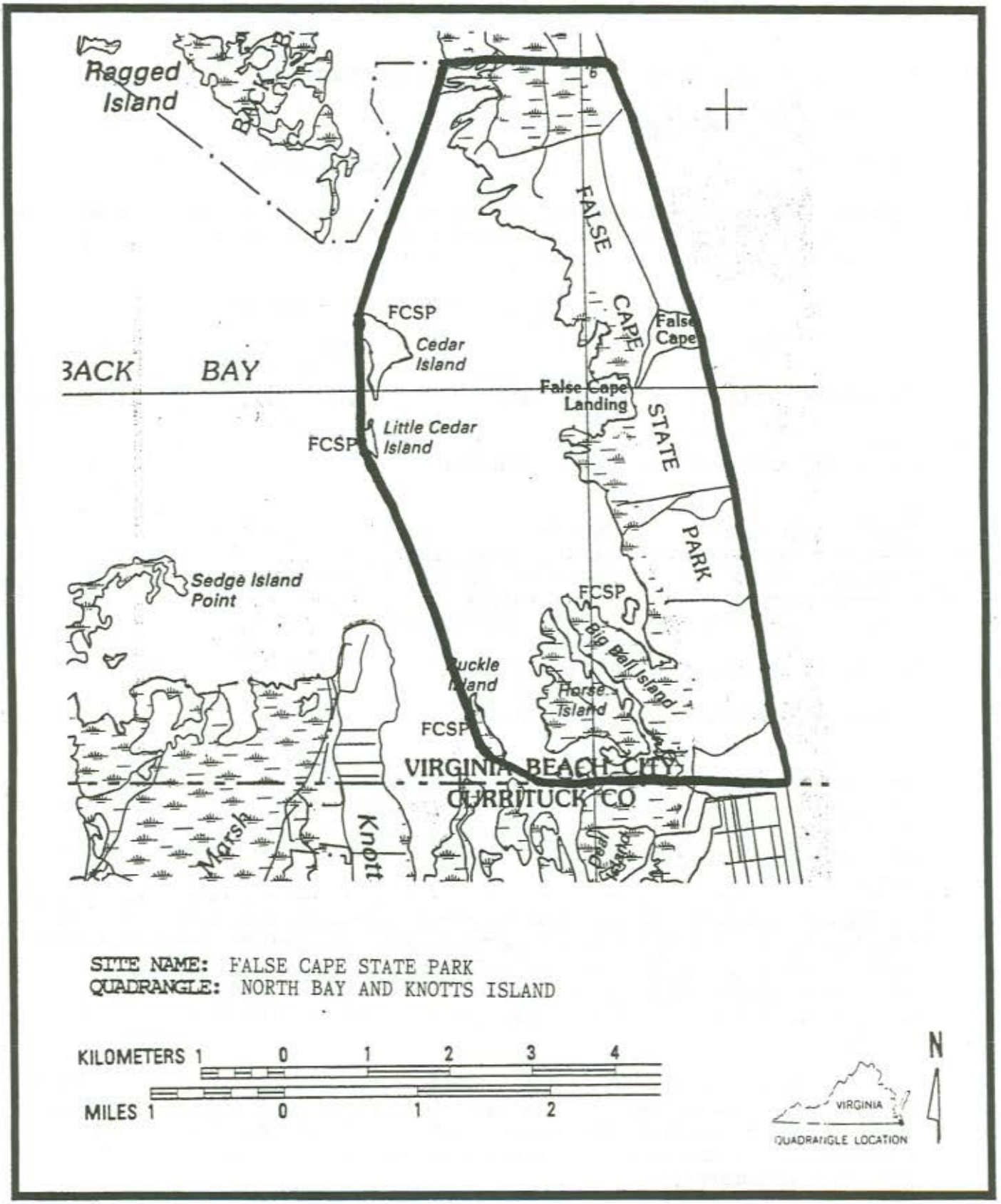
Fernald, M.L. 1940. A century of additions to the flora of Virginia. Rhodora 42: 355-416, 419-498, 503-521.

Fernald, M.L. 1947. Additions to and subtractions from the flora of Virginia. Rhodora 49:85-115, 121-142, 145-159, 175-194.

Frost, C.C. 1989. History and status of remnant pocosin, canebrake and white cedar wetlands in Virginia. Unpublished report on file with the Virginia Natural Heritage Program, Richmond. 130 pp.

Ludwig, J.C., J.B. Wright, and N.E. Van Alstine. 1990. The rare plants of False Cape State Park, Virginia Beach City, Virginia. Pages 249-256 in H.G. Marshall and M.D. Norman, editors. Proceedings of the Back Bay Ecological Symposium, Virginia Beach, 1990. Old Dominion University, Norfolk, VA.

Tyndall, R.W., and G.F. Levy. 1978. Plant distribution and succession within interdunal depressions on a Virginia barrier dune system. J.Elisha Mitchell Sci. Soc. 94:1-15.



SITE NAME: FALSE CAPE STATE PARK
QUADRANGLE: NORTH BAY AND KNOTTS ISLAND

NORTH LANDING RIVER MACROSITE - SOUTHERN MARSHES

SIZE: ca. 3570 acres **BIODIVERSITY RANK:** B3

LOCALITY: City of Virginia Beach

QUADRANGLE: Creeds **QUADRANGLE CODE:** 3607651

LOCATION: The site includes the wetland on west side of the North Landing River, mostly east of Blackwater Road; north of the North Carolina border, and south of the Blackwater River.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
MID-HEIGHT HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	B
plants:						
CLADIUM JAMACIENSIS	SAWGRASS	G5	S1	-	-	B
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G4	S2	-	-	D
LOBELIA ELONGATA	ELONGATED LOBELIA	G3G5	S1	-	-	A
LUDWIGIA ALATA	WINGED SEEDBOX	G3G4	S1	-	-	B
PHYSOSTEGIA LEPTOPHYLLA	SLENDER-LEAVED DRAGON-HEAD	G4G5	S2	2	-	A
SPIRANTHES ODORATA	SWEETSCENT LADIES'-TRESSES	G5	S2	-	-	B
STEWARTIA MALACHODENDRON	SILKY CAMELIA	G4	S2	-	-	B

SITE DESCRIPTION: The site experiences regular water level fluctuations resulting from wind tides and is part of the large wetland ecosystem along the North Landing River. The water is fresh to very-slightly brackish. Plant species diversity is very high, and wetland vegetation types form a complex mosaic.

Marsh vegetation is dominated by robust emergents such as big cordgrass (Spartina cynosuroides), common reed (Phragmites australis), broad-leaf cattail (Typha latifolia), narrow-leaf cattail (Typha angustifolia), black needlerush (Juncus roemerianus), and the rare sawgrass (Cladium jamaciensis). Areas of low marsh contain a diverse mix of plants, including several rare species.

Many of the marshes are being invaded by woody species such as red maple (Acer rubrum), swamp rose (Rosa palustris), and waxmyrtle (Myrica cerifera). Cecil Frost, who studied this wetland system, believes that the lack of frequent fire in the marshes is a major reason for the woody plant increase (personal communication).

The swamp forests are characterized by bald cypress (Taxodium distichum), black gum (Nyssa biflora), loblolly pine (Pinus taeda), sweet gum (Liquidambar styraciflua), and red maple. Some upland forest is included in this site, providing habitat for the rare shrub, silky camellia (Stewartia malachodendron).

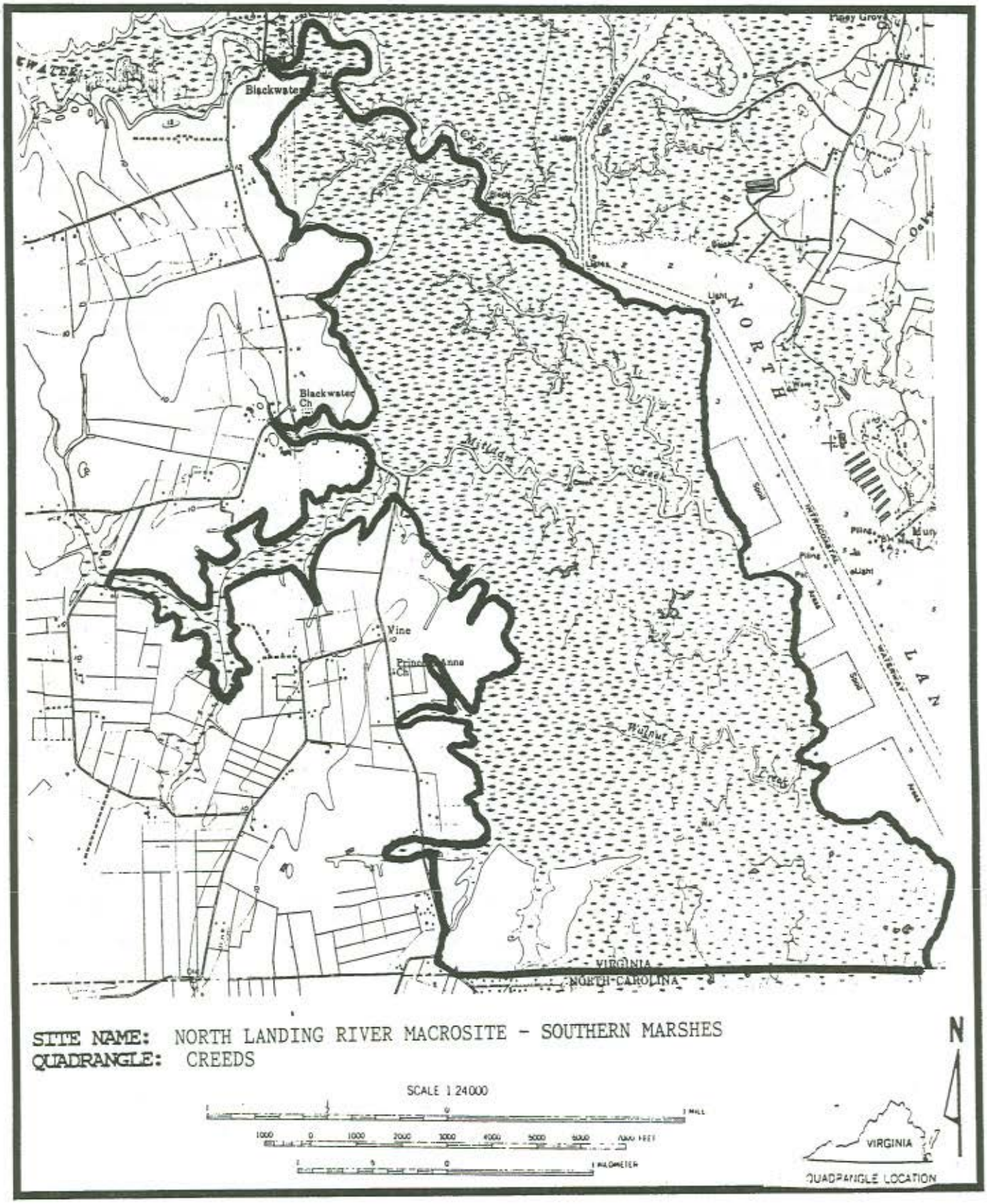
BOUNDARY JUSTIFICATION: The conservation planning boundary includes the community, rare species, and buffer necessary to mitigate imapcts from off-site land uses. Areas not field-checked were delineated using NHAP color-infrared photograph #313-147 taken on 4/2/82.

THREATS: Common reed, which can be invasive, may be threatening the natural vegetation of the marshes. Logging threatens the forest vegetation. Woody species encroachment into the marsh, possibly resulting from less frequent fire, is cause for concern.

MANAGEMENT RECOMMENDATIONS: Monitor woody species and common reed in the marsh. Prescribed burning should be conducted on a regular basis.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: This site is part of the significant North Landing River ecosystem, and protection actions here will have direct bearing on the larger landscape unit.


Blackwater
Blackwater Ch
Vine
Princess Anne Ch
NORTH
LANDING
VIRGINIA
NORTH CAROLINA
SITE NAME: NORTH LANDING RIVER MACROSITE - SOUTHERN MARSHES
QUADRANGLE: CREEDS
SCALE 1:24000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER
N
VIRGINIA
QUADRANGLE LOCATION

NORTH LANDING RIVER MACROSITE - NORTH LANDING RIVER NATURAL AREA PRESERVE

SIZE: ca. 1900 acres **BIODIVERSITY RANK:** B3

LOCALITY: City of Virginia Beach

QUADRANGLE: Creeds **QUADRANGLE CODE:** 3607651
Pleasant Ridge 3607661

LOCATION: The site lies to the north and south of Pungo Ferry Road, west of North Landing River. It is bordered to the north by a large creek channel (locally referred to as Alton's Creek). The western boundary more or less follows the edge of upland vegetation. The southern border is Blackwater Creek, and the eastern border is the North Landing River.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
MID-HEIGHT HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	B
OLIGOTROPHIC SATURATED PALUSTRINE WOODLAND		-	-	-	-	B
plants:						
ASTER ELLIOTTII	ELLIOTT'S ASTER	G3G4	S1	-	-	H
CLADIUM JAMACIENSIS	SAWGRASS	G5	S1	-	-	B
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G4	S2	-	-	B
ELEOCHARIS ROSTELLATA	BEAKED SPIKERUSH	G5	S1	-	-	H
JUNCUS MEGACEPHALUS	BIG-HEAD RUSH	G4G5	S2	-	-	H
KALMIA ANGUSTIFOLIA	SHEEP-LAUREL	G5	S2S3	-	-	AB
LOBELIA ELONGATA	ELONGATED LOBELIA	G3G5	S1	-	-	A
LUDWIGIA ALATA	WINGED SEEDBOX	G3G4	S1	-	-	H
PHYSOSTEGIA LEPTOPHYLLA	SLENDER-LEAVED DRAGON-HEAD	G4G5	S2	2	-	A
SPIRANTHES ODORATA	SWEETSCENT LADIES'-TRESSES	G5	S2	-	-	B
VACCINIUM MACROCARPON	LARGE CRANBERRY	G4	S2	-	-	H
animals:						
IXOBRYCHUS EXILIS	LEAST BITTERN	G5	S2	-	-	U

SITE DESCRIPTION: Pungo Ferry Road bisects the site and affords a marvelous opportunity to observe the gradient of wetland vegetation. Dense, nearly impenetrable pocosin gives way to palustrine scrub, and then to robust emergent marsh bordering the North Landing River. The pocosin is one of Virginia's finest examples. It has burned frequently in the past and presently supports a woodland dominated by pond pine (Pinus serotina), tall ericaceous shrubs, and Virginia chain-fern (Anchistea virginica). The marshes

are exposed to water level fluctuations resulting from wind tides, and the water is fresh to very-slightly brackish. The upland forest at the site appears to be unusual and is worthy of further study.

BOUNDARY JUSTIFICATION: The conservation planning boundary includes the communities and rare species within the Natural Area Preserve. Large units of wetland immediately to the north and south of the site are not included in the site boundary because these areas, North Pocosin and Southern Marshes, respectively, are described as separate sites in this report.

THREATS: The lack of fire is the major threat to the rare pocosin vegetation. Also, road maintenance or expansion constitute threats if accompanied by perturbations to the natural hydrology of the wetland. Common reed (Phragmites australis), an aggressive grass, occurs along Pungo Ferry Road and in a large area south of the road, "where it is going great guns" (Chris Clampitt, personal communication).

MANAGEMENT RECOMMENDATIONS: Develop and implement a prescribed burning management plan to maintain the distinctive pocosin vegetation and its rare species. Monitor the rare species populations and the spread of common reed.

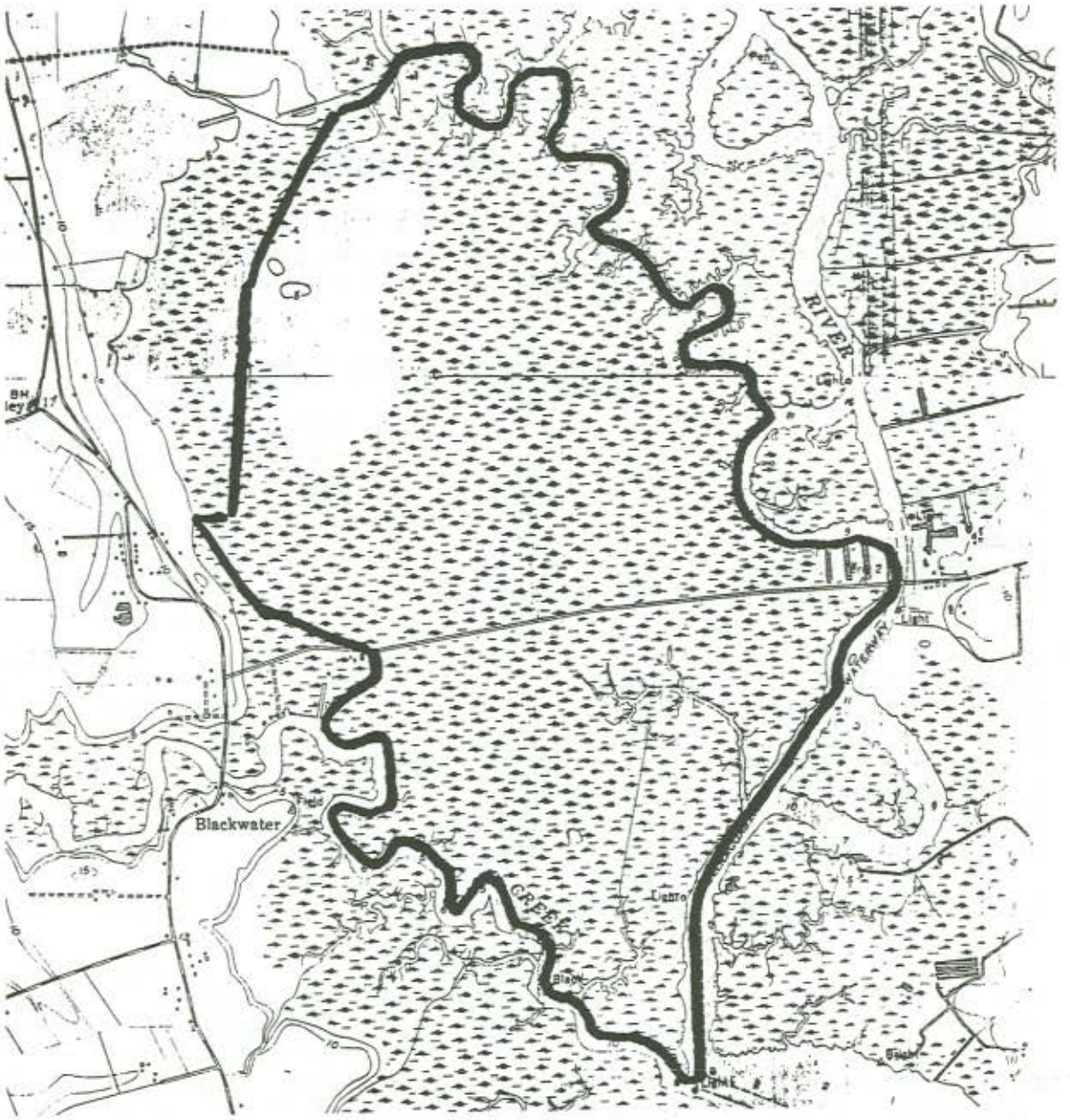
CURRENT STATUS: The site managed as a natural area preserve by the Virginia Department of Conservation and Recreation. The Preserve is a dedicated natural area, which provides the strongest level of protection to natural heritage resources through formal recognition and stringent legal safeguards against conversion to inappropriate uses. Additional lands are privately owned.

PROTECTION RECOMMENDATIONS: Protection of the adjacent wetland and upland areas would contribute to forming a larger, more viable and defensible, natural area preserve. Impacts from surrounding agricultural lands can be mitigated by encouraging sound soil and water management practices.

REFERENCES:

Caljouw, C.A. and S. Hobbs. 1991. Management plan for the North Landing River Preserve System. unpublished rep. on file with the Virginia Dept. of Conservation and Recreation, Div. of Natural Heritage, Richmond. 13 pp.

Frost, C.C. 1989. History and status of remnant pocosin, canebrake and white cedar wetlands in Virginia. Unpublished report on file with the Virginia Natural Heritage Program, Richmond. 130 pp.



SITE NAME: NORTH LANDING RIVER MACROSITE - NORTH LANDING RIVER NATURAL AREA PRESERVE
QUADRANGLE: PLEASANT RIDGE AND CREEDS

SCALE 1:24000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

N

VIRGINIA

QUADRANGLE LOCATION

NORTH LANDING RIVER MACROSITE - NORTH POCOSIN

SIZE: ca. 2700 acres **BIODIVERSITY RANK:** B3

LOCALITY: City of Virginia Beach

QUADRANGLE: Pleasant Ridge **QUADRANGLE CODE:** 3607661

LOCATION: The site embraces a large wetland situated west of the North Landing River, south of the Pocaty River, and north of the North Landing River Natural Area Preserve. The western boundary roughly coincides with the edge of the upland vegetation.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
MID-HEIGHT HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	B
OLIGOTROPHIC SATURATED PALUSTRINE WOODLAND		-	-	-	-	A
plants:						
CAREX WALTERIANA	A SEDGE	G4	S1S2	-	-	B
CLADIUM JAMACIENSIS	SAWGRASS	G5	S1	-	-	B
CLEISTES DIVARICATA	SPREADING POGONIA	G4	S1S2	-	-	D
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G4	S2	-	-	B
KALMIA ANGUSTIFOLIA	SHEEP-LAUREL	G5	S2S3	-	-	A
LOBELIA ELONGATA	ELONGATED LOBELIA	G3G5	S1	-	-	A
PHYSOSTEGIA LEPTOPHYLLA	SLENDER-LEAVED DRAGON-HEAD	G4G5	S2	2	-	A
VACCINIUM MACROCARPON	LARGE CRANBERRY	G4	S2	-	-	H

SITE DESCRIPTION: This site is noteworthy for its low pocosin, a peatland community locally referred to as "juniper bog". This community is extremely rare in Virginia. It is characterized by rare orchids and sedges, knee-high heaths, and young Atlantic white cedar (Chamaecyparis thyoides) trees. Surrounding the low pocosin is an extensive area of forested pocosin dominated by pond pine (Pinus serotina), high-bush blueberry (Vaccinium corymbosum), laurel-leaf greenbrier (Smilax laurifolia), and Virginia chain-fern (Anchistea virginica). Frequent fire has played an important ecological role in maintaining these pocosin communities, and regular prescribed burning will be required in the future.

Elsewhere on the site, robust emergent marsh, shrub swamp, and deciduous swamp forest vegetation exist. Much of the area has not been explored on foot due to the extremely thick vegetation.

BOUNDARY JUSTIFICATION: The conservation planning boundary includes all element occurrences and their habitat, and a limited amount of buffer land. Large units of wetland immediately to the north and south of the site are not included in the site boundary because these areas, North Pocaty and North Landing River Natural Area Preserve, respectively, are described as separate sites in this report. Lands not surveyed in the field were delineated using NHAP color-infrared photograph #313-149 taken on 4/2/82.

THREATS: Lack of fire is the major threat to the rare pocosin vegetation. Additional threats are any perturbations to the natural hydrology of the wetland, such as ditching. Common reed (Phragmites australis), a potentially aggressive grass, might have a negative impact in the marshes.

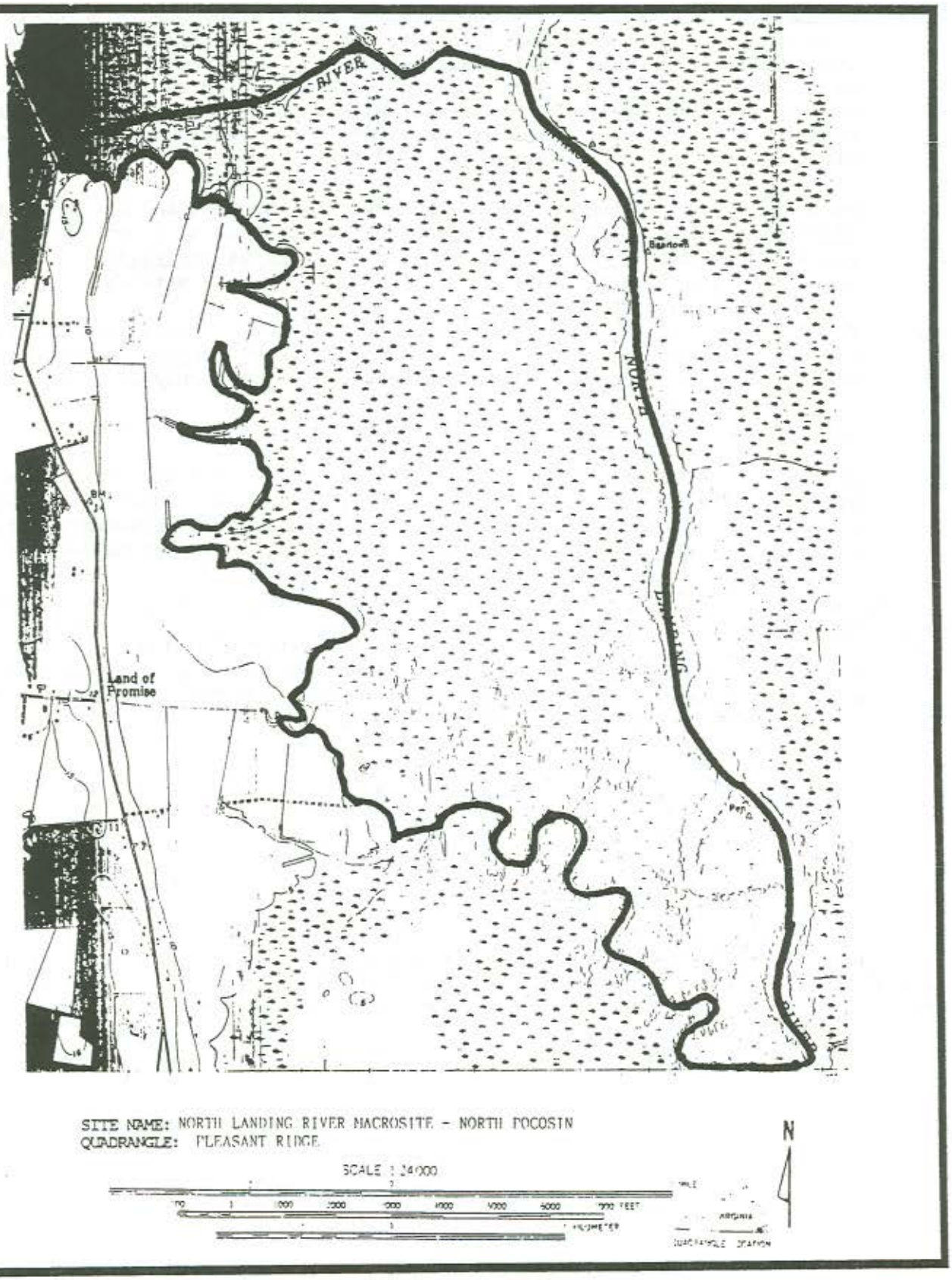
MANAGEMENT RECOMMENDATIONS: Develop and implement a prescribed burning management plan to maintain the distinctive pocosin vegetation and its rare species. Monitor rare species populations and the spread of common reed.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Protection of this site would contribute significantly to forming a larger, more viable and defensible, natural area preserve along the North Landing River. Impacts from surrounding agricultural lands can be mitigated by encouraging sound soil and water management practices.

REFERENCES:

Frost, C.C. 1989. History and status of remnant pocosin, canebrake and white cedar wetlands in Virginia. Unpublished report on file with the Virginia Natural Heritage Program, Richmond. 130 pp.



SITE NAME: NORTH LANDING RIVER MACROSITE - NORTH POCOSIN
QUADRANGLE: PLEASANT RIDGE

Figure 5. Low pocosin vegetation found along the North Landing River. This rare bog-like natural community is maintained by frequent fire.

NORTH LANDING RIVER MACROSITE - WEST NECK CREEK

SIZE: ca. 4500 acres **BIODIVERSITY RANK:** B3

LOCALITY: City of Virginia Beach

QUADRANGLE: Pleasant Ridge **QUADRANGLE CODE:** 3607661
Creeds 3607651

LOCATION: The site includes the wetland and adjacent forested upland on the east side of the North Landing River and both sides of West Neck Creek, west of Princess Anne Road, north of the Pungo Ferry Road, and south of Indian River Road.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
MID-HEIGHT HERBACEOUS PALUSTRINE WETLAND		-	-	-	-	B
OLIGOTROPHIC SATURATED PALUSTRINE FOREST		-	-	-	-	B
plants:						
CAREX DECOMPOSITA	EPIPHYTIC SEDGE	G3G4	S1	3C	-	C
CLADIUM JAMACIENSIS	SAWGRASS	G5	S1	-	-	B
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G4	S2	-	-	B
LILAEOPSIS CAROLINENSIS	CAROLINA LILAEOPSIS	G3	S1	-	-	D
LOBELIA ELONGATA	ELONGATED LOBELIA	G3G5	S1	-	-	A
PASPALUM DISTICHUM	JOINT PASPALUM	G5	S1	-	-	C
PHYSOSTEGIA LEPTOPHYLLA	SLENDER-LEAVED DRAGON-HEAD	G4G5	S2	2	-	A
STEWARTIA MALACHODENDRON	SILKY CAMELIA	G4	S2	-	-	B

SITE DESCRIPTION: This site, like others along the North Landing River, experiences water level fluctuations resulting from wind tides. The water is fresh to very-slightly brackish. Plant species richness is quite high, and several vegetation types exist; marsh, shrub swamp, deciduous swamp forest, and Atlantic white cedar (Chamaecyparis thyoides) swamp. The cedar swamp is particularly significant because it represents a regionally rare vegetation type much reduced from its former extent. A population of the globally-rare epiphytic sedge (Carex decomposita) occurs in the swamps along West Neck Creek. Some upland forest habitat, occurring as islands amid the vast swamp, supports the rare shrub, silky camellia (Stewartia malachodendron).

BOUNDARY JUSTIFICATION: The conservation planning boundary includes the communities, rare species, and a limited amount of upland buffer. This site represents a critical unit of land within this large North Landing River wetland ecosystem.

THREATS: The lack of fire is a major threat to the rare marsh and Atlantic white cedar vegetation. Additional threats are salt water intrusion and any perturbations to the natural hydrology of the wetland, such as ditching. Common reed (Phragmites australis), a potentially aggressive grass species, might have a negative impact.

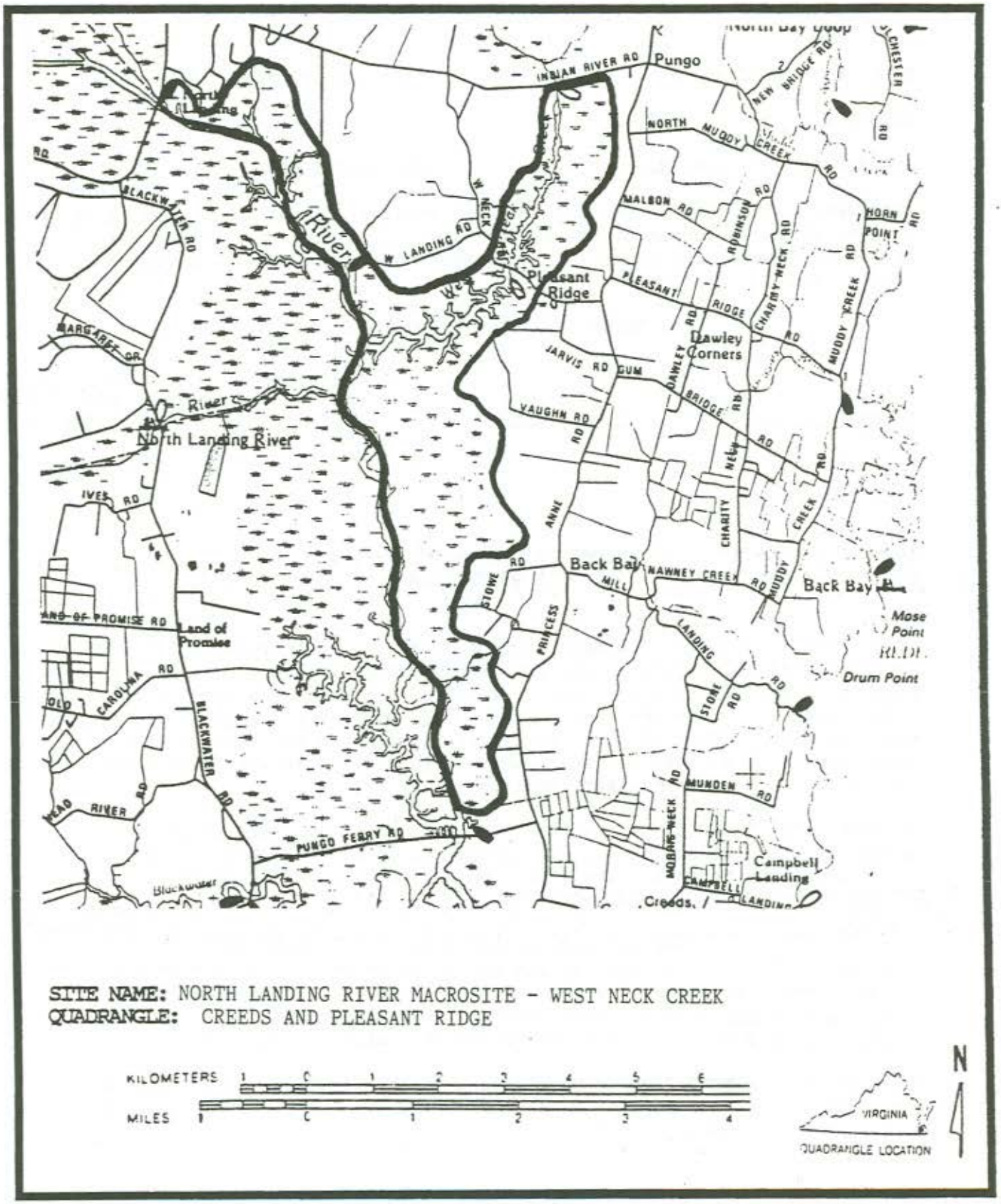
MANAGEMENT RECOMMENDATIONS: The marshes and cedar swamp communities require periodic fire for their long-term maintenance. Develop and implement a prescribed burning management plan. Monitor rare species populations and the spread of common reed.

CURRENT STATUS: The site is privately owned.

PROTECTION RECOMMENDATIONS: Protection of this site would help form a larger, more viable and defensible natural area preserve along the North Landing River. Impacts from surrounding agricultural lands should be mitigated by encouraging sound soil and water management practices.

REFERENCES:

Frost, C.C. 1989. History and status of remnant pocosin, canebrake and white cedar wetlands in Virginia. Unpublished report on file with the Virginia Natural Heritage Program, Richmond. 130 pp.



SITE NAME: NORTH LANDING RIVER MACROSITE - WEST NECK CREEK
QUADRANGLE: CREEDS AND PLEASANT RIDGE

NORTH LANDING RIVER MACROSITE - NORTH POCATY

SIZE: ca. 3,000 acres **BIODIVERSITY RANK:** B4

LOCALITY: City of Chesapeake

QUADRANGLE: Pleasant Ridge **QUADRANGLE CODE:** 3607661

LOCATION: The site encompasses a large wetland area situated west of the North Landing River and north of the Pocaty River. The western boundary coincides with the wetland bordering Route 165 and extends southward along the edge of the upland vegetation.

NATURAL HERITAGE RESOURCE SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
communities:						
POCOSIN		-	S1S2	-	-	U
plants:						
LOBELIA ELONGATA	ELONGATED LOBELIA	G3G5	S1	-	-	D
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G5	S2	-	-	U

SITE DESCRIPTION: The southern portion of this site includes a forested pocosin, while the northern portion is predominantly deciduous swamp forest. Field work at this site was more or less restricted to the marshes bordering creek channels, where the rare plant, elongated lobelia (Lobelia elongata), was discovered. Much of the thickly vegetated swamp interior remains unexplored, but several reconnaissance flights over the area showed the vegetation to be in excellent condition.

BOUNDARY JUSTIFICATION: The conservation planning boundary includes the community, rare plants, and a limited amount of upland buffer. Like other sites along the North Landing River, this site is integral to the protection of the entire wetland ecosystem.

THREATS: Fire is a natural and necessary process within the marsh and pocosin. Without fire, the pocosin would become very thickly vegetated and Atlantic white cedar would decrease. The canebrake rattlesnake (Crotalus horridus atricaudatus) has been reported from the general area, and if present, this species would be threatened by collection/killing.

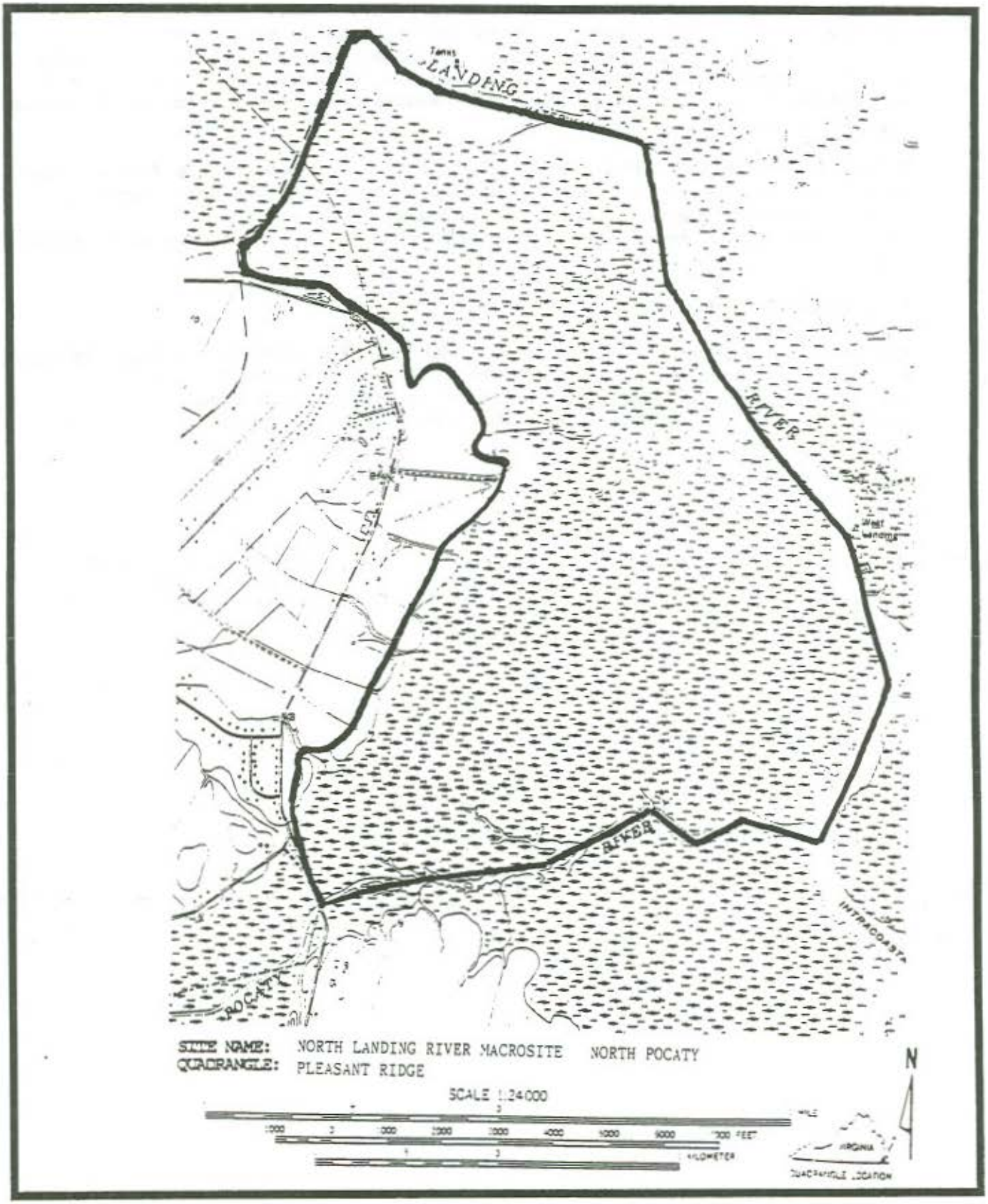
MANAGEMENT RECOMMENDATIONS: Develop and implement a prescribed burning management plan to maintain the distinctive pocosin vegetation and rare plants such as Atlantic white cedar.

CURRENT STATUS: Two tracts within this site are owned by The Nature Conservancy. A small area near North Landing Road is managed by the U.S. Navy as part of the Fentress Landing area. The remainder of the area, including all of the upland buffer is privately owned. The North Landing River (and associated bottomlands) from the North Landing Road, downstream, is designated as a state scenic river.

PROTECTION RECOMMENDATIONS: Protection of this site would help form a larger, more viable and defensible natural area preserve along the North Landing River. Impacts from surrounding agricultural lands and residential development should be mitigated by encouraging sound soil and water management practices.

REFERENCES:

Mitchell, J. C., and D. Schwab. 1991. Canebrake Rattlesnake (Crotalus horridus atricaudatus Latreille). Pages 462-464 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.


LANDING
RIVER
RIVER
INTRACOASTAL
SITE NAME: NORTH LANDING RIVER MACROSITE NORTH POCATY
QUADRANGLE: PLEASANT RIDGE
SCALE 1:24000
N

NORTH LANDING RIVER MACROSITE - GUM SWAMP

SIZE: ca. 4330 acres **BIODIVERSITY RANK:** B3

LOCALITY: City of Chesapeake and City of Virginia Beach

QUADRANGLE:		**QUADRANGLE CODE:**
	Pleasant Ridge	3607661
	Fentress	3607662
	Princess Anne	3607671
	Kempsville	3607672

LOCATION: The Gum Swamp site covers a large area of land along the North Landing River, north of the Intracoastal Waterway, and includes Stumpy Lake (see map). The conservation planning boundary established for this site is provisional due to the large amount of land involved and the limited on-the-ground field survey conducted. Future refinements to this map will be needed.

NATURAL HERITAGE RESOURCE SUMMARY TABLE

SCIENTIFIC NAME	COMMON NAME	GLOBAL RARITY RANK	STATE RARITY RANK	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
plants:						
TILLANDSIA USNEOIDES	SPANISH MOSS	G5	S2	-	-	H
TRILLIUM PUSILLUM	DWARF TRILLIUM	G3	S2	2	-	U
animals:						
ARDEA HORDIAS	GREAT BLUE HERON	G5	S3	-	-	A
CASMERODIUS ALBUS	GREAT EGRET	G5	S2	-	-	A
WADING BIRD NESTING COLONY	MIXED COLONY		S3	-	-	A
SOREX LONGIROSTRIS FISHERI	DISMAL SWAMP SOUTHEASTERN SHREW	G5T2	S2	LT	LT	C
SYNAPTOMYS COOPERI HALETES	DISMAL SWAMP SOUTHERN BOG LEMMING	G5T3	S3	3C	-	B
NASIAESCHNA PENTECANTHA	CYRANO DARNER	G5	S1	-	-	H

SITE DESCRIPTION: The site contains an extensive swamp encompassing Stumpy Lake and the portion of Gum Swamp above Indian River Road. The swamp is dominated by bald cypress (*Taxodium distichum*), black gum (*Nyssa biflora*), black willow (*Salix nigra*), and red maple (*Acer rubrum*). Nesting colonies of great blue herons (*Ardea herodia*) and great egrets (*Casmerodius albus*) occur here. Stumpy Lake, a Norfolk City reservoir, is bordered by bald cypress. The forest along the wetland - upland ecotone is likely habitat for canebrake rattlesnakes (*Crotalus horridus atricaudatus*), a state endangered species. The Dismal Swamp southeastern shrew (*Sorex longirostris fisheri*) and the Dismal Swamp southern bog lemming (*Synaptomys cooperi haletes*) have been collected in this area.

The canal dug for the Intracoastal Waterway is a prominent disturbance feature at the site.

BOUNDARY JUSTIFICATION: The conservation planning boundary includes the natural heritage resources and a limited upland buffer. Adjustments to the site boundary will likely be made in the future, pending additional field inventory.

THREATS: The threats are somewhat difficult to assess because impacts from the many adjacent land use activities have not yet been thoroughly characterized. Nevertheless, any hydrologic disruption would constitute a threat, as would increasing development of surrounding upland habitat. The nesting colonies of herons and egrets and the rattlesnakes would most certainly suffer from increased human contact.

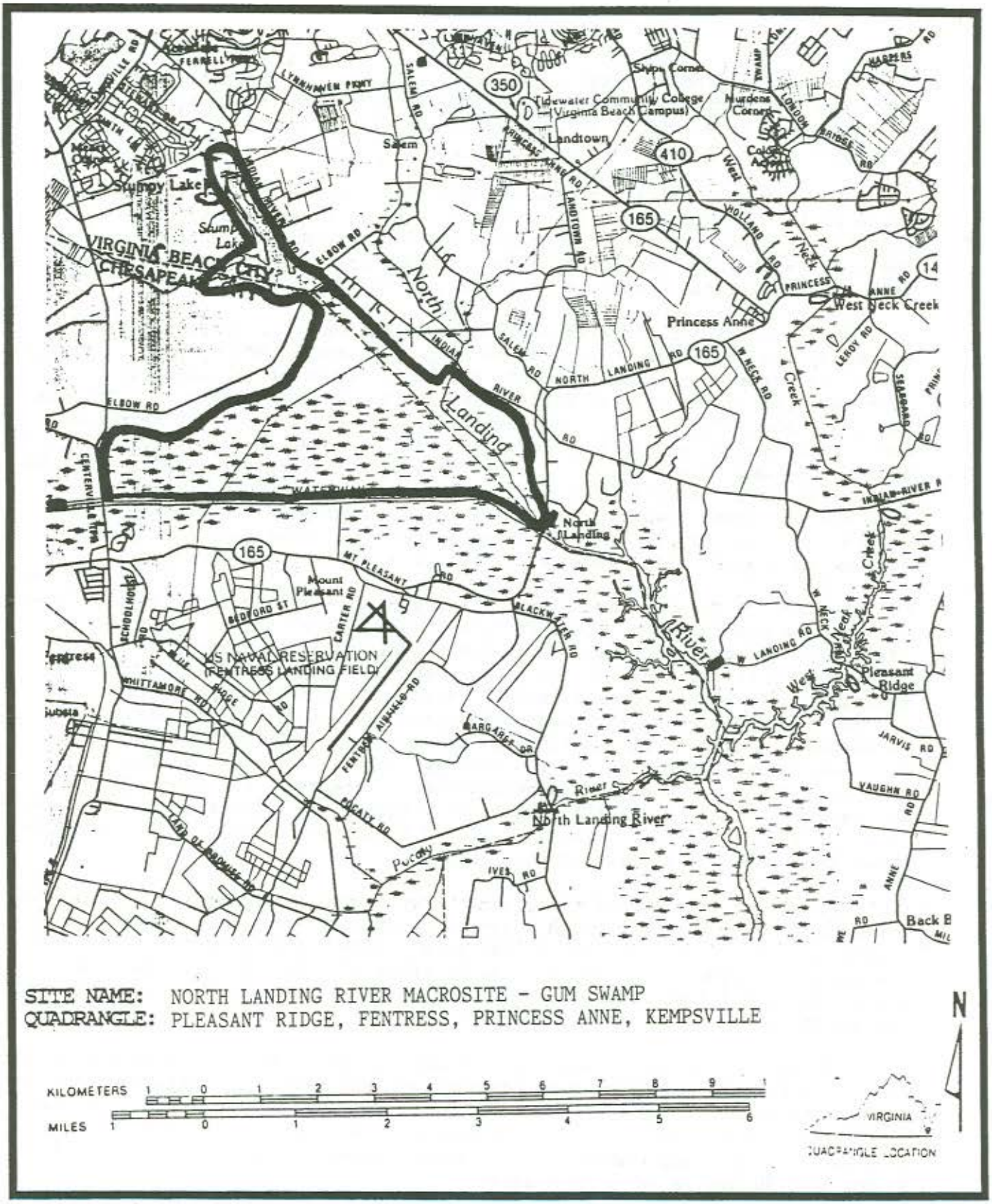
MANAGEMENT RECOMMENDATIONS: The forested portions of this site should remain in their natural state. Such conditions would benefit most rare species currently known from the area. Baseline information on all of the rare species is needed.

CURRENT STATUS: Most of the site is privately owned. Gum Swamp is a major drainage of the North Landing River, a State Scenic River. Stumpy Lake is owned and operated by the City of Norfolk as a reservoir.

PROTECTION RECOMMENDATIONS: The site is part of the significant North Landing River wetland ecosystem and should receive a strong level of protection.

REFERENCES:

Rose, R.K. and T.M. Padgett. 1991. Southeastern shrew (Sorex longirostris fisheri Merriam). Pages 562-564 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.



SITE NAME: NORTH LANDING RIVER MACROSITE - GUM SWAMP
QUADRANGLE: PLEASANT RIDGE, FENTRESS, PRINCESS ANNE, KEMPSVILLE

KILOMETERS 1 0 1 2 3 4 5 6 7 8 9 1
MILES 1 0 1 2 3 4 5 6

N

VIRGINIA
QUADRANGLE LOCATION

DATA ANALYSIS

The APES region of Virginia is especially rich in natural heritage resources (Appendix 1). Approximately one third of the state's rare plant species occur here, within an area encompassing just one tenth of Virginia's land mass.

Most natural heritage resources require natural habitats, and such habitats in the APES region tend to be forested. The amount of forest land is therefore roughly indicative of natural heritage resource potential. Within the APES region, the total percentage of county/city land in forest ranges from 25% in Virginia Beach, to 81% in Brunswick (Table 2).

Physiographic province is another broad factor which influences the diversity and abundance of natural heritage resources. Most natural heritage resources occur on the coastal plain (Table 2) because of the following factors. First, the coastal plain possesses the warmest climate in Virginia (Woodward and Hoffman 1991), and therefore a large number of southern plant and animal species are able to survive here at or near their northern range limits. Second, compared to all other physiographic regions in Virginia, the coastal plain is exceptionally rich in wetland habitats. The wetlands contain many species found nowhere else in the state. Lastly, unique coastal plain upland habitats such as long-leaf pine barrens and turkey oak sandhills support many rare, edge-of-range species.

Most of the forest land in the APES region of Virginia is privately owned, including a considerable amount of intensively managed forest industry land (Table 3). Since 1985, the coastal plain municipalities experienced a 29-percent jump in the area of planted pine stands (Thompson 1991). Compared to naturally established forests, pine plantations generally support fewer natural heritage resources because the plantings are often treated with herbicides, and the soil habitats are often disturbed by site preparation measures. Also, rare tree species such as long-leaf pine and turkey oak are obviously destroyed when pine monocultures are created. Consequently, natural heritage resources in the APES region of Virginia are being placed in greater jeopardy by the rapidly increasing and indiscriminate conversion of naturally established forests to planted pine stands.

The amount of reserved timberland, i.e. productive forest land withdrawn from timber utilization through statute or administrative designation (Thompson 1991), is 1 percent or less in all APES region municipalities except Chesapeake, Suffolk, and Virginia Beach (Table 2). Public lands such as Great Dismal Swamp National Wildlife Refuge and Seashore State Park and Natural Area contain most of the reserved timberland.

Threats to natural areas from residential and commercial development are largely a function of human population growth and density. Virginia Beach has by far the greatest human population, and experienced a rapid rate of growth from 1980 to 1988 (Table 4). In dramatic contrast, Brunswick, Charlotte, Lunenburg, Surry, and Sussex Counties remain sparsely populated, each with fewer than 30 people per square mile.

Table 3. Area, percent forest land, and natural heritage resource occurrences of APES region municipalities.

Municipality	Area (acres)	Percent Forest Land		Natural Heritage Resources	
		Nonreserved	Reserved	Entire Municipality	APES Portion
(Piedmont)					
Brunswick	360,460	81	0	42	29
Charlotte	304,960	69	0	14	0
Dinwiddie	337,213	72	<1	48	44
Lunenburg	276,627	76	0	21	20
Mecklenburg	394,330	67	1	16	2
Nottoway	202,502	68	0	15	12
Prince Edward	226,253	73	1	11	1
(Coastal Plain)					
Chesapeake	270,655	22	15	87	67
Emporia (a)	-	-	-	6	6
Franklin (b)	-	-	-	2	2
Greensville	193,779	70	0	72	71
Isle of Wight	204,454	56	<1	102	60
Prince George	178,537	66	1	32	17
Southampton	388,307	62	<1	126	120
Suffolk	261,869	42	12	139	97
Surry	180,058	68	1	31	13
Sussex	314,490	80	<1	170	166
Virginia Beach	163,795	22	3	320	222

(a) acreage included within Greensville total.
(b) acreage included within Southampton total.

Data from Thompson (1992), Johnson (1991), and the Department of Conservation and Recreation's Biological and Conservation Data System.

Table 4. Area of non-reserved timberland, by municipality and ownership class (acres).

Municipality	All Ownerships	Federal	State	County/ Municipal	Forest Industry	Other Private
(Piedmont)						
Brunswick	290,950	5,326	644	380	80,335	204,265
Charlotte	209,194	1,835	0	11	41,610	165,738
Dinwiddie	244,049	8,676	680	330	64,864	169,499
Lunenburg	209,807	0	0	600	52,726	156,481
Mecklenburg	263,242	23,680	237	337	17,249	221,739
Nottoway	137,331	14,683	297	421	24,959	96,945
Prince Edward	165,647	0	8,692	945	15,182	140,828
(Coastal Plain)						
Chesapeake	59,974	1,533	190	1,947	6,125	50,179
Emporia (a)	-	-	-	-	-	-
Franklin (b)	-	-	-	-	-	-
Greensville	135,286	0	0	143	50,708	84,435
Isle of Wight	114,161	60	10	925	28,033	85,133
Prince George	117,291	3,166	176	185	29,606	84,158
Southampton	240, 492	19	1,700	150	62,012	176,611
Suffolk	111,147	189	167	2,557	32,664	75,570
Surry	122,880	0	1,697	90	35,292	85,801
Sussex	250,649	0	133	190	94,760	155,566
Virginia Beach	36,581	1,877	650	743	0	33,311

(a) Data included within Greensville total.
(b) Data included within Southampton total.

Data from Thompson (1992) and Johnson (1991).

Table 5. Estimates of the human population in APES region municipalities, 1988.

Municipality	Population	Percent Change 1980-1988	Population Density per Square Mile
(Piedmont)			
Brunswick	16,000	2.4	28.4
Charlotte	11,800	-3.8	24.8
Dinwiddie	21,100	-6.6	41.6
Lunenburg	12,100	-0.2	28.0
Mecklenburg	29,700	0.9	48.2
Nottoway	14,900	1.6	47.0
Prince Edward	17,600	7.0	49.7
(Coastal Plain)			
Chesapeake	147,100	3.2	432.6
Emporia	5,800	-1.9	2,900.0
Franklin	7,500	-0.4	949.4
Greensville	9,200	-6.4	30.7
Isle of Wight	25,500	2.1	79.9
Prince George	27,100	5.3	101.9
Southampton	18,100	-0.1	30.2
Suffolk	52,800	1.3	129.1
Surry	6,500	7.5	23.1
Sussex	10,300	-5.3	20.9
Virginia Beach	364,300	4.2	1,423.0

Data from the Center for Public Service, University of Virginia (Argue and Barnes 1990A; Argue and Barnes 1990B; Holliday and Barnes 1990; Karayannis and Barnes 1990).

CONCLUSION/DISCUSSION

The need to protect natural areas and significant wetlands in the APES region of Virginia is urgent and paramount. These areas are being destroyed or degraded at an alarming rate. At risk are globally rare species, exemplary natural communities, awe-inspiring virgin forests, and large wetland systems which provide multiple values to society. Through the passage of a 95 million dollar parks and recreation facilities bond, which includes funds for natural area conservation in the Commonwealth, Virginia citizens recently made a commitment to protect natural heritage resources from destruction and extirpation.

The 57 sites described in this report have varying levels of protection. Sites within state parks, state natural areas, national wildlife refuges, and private natural areas are largely protected, but some of their natural heritage resources require special management. In some cases, additional lands are needed around the existing parks or natural areas to ensure the full protection of natural heritage resources at these sites. In contrast, privately owned sites are highly threatened by such factors as land development, land conversion, logging, herbiciding, ditching, and fire suppression. Rare fish and mollusks documented from riverine sites can only be protected by enacting large-scale watershed protection measures.

Other significant natural areas no doubt await discovery within the APES region of Virginia. Although the recently completed inventory was intensive, it was nevertheless conducted over a relatively brief period of time with a fixed amount of financial resources. Information from any new natural areas discovered in the APES region will be recorded within the Department of Conservation and Recreation's Biological and Conservation Data System and made available for conservation planning purposes.

The most immediate benefit of this final report is that it should prevent the inadvertent destruction or degradation of significant natural heritage resources. In the past, land owners either were not informed of a site's natural heritage significance, or did not receive the type of professional guidance which could have mitigated development impacts. Logging currently represents one of the most serious threats to natural heritage resources in the region, but in many cases logging activity and natural heritage resources can coexist in situ as long as the best management practices for the natural heritage resource are considered and followed. For instance, the timber management prescription for such lands might involve selective cutting instead of clear-cutting, natural reforestation instead of single-species plantings, and prescribed burning instead of herbicides to control undesireable vegetation. The forest industry, controlling a vast amount of land in this part of Virginia, could set an important example by managing environmentally sensitive natural heritage sites in a manner consistent with the long term protection of these resources.

RECOMMENDATIONS

1. **Continue conservation planning for the natural heritage sites and participate fully in the development of local protection tools.** Most of the natural heritage sites described in this report are unprotected. The Department of Conservation and Recreation (DCR) will continue to seek the advice, and utilize the expertise, of local officials in evaluating practical and effective protection options. Also, continued field work is necessary to refine site conservation planning boundaries and to identify new sites. A land owner contact program and natural area registry program are urgently needed to prevent the inadvertent destruction of significant sites in Albemarle-Pamlico Estuarine Study region of Virginia.

2. **Include the DCR in the review of projects in or near natural areas.** The site boundaries contained in this report are provided for planning purposes only, and are not regulatory in nature. As proposed development projects come before the localities, project maps should be compared with the site maps in this report. The DCR offers its knowledge and expertise in reviewing project proposals that may affect a natural area. Since the early stages of the planning process typically offer the greatest flexibility, it is important to contact the DCR staff and appropriate regulatory agencies as soon as possible.

3. **Expand public awareness of the need for protecting natural areas.** The rapid rate of human population growth and coincident land development throughout much of southeastern Virginia have placed natural heritage resources in jeopardy. Natural areas provide biological diversity values, they help maintain ecosystem stability, and they allow recreational and educational opportunities for the public. In short, natural areas add to the quality of life in the region. Increasingly, the public has acknowledged the importance of natural areas within Seashore State Park and False Cape State Park. Through a variety of educational programs and materials, these parks are bringing needed attention to natural area values. The North Landing River Natural Area Preserve and the Blackwater Ecologic Preserve represent breakthroughs in natural area protection and awareness; these sites were protected specifically for their outstanding natural history values. The many unprotected natural areas throughout southeastern Virginia can only benefit from the increased awareness of natural area values.

4. **Increase interaction and cooperation among conservation agencies and organizations to achieve natural area protection and management.** Among the many groups and individuals that should be involved are those that own, manage, or have the authority to acquire natural areas. One goal should be to develop stronger ties among federal, state, local and private interests involved in the protection or management of natural lands. This can be achieved through workshops, demonstration areas, joint protection activities, cooperative research and management projects, and newsletters.

5. **Properly manage natural areas in southeastern Virginia.** Natural area management is an evolving science and art which utilizes multiple viewpoints, disciplines, and skills to maintain and enhance biodiversity and aesthetic values on natural lands. The first step involves developing management programs for existing public and private conservation lands. The DCR site management plan for the North Landing River Natural Area Preserve can serve as a model. The plan addresses such topics as research needs, prescribed burning, exotic species control, and rare species monitoring. Sufficient human and financial resources should be established at the outset to ensure that long term management activities can be sustained, and long term goals achieved. Certain management practices, such as prescribed burning, require advanced notification and cooperation among adjoining land owners and agencies.

REFERENCES

Argue, D.A. and G.E. Barnes. 1990A. An economic profile of the Southeastern Virginia Planning District. Virginia's Local Economies, Report #13. Center for Public Service, University of Virginia, Charlottesville. 32 pp.

Argue, D.A. and G.E. Barnes. 1990B. An economic profile of the Piedmont Planning District. Virginia's Local Economies Report #23. Center for Public Service, University of Virginia, Charlottesville. 27 pp.

Frost, C.C., H.E. LeGrand, Jr. and R.E. Schneider. 1990. Regional inventory for critical natural areas, wetland ecosystems, and endangered species habitats of the Albemarle-Pamlico Estuarine Region: Phase 1. Albemarle-Pamlico Study Project No. 90-01. North Carolina Natural Heritage Program, Raleigh. 462 pp.

Holliday, A.J. and G.E. Barnes. 1990. An economic profile of the Southside Planning District. Virginia's Local Economies, Report #27. Center for Public Service, University of Virginia, Charlottesville. 30 pp.

Johnson, T.G. 1991. Forest statistics for the southern Piedmont of Virginia, 1991. Resour. Bull. SE-124. Ashville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. 53 pp.

Karayannis, M. and G.E. Barnes. 1990. An economic profile of the Crater Planning District. Virginia's Local Economies, Report #11. Center for Public Service, University of Virginia, Charlottesville. 29 pp.

LeGrand, H.E., C.C. Frost, and J.O. Fussell,III. 1992. Regional inventory for critical natural areas, wetland ecosystems, and endangered species habitats of the Albemarle-Pamlico estuarine region: phase II. E.P.A. Albemarle-Pamlico Study Project No. 92-07.

Rawinski, T.J. and J.C. Ludwig. 1992. Critical natural areas, exemplary wetlands, and endangered species habitats in southeastern Virginia: results of the 1991 inventory encompassing Prince George County, Surry County, Isle of Wight County, Chesapeake City, Suffolk City, and Virginia Beach City. Natural Heritage Tech. Rep. 92-14. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond. 87 pp.

Smith, I.K., H.E. LeGrand, S.P. Hall, Z.E. Murrell, C.W. Nordman, and M.P. Schafale. 1993. Regional inventory for critical natural areas, wetland ecosystems, and endangered species habitats of the Albemarle-Pamlico Estuarine Region: phase III. E.P.A. Albemarle-Pamlico Study Report No. 92-21.

Thompson, M.T. 1991. Forest statistics for the Coastal Plain of Virginia, 1991. Resour. Bull. SE-122. Ashville, NC: U.S. Department of Agriculture. Forest Service, Southeastern Forest Experiment Station. 52 pp.

Woodward, S.L. and R.L. Hoffman. 1991. The nature of Virginia. Pages 23-48 in J.N. McDonald and T. Skwara, editors. Virginia's Endangered Species:

Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.

APPENDIX 1

List of natural heritage resources occurring in the APES region of Virginia.

10 DEC 1992

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

Natural Heritage Resources of the Chowan River/Dismal Swamp Drainage

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Group: COMMUNITIES					
COASTAL PLAIN SINKHOLE POND			S1		
ESTUARINE HERBACEOUS VEGETATION					
EUTROPHIC SEASONALLY FLOODED FOREST					
EUTROPHIC SEASONALLY FLOODED SCRUB					
EUTROPHIC SEMIPERMANENTLY FLOODED FOREST					
LOBLOLLY PINE FOREST			S4		
LOW HERBACEOUS WETLAND					
MESOTROPHIC SATURATED FOREST					
MID-HEIGHT HERBACEOUS UPLAND VEGETATION					
MID-HEIGHT HERBACEOUS WETLAND					
MOSS/LICHEN UPLAND VEGETATION					
OLIGOTROPHIC FOREST					
OLIGOTROPHIC SATURATED FOREST					
OLIGOTROPHIC SATURATED SCRUB					
OLIGOTROPHIC SATURATED WOODLAND					
OLIGOTROPHIC SCRUB					
OLIGOTROPHIC SEASONALLY FLOODED FOREST					
OLIGOTROPHIC WOODLAND					
PERMESOTROPHIC FOREST					
POCOSIN			S1S2		
SUBMESOTROPHIC FOREST					
TALL HERBACEOUS WETLAND					

10 DEC 1992

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

Natural Heritage Resources of the Chowan River/Dismal Swamp Drainage

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Group: INVERTEBRATES					
ALASMIDONTA HETERODON	DWARFWEDGE MUSSEL	G1	S1	LE	LE
ANODONTA IMBECILLIS	PAPER PONDSHELL	G5	S2		
APHYLLA WILLIAMSONI	A DRAGONFLY	G5	S1		
ATLIDES HALESUS	GREAT PURPLE HAIRSTREAK	G5	S3		
AUTURUS ERYTHROPYGOS	A MILLIPEDE	G3	S1		
BRACHYMESIA GRAVIDA	FOUR-SPOTTED PENNANT	G5	S1		
CALEPHELIS VIRGINIENSIS	LITTLE METALMARK	G4	S3		
CELASTRINA EBENINA	SOOTY AZURE	G4	S3S4		
CHLOROCHROA DISMALIA	DISMAL SWAMP GREEN STINK BUG	G1	S1	C2	C
CICINDELA TRIFASCIATA	A TIGER BEETLE	G5	S1		
CORDULEGASTER FASCIATA	A DRAGONFLY	G3Q	S1		
CORYPHAESCHNA INGENS	REGAL DARNER	G5	S1		
ELLIPTIO LANCEOLATA	YELLOW LANCE	G4	S2S3	C2	
ELLIPTIO ROANOKENSIS	ROANOKE SLABSHELL	G2Q	S1		
ENALLAGMA DURUM	A DAMSELFLY	G5	S2		
ENALLAGMA PALLIDUM	A DAMSELFLY	G4	S1		
EPITHECA COSTALIS	STRIPE-WINGED BASKETTAIL	G4	S1		
EPITHECA SEMIAQUEA	MANTLED BASKETTAIL	G4	S1		
EPITHECA SPINOSA	ROBUST BASKETTAIL	G3G4	S1		C
EUPHYES DUKESI	SCARCE SWAMP SKIPPER	G3G4	S2		C
FUSCONAIA MASONI	ATLANTIC PIGTOE	G2	S2	C2	LT
GOMPHUS SEPTIMA	SEPTIMA'S CLUBTAIL	G2	SR	C2	
LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL	G4	S2	C2	
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	G5	S2		
LEPTODEA OCHRACEA	TIDEWATER MUCKET	G4	S3		
LIBELLULA AURIPENNIS	GOLDEN-WINGED SKIMMER	G5	S1		
LIBELLULA FLAVIDA	YELLOW-SIDED SKIMMER	G5	S2		
LIGUMIA NASUTA	EASTERN PONDMUSSEL	G4	S3		
NASIAESCHNA PENTACANTHA	CYRANO DARNER	G5	S1		
NEHALENNIA INTEGRICOLLIS	A DAMSELFLY	G5	S1		
NEONYMPHA AREOLATUS AREOLATUS	GEORGIA SATYR	G5T4	S2S4		
PLOIARIA HIRTICORNIS	AN ASSASSIN BUG	G3?	S1		
POANES AARONI AARONI	SAFFRON SKIPPER	G4T4	S3		
PSEUDOPOLYDESMUS PALUDICOLOUS	A MILLIPEDE	G1	S1		
SOMATOCHLORA FILOSA	FINE-LINED EMERALD	G5	S1		
SOMATOCHLORA PROVOCANS	STRIPED EMERALD	G3G4	S1		
SPEYERIA DIANA	DIANA	G3	S3		
SYMPETRUM AMBIGUUM	BLUE-FACED MEADOWFLY	G5	S1		
ZANCLOGNATHA GYPSALIS	A NOCTUID MOTH	GU	SU		
ZANCLOGNATHA SP 2	A NOCTUID MOTH	G4	SU		

10 DEC 1992

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

Natural Heritage Resources of the Chowan River/Dismal Swamp Drainage

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Group: VERTEBRATES					
ACANTHARCHUS POMOTIS	MUD SUNFISH	G5	S3		
AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	G3	S1	C2	LT
AMBLOPLITES CAVIFRONS	ROANOKE BASS	G3	S3		
AMBYSTOMA MABEEI	MABEE'S SALAMANDER	G4	S1		LT
BUFO QUERCICUS	OAK TOAD	G5	S1		
CHOLOGASTER CORNUTA	SWAMPFISH	G5	S3		
CROTALUS HORRIDUS ATRICAUDATUS	CANEBRAKE RATTLESNAKE	G5TUQ	S1		LE
ENNEACANTHUS CHAETODON	BLACKBANDED SUNFISH	G5	S1		LE
ERIMYZON SUCETTA	LAKE CHUBSUCKER	G5	S2		
ETHEOSTOMA SERRIFER	SAWCHEEK DARTER	G5	S3		
FUNDULUS LINEOLATUS	LINED TOPMINNOW	G5	S1		
HYLA GRATIOSA	BARKING TREEFROG	G5	S1		LT
IXOBRYCHUS EXILIS	LEAST BITTERN	G5	S2		
LANIUS LUDOVICIANUS	LOGGERHEAD SHRIKE	G4	S2	C2	LT
LIMNAOEDUS OCULARIS	LITTLE GRASS FROG	G5	S3		
LIMNOTHLYPIS SWAINSONII	SWAINSON'S WARBLER	G4	S2		
NECTURUS PUNCTATUS	DWARF WATERDOG	G4	SU		
NOTROPIS ALTIPINNIS	HIGHFIN SHINER	G5	S3		
OPHISAURUS VENTRALIS	EASTERN GLASS LIZARD	G5	S1		LT
PERCINA REX	ROANOKE LOGPERCH	G2	S1S2	LE	LE
PEROMYSCUS GOSSYPINUS	COTTON MOUSE	G5	S3		
PEROMYSCUS LEUCOPUS EASTI	PUNGO MOUSE	G5T1	SH	C2	
PICOIDES BOREALIS	RED-COCKADED WOODPECKER	G2	S1	LE	LE
PLECOTUS RAFINESQUII	EASTERN BIG-EARED BAT	G4	S1	C2	LE
RALLUS ELEGANS	KING RAIL	G4Q	S2		
RALLUS LIMICOLA	VIRGINIA RAIL	G5	S2		
RANA VIRGATIPES	CARPENTER FROG	G5	S3		
SIREN INTERMEDIA	LESSER SIREN	G5	SU		
SIREN LACERTINA	GREATER SIREN	G5	SU		
SOREX LONGIROSTRIS FISHERI	DISMAL SWAMP SOUTHEASTERN SHREW	G5T2Q	S2	LT	LT
STEREOCHILUS MARGINATUS	MANY-LINED SALAMANDER	G5	S3		
SYLVILAGUS PALUSTRIS	MARSH RABBIT	G5	S2S3		
SYNAPTOMYS COOPERI HELALETES	DISMAL SWAMP BOG LEMMING	G5T3	S3	3C	
TANTILLA CORONATA	SOUTHEASTERN CROWNED SNAKE	G5	S2?		

10 DEC 1992

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

Natural Heritage Resources of the Chowan River/Dismal Swamp Drainage

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Group: PLANTS					
AGALINIS DECEMLOBA	BLUE RIDGE GERARDIA	G3G4	S2		
AGALINIS VIRGATA	PINE-BARREN GERARDIA	G3G4	S1		
ALETRIS AUREA	GOLDEN COLICROOT	G5	SH		
ANDROPOGON MOHRII	MOHR BLUESTEM	G3G4	SH		
ARMORACIA LACUSTRIS	LAKE CRESS	G4?	SH	C2	
ASCLEPIAS RUBRA	RED MILKWEED	G4G5	S2S3		
ASIMINA PARVIFLORA	DWARF PAW-PAW	G5	S2S3		
ASTER PUNICEUS VAR ELLIOTTII	ELLIOTT'S ASTER	G5T3T4	S1		
ASTER RACEMOSUS	COASTAL-PLAIN ASTER	G3?Q	S1		
BAPTISIA CINEREA	HAIRY FALSE-INDIGO	G2G3	S1		
BOLTONIA ASTEROIDES	ASTER-LIKE BOLTONIA	G5	S2		
BOLTONIA CAROLINIANA	CAROLINA BOLTONIA	G2Q	S2		
BUCHNERA AMERICANA	BLUE-HEARTS	G3G4	S1		
BURMANNIA BIFLORA	NORTHERN BURMANNIA	G4G5	SH		
CALAMOVILFA BREVIPILIS	PINE-BARREN REED-GRASS	G3	SX	3C	
CALLISIA GRAMINEA	GRASS-LIKE ROSELINGS	G5	S1		
CALOPOGON PALLIDUS	PALE GRASS-PINK	G4G5	SH		
CALYCANTHUS FLORIDUS VAR FLORIDUS	SWEET-SHRUB	G5T4T5	S2?		
CAREX BARRATTII	BARRATT'S SEDGE	G3	S1S2	3C	C
CAREX BUXBAUMII	BROWN BOG SEDGE	G5	S2		
CAREX COLLINSII	COLLINS' SEDGE	G4	S3		
CAREX CRUS-CORVI	RAVENFOOT SEDGE	G5	S1S2		
CAREX DECOMPOSITA	EPIPHYTIC SEDGE	G3G4	S1	3C	C
CAREX LUPULIFORMIS	FALSE HOP SEDGE	G3G4Q	S1		
CAREX RENIFORMIS	RENIFORM SEDGE	G4?	S1		
CAREX STRAMINEA	STRAW SEDGE	G5	S2		
CAREX STRIATA	A SEDGE	G4	S1S2		
CAREX TETANICA	RIGID SEDGE	G4G5	S2		
CARPHEPHORUS BELLIDIFOLIUS	SANDY-WOODS CHAFFHEAD	G4	S1		
CARPHEPHORUS TOMENTOSUS	WOOLY CHAFFHEAD	G4	S1		
CASSIA FASCICULATA VAR MACROSPERMA	PRAIRIE SENNA	G5T2Q	S2	C2	
CENCHRUS CAROLINIANUS	COAST SANDBUR	G5	S1		
CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	G4	S2		
CHAMAESYCE BOMBENSIS	A SPURGE	G3G4	S2		
CHASMANTHIUM LAXUM VAR SESSILIFLORUM	LONG-LEAF SPIKEGRASS	G5T5	S2		
CHELONE CUTHBERTII	CUTHBERT TURTLEHEAD	G3	S2		
CHELONE OBLIQUA	RED TURTLEHEAD	G4	S1		
CHRYSOPSIS GOSSYPINA	COTTONY GOLDEN-ASTER	G5	S1		
CIRSIUM VIRGINIANUM	VIRGINIA THISTLE	G3G4	S2		
CLADIUM MARISCUS SSP JAMAICENSE	SAWGRASS	G5T5	S1		
CLEISTES DIVARICATA	SPREADING POGONIA	G4	S1		
COELORACHIS RUGOSA	WRINKLED JOINTGRASS	G5	SH		

10 DEC 1992

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

Natural Heritage Resources of the Chowan River/Dismal Swamp Drainage

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
COLLINSONIA VERTICILLATA	WHORLED HORSE-BALM	G2G3	S1		C
COREOPSIS LINIFOLIA	TEXAS TICKSEED	G4Q	S1		
CRATAEGUS AESTIVALIS	MAY HAWTHORN	G5	S1		
CROTALARIA ROTUNDIFOLIA	PROSTRATE RATTLE-BOX	G5	S1		
CTENIUM AROMATICUM	TOOTHACHE GRASS	G5	S1		
CUSCUTA CEPHALANTHI	BUTTON-BUSH DODDER	G5	S1?		
CUSCUTA INDECORA	PRETTY DODDER	G5	S2?		
CYPERUS GRANITOPHILUS	GRANITE-LOVING FLATSEDGE	G3Q	S1	3C	C
DESMODIUM STRICTUM	PINELAND TICK-TREFOIL	G3G4	S2		
DESMODIUM TENUIFOLIUM	SLIM-LEAF TICK-TREFOIL	G3G4	S2		
DICLIPTERA BRACHIATA	WILD MUDWORT	G5	S1		
DIDIPLAS DIANDRA	WATER-PURSLANE	G5	S1		
DROSERA BREVIFOLIA	DWARF SUNDEW	G5	S2		
ELEOCHARIS BALDWINII	BALDWIN SPIKERUSH	G4G5	S1		
ELEOCHARIS HALOPHILA	SALT-MARSH SPIKERUSH	G4	S1		
ELEOCHARIS RADICANS	ROOTED SPIKERUSH	G5	SH		
ELEOCHARIS ROSTELLATA	BEAKED SPIKERUSH	G5	S2		
ELEOCHARIS TENUIS VAR VERRUCOSA	SLENDER SPIKERUSH	G5T3T5	S1		
ELEOCHARIS TRICOSTATA	THREE-ANGLE SPIKERUSH	G3	S1		
ELEOCHARIS VIVIPARA	VIVIPAROUS SPIKERUSH	G5	S1		
ERIGERON VERNUS	WHITE-TOP FLEABANE	G5	S2		
ERIOCAULON DECANGULARE	TEN-ANGLE PIPEWORT	G5	S2		
ERIOCAULON PARKERI	PARKER'S PIPEWORT	G3	S3	3C	
ERYNGIUM YUCCIFOLIUM	RATTLESNAKE-MASTER	G5	S2		
FIMBRISTYLIS CAROLINIANA	CAROLINA FIMBRISTYLIS	G4	S1		
GALIUM HISPIDULUM	COAST BEDSTRAW	G5	S2		
GENTIANA AUTUMNALIS	PINE-BARREN GENTIAN	G3	S1	3C	
GYMNOPOGON BREVIFOLIUS	BROAD-LEAVED BEARDGRASS	G5	SH		
HELENIUM BREVIFOLIUM	SHORTLEAF SNEEZEWEED	G4	S2		
HELIOTROPIUM CURASSAVICUM	SEASIDE HELIOTROPE	G5	S1		
HEXASTYLIS LEWISII	A HEARTLEAF	G3	S2S3	3C	
HYDROCOTYLE BONARIENSIS	COASTAL-PLAIN PENNY-WORT	G5	S1		
HYPERICUM ADPRESSUM	CREEPING ST. JOHN'S-WORT	G2G3	SH		
HYPERICUM DRUMMONDII	DRUMMOND ST. JOHN'S-WORT	G5	S1		
HYPERICUM SETOSUM	A ST. JOHN'S-WORT	G3G5	S2		
HYPOXIS SESSILIS	LONG'S YELLOW STAR-GRASS	G4	SH	3C	
ILEX CORIACEA	BAY-GAIL HOLLY	G5	S1		
IRESINE RHIZOMATOSA	EASTERN BLOODLEAF	G5	S1S2		
IVA IMBRICATA	SEA-COAST MARSH-ELDER	G5?	S1S2		
JUNCUS ABORTIVUS	PINE-BARREN RUSH	G4G5	S1		C
JUNCUS CAESARIENSIS	NEW JERSEY RUSH	G2	S2	C2	C
JUNCUS ELLIOTTII	BOG RUSH	G4G5	S1S2		
JUNCUS MEGACEPHALUS	BIG-HEAD RUSH	G4G5	S2		
JUNCUS VALIDUS	A RUSH	G?	S2		

10 DEC 1992

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

Natural Heritage Resources of the Chowan River/Dismal Swamp Drainage

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
JUNIPERUS COMMUNIS	GROUND JUNIPER	G5	S1		
JUSTICIA OVATA	OVATE WATER-WILLOW	G5	S1		
KALMIA ANGUSTIFOLIA	SHEEP-LAUREL	G5	S2S3		
LACHNANTHES CAROLIANA	CAROLINA REDROOT	G4	SH		
LACHNOCAULON ANCEPS	BOG-BUTTONS	G5	S2		
LEERSIA HEXANDRA	CLUB-HEAD CUTGRASS	G5	SH		
LILAEOPSIS ATTENUATA	CAROLINA LILAEOPSIS	G3	S1S2	3C	C
LILIUM CATESBAEI	SOUTHERN RED LILY	G4	S1		
LIPOCARPHA MICRANTHA	DWARF BULRUSH	G4	S1		
LISTERA AUSTRALIS	SOUTHERN TWAYBLADE	G4	S2S3		
LITHOSPERMUM CAROLINIENSE	GOLDEN PUCCOON	G4G5	S1		
LOBELIA ELONGATA	ELONGATED LOBELIA	G3G5	S1		
LUDWIGIA ALATA	WINGED SEEDBOX	G3G4	S1		
LUDWIGIA BREVIPES	LONG BEACH SEEDBOX	G4G5	S2		
LUDWIGIA REPENS	CREEPING SEEDBOX	G5	S1		
LYCOPODIELLA CAROLINIANA VAR CAROLINIANA	SLENDER CLUBMOSS	G5T4	S1		
LYONIA LIGUSTRINA VAR FOLIOSIFLORA	SOUTHERN MALEBERRY	G5T?	S1		
LYSIMACHIA RADICANS	TRAILING LOOSESTRIFE	G4G5	S1		
LYTHRUM ALATUM VAR ALATUM	WINGED LOOSESTRIFE	G5T5	S2		
MICRANTHEMUM UMBROSUM	SHADE MUDFLOWER	G5	S1		
MUHLENBERGIA BUSHII	BUSH'S MUHLY	G5	SH		
MUHLENBERGIA CAPILLARIS VAR TRICHOPODES	CUT-OVER MUHLY	G5T5	SH		
MUHLENBERGIA GLABRIFLORUS	SMOOTH-LEAVED MUHLY	G3G4	SH		
NESTRONIA UMBELLULA	NESTRONIA	G3G4	S1S2	C2	LE
NOTHOSCORDUM BIVALVE	CROW-POISON	G4	S2		
NYMPHOIDES AQUATICA	BIG FLOATING-HEART	G5	S1		
OLDENLANDIA BOSCII	BOSC'S BLUET	G5	S1		
PANICUM HEMITOMON	MAIDENCANE	G5?	S1		
PASPALUM BIFIDUM	PITCHFORK PASPALUM	G5	S1		
PASPALUM DISSECTUM	WALTER PASPALUM	G3G4	S1		
PASPALUM DISTICHUM	JOINT PASPALUM	G5	S1		
PASPALUM PRAECOX	EARLY PASPALUM	G4	SH		
PEDIOMELUM CANESCENS	HOARY SCURFPEA	G2G4	S1		
PHLOX PILOSA	DOWNY PHLOX	G5	S2		
PHYLA NODIFLORA	COMMON FROG-FRUIT	G5	S1		
PHYSALIS VISCOSA SSP MARITIMA	STICKY GROUND-CHERRY	G4G5T4T	S2		
PHYSOSTEGIA LEPTOPHYLLA	SLENDER-LEAVED DRAGON-HEAD	G4G5	S2	C2	
PINUS PALUSTRIS	LONG-LEAF PINE	G4G5	S1		
PLATANTHERA BLEPHARIGLOTTIS	WHITE-FRINGE ORCHIS	G4G5	S2		C
POLYGALA RAMOSA	LOW PINE-BARREN MILKWORT	G5	SH		
POLYGONELLA POLYGAMA	OCTOBER-FLOWER	G4	S1		
PORTULACA SMALLII	SMALL'S PURSLANE	G2G3	S1	3C	C

10 DEC 1992

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

Natural Heritage Resources of the Chowan River/Dismal Swamp Drainage

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
PRENANTHES AUTUMNALIS	SLENDER RATTLESNAKE-ROOT	G4G5	S2		
PYCNANTHEMUM TORREI	TORREY MOUNTAIN-MINT	G2G3	S1?		
PYXIDANTHERA BARBULATA	FLOWERING PIXIE-MOSS	G4	S1		C
QUERCUS HEMISPHAERICA	DARLINGTON'S OAK	G5	S2		
QUERCUS INCANA	BLUE JACK OAK	G5	S2		
QUERCUS LAEVIS	TURKEY OAK	G5	S2		
QUERCUS MARGARETTAE	SAND POST OAK	G5	S2		
RANUNCULUS HEDERACEUS	LONG-STALKED CROWFOOT	G5	SH		
RANUNCULUS LAXICAULIS	MISSISSIPPI BUTTERCUP	G5?	S1		
RHEXIA PETIOLATA	CILIATE MEADOWBEAUTY	G3G5	S1		
RHYNCHOSPORA CEPHALANTHA	CAPITATE BEAKRUSH	G5	S2		
RHYNCHOSPORA COLORATA	WHITE-TOPPED SEDGE	G4G5	S1		
RHYNCHOSPORA DEBILIS	SAVANNAH BEAKRUSH	G4?	S1		
RHYNCHOSPORA FASCICULARIS	FASCICULATE BEAKRUSH	G5	S2		
RHYNCHOSPORA FILIFOLIA	THREAD-LEAVED BEAKRUSH	G5	SH		
RHYNCHOSPORA HARVEYI	HARVEY BEAKRUSH	G4	SH		
RHYNCHOSPORA NITENS	SHORT-BEAKED BALDRUSH	G3	S1		
RHYNCHOSPORA PALLIDA	PALE BEAKRUSH	G2G3	SH		
RHYNCHOSPORA PERPLEXA	A BEAKRUSH	G5	S1		
RHYNCHOSPORA SCIRPOIDES	LONG-BEAKED BALDRUSH	G4	S1		
RUDBECKIA HELIOPSIDIS	SUN-FACING CONEFLOWER	G2	S1	C2	C
SABATIA BRACHIATA	NARROW-LEAF PINK	G5?	S1		
SABATIA CALYCINA	COAST ROSE-GENTIAN	G3G5	S1S2		
SABATIA CAMPANULATA	SLENDER MARSH PINK	G5	S2		
SABATIA DIFFORMIS	TWO-FORMED PINK	G4G5	S1		
SACCHARUM BREVIBARBE	SHORT-BEARD PLUMEGRASS	G3G5	S1		
SAGITTARIA ENGELMANNIANA	ENGELMANN ARROWHEAD	G5?	SH		
SARRACENIA FLAVA	YELLOW PITCHER-PLANT	G4G5	S1		C
SARRACENIA PURPUREA	NORTHERN PITCHER-PLANT	G5	S2		
SCHWALBEA AMERICANA	CHAFFSEED	G2	SH	PE	
SCIRPUS ACUTUS	HARD-STEMMED BULRUSH	G5	S2		
SCIRPUS FLACCIDIFOLIUS	RECLINING BULRUSH	G1?Q	S1	3C	
SCLERIA MINOR	SLENDER NUTRUSH	G4G5	S2		
SEYMERIA CASSIOIDES	SEYMERIA	G5	S1S2		
SIDA INFLEXA	VIRGINIA PINE SIDA	GHQ	SH	C2*	
SISYRINCHIUM ALBIDUM	WHITE BLUE-EYED-GRASS	G?	S1		
SOLIDAGO LATISSIMIFOLIA	ELLIOTT GOLDENROD	G5	S1		
SOLIDAGO PATULA VAR STRICTULA	ROUND-LEAVED GOLDENROD	G5T5	S1		
SOLIDAGO TORTIFOLIA	A GOLDENROD	G3G5	S1		
SPHAGNUM CAROLINIANUM	CAROLINA PEATMOSS	G3	S1		
SPHAGNUM INUNDATUM	INUNDATED PEATMOSS	G3?	S2		
SPHAGNUM PERICHAETIALE	BRACT PEATMOSS	G5	S2S3		
SPHAGNUM TENERUM	TENDER PEATMOSS	G5	S2S3		
SPHAGNUM TORREYANUM	TORRRY'S PEATMOSS	G3G4	S1S2		

10 DEC 1992

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

Natural Heritage Resources of the Chowan River/Dismal Swamp Drainage

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
SPHAGNUM TRINITENSE	TRINIDAD PEATMOSS	G4	S2S3		
SPHENOPHOLIS FILIFORMIS	LONG-LEAF WEDGESCALE	G3G4	SH		
SPIRANTHES ODORATA	SWEETSCENT LADIES'-TRESSES	G5	S2		
STEINCHISMA HIANS	GAPING PANIC GRASS	G5	S1		
STEWARTIA MALACHODENDRON	SILKY CAMELLIA	G4	S2		
STILLINGIA SYLVATICA	QUEEN'S DELIGHT	G4G5	S1		
STIPULICIDA SETACEA	PINELAND SCALY-PINK	G5	S1		
TILLANDSIA USNEOIDES	SPANISH MOSS	G5	S2		
TOFIELDIA RACEMOSA	COASTAL FALSE-ASPHODEL	G5	S1		
TRILLIUM PUSILLUM VAR VIRGINIANUM	VIRGINIA LEAST TRILLIUM	G3T2	S2	C2	
UTRICULARIA FIBROSA	FIBROUS BLADDERWORT	G4G5	S1		
UTRICULARIA MACRORHIZA	GREATER BLADDERWORT	G5	S2		
UTRICULARIA PURPUREA	PURPLE BLADDERWORT	G5	S2		
VACCINIUM CRASSIFOLIUM	CREEPING BLUEBERRY	G4G5	S1		
VACCINIUM MACROCARPON	LARGE CRANBERRY	G4	S2		
VERBENA SCABRA	SANDPAPER VERVAIN	G5	S2		
VIOLA ESCULENTA	SALAD VIOLET	G4G5	S1		
WISTERIA FRUTESCENS	AMERICAN WISTERIA	G5	S2		
XYRIS CAROLINIANA	CAROLINA YELLOW-EYED-GRASS	G4G5	S1		
XYRIS FIMBRIATA	FRINGED YELLOW-EYED-GRASS	G5	SH		
XYRIS LAXIFOLIA VAR IRIDIFOLIA	A YELLOW-EYED-GRASS	G3G5T?	S1		
ZENOBIA PULVERULENTA	DUSTY ZENOBIA	G5	S1		
ZIGADENUS DENSUS	BLACK SNAKEROOT	G5	S1		
ZIGADENUS GLABERRIMUS	LARGE-FLOWERED CAMASS	G5	S1		
ZORNIA BRACTEATA	VIPERINA	G5?	S1		