Task 21 FY 90
Final Work Product

CRITICAL NATURAL AREAS, EXEMPLARY WETLANDS, AND ENDANGERED SPECIES HABITATS IN SOUTHEASTERN VIRGINIA

(Old growth cypress - tupelo swamp)

Department of Conservation and Recreation
of Natural Heritage

Heritage Technical Report # 92-14
18, 1992

ADMINISTRATION
NATURAL HERITAGE
PLANNING AND RECREATION RESOURCES
SOIL AND WATER CONSERVATION
STATE PARKS

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

DIVISION OF NATURAL HERITAGE

Main Street Station. 1500 East Main Street — Suite 312

TDD (804) 786-2121 Richmond. Virginia 23219 (804) 786-7951 FAX: (804) 371-2674

March 27, 1992

Received by:
Council on the Environment

MAR 30 1992

Ms. Laura Lower
Coastal Resources Management Program
Virginia Council on the Environment
202 North 9th Street
Richmond, VA 23219

Dear Laura:

On behalf of the Department of Conservation and Recreation, I am pleased to provide you with the final report, Critical Natural Areas, Exemplary Wetlands, and Endangered Species Habitats in Southeastern Virginia, in fulfillment of NOAA grant number NA90AA-H-CZ796. During the 1992 field season, we will continue our inventory of natural areas in this region under a grant from the Albemarle-Pamlico Estuarine Study, and will provide you with a copy of that final report, due in the fall of 1992. The Department looks forward to future involvement in the protection and management of natural areas identified through this study.

Sincerely,

Thomas L. Smith

Thomas L. Smith
Acting Division Director

cc. J. Robert Hicks, Jr.
Randall G. Waite

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

FINAL REPORT

Submitted to:

Virginia Coastal Resources Management Program
Council on the Environment
903 Ninth Street Office Building
Richmond, VA 23219

Prepared by:

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

March, 1992

This report should be cited as follows:

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 Heratage, Richmond. 87 pp.

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INTRODUCTION

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. Southeastern Virginia contains an extraordinary concentration of the Commonwealth's natural heritage resources; approximately one third of Virginia's rare plant species occur within the Chowan River watershed, an area encompassing only 8% of Virginia's land mass. The goal of this inventory was to identify important rare plant and animal sites and exemplary natural communities, with a particular emphasis on wetland habitats. This work addresses the issue of natural area preservation and conservation, as currently being drafted in the Albemarle-Pamlico Comprehensive Conservation Management Plan.

This report describes the findings of the 1991 natural heritage inventory. The information presented here will become part of a more comprehensive natural area report being prepared for the entire Virginia portion of the Albemarle-Pamlico Estuarine Region (Figure 1).

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 established throughout much of the Western Hemisphere.

Natural Heritage Resources

Each natural heritage resource is assigned a rank that indicates its 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 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. These "S-ranks" apply specifically to Virginia; global ranks, or "G-ranks", reflect species status on a global, or range-wide scale.

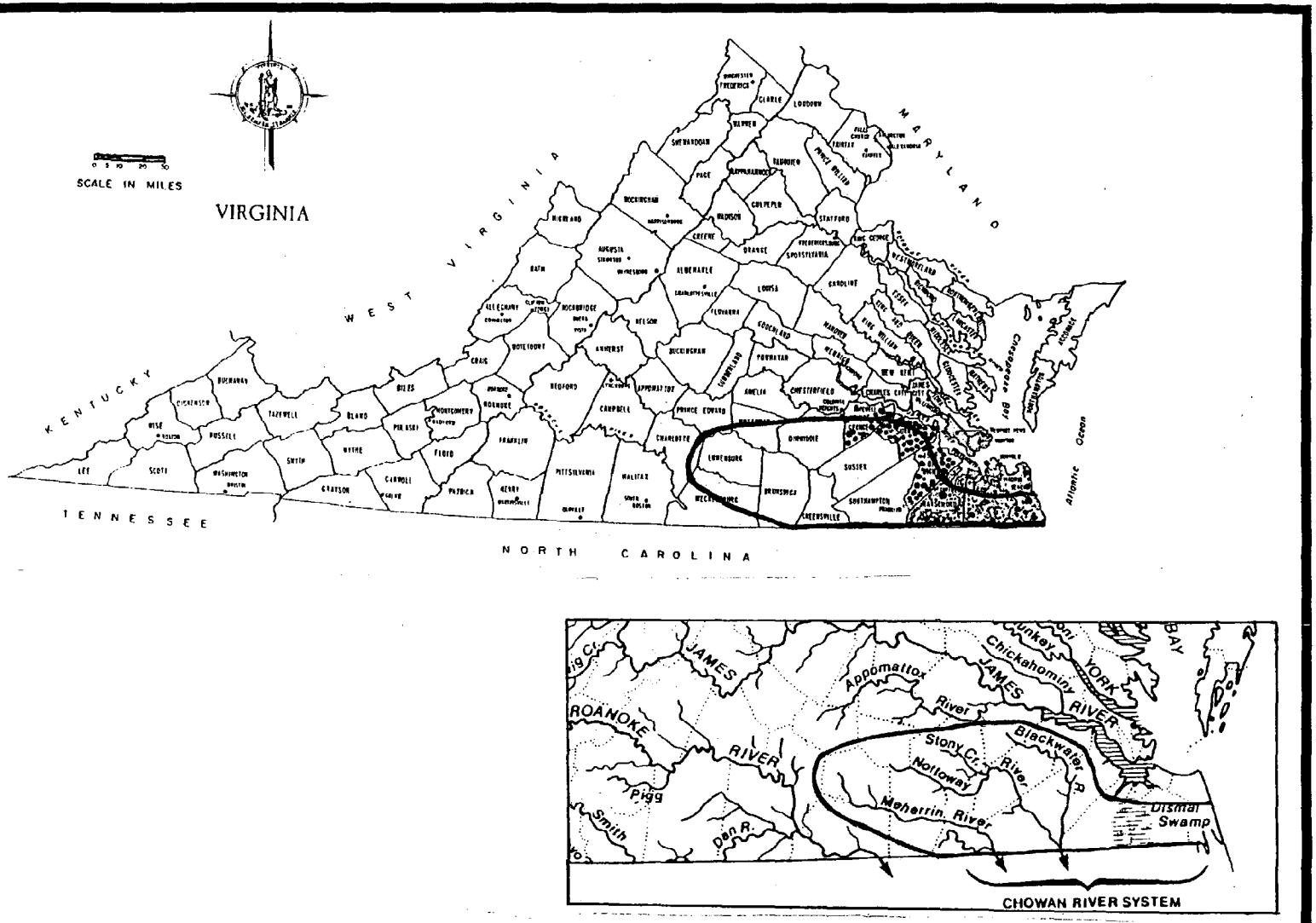


Figure 1. Map of the entire Albemarle-Pamlico planning region in Virginia, showing the Coastal Resources Management Program region investigated in 1991 (shaded area).

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 transients 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.

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. Rarity ranks used by the Division of Natural Heritage are not legal designations, and they are continuously updated to reflect new information.

The landscape unit that supports a particular natural heritage resource is called an **element occurrence**. The Division of Natural Heritage has mapped over 5500 element occurrences in the Commonwealth. Information on the location and quality of these element occurrences is computerized within the Division's Biological and Conservation Databases (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 overall natural condition and size.

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; each B-rank is defined below:

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: one of the best examples of a 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.

METHODS

Division of Natural Heritage staff approach natural heritage inventories in a systematic 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 Natural Heritage 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 (Figure 2). Local naturalists, soil conservationists, foresters, and college faculty are consulted for additional information. During this stage, some PNAs are eliminated from further consideration while others are added.

3) Aerial reconnaissance. Selected PNAs 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 PNAs 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 PNA. 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 features is determined. Threats and past or present disturbances are also noted. Element occurrence data are transcribed onto Division maps, and entered into the BCD databases.

6) Compilation of results and preparation of final report. As fieldwork is completed, Division biologists review the information gathered. Based on a review of all natural heritage resources present, the staff prioritizes the sites in terms of their significance and the threats facing them, develops and maps preliminary conservation planning boundaries, and drafts protection and management recommendations. This information is then combined into a final report.

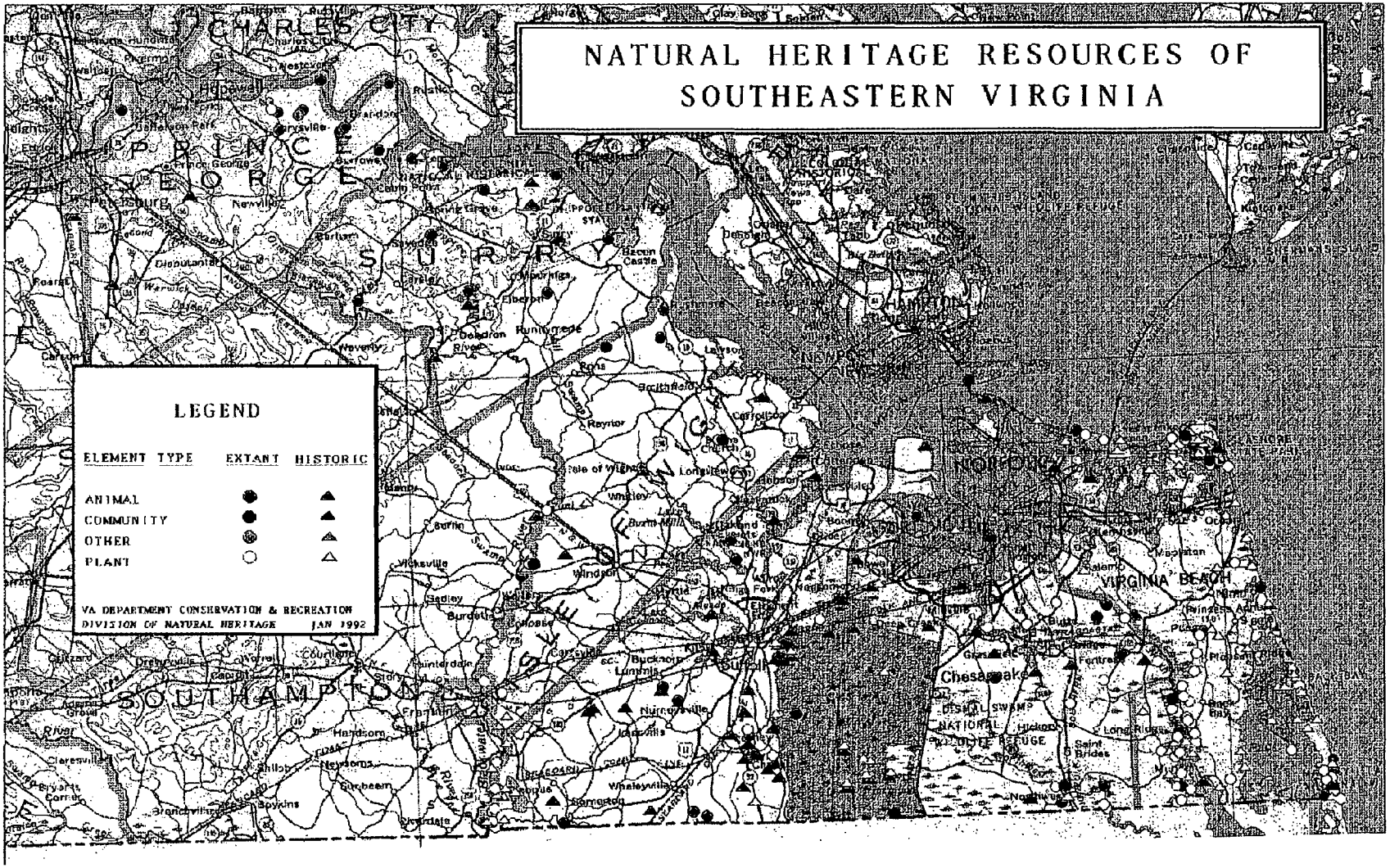


Figure 2. Map showing the distribution of natural heritage resources in southeastern Virginia.

RESULTS

Results of the natural heritage inventory are presented by way of 24 detailed site reports. The site reports are arranged by larger landscape units (macrosites) and municipality. Each site is described using the following standard reporting format:

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

SIZE: The approximate acreage included within the conservation planning boundary for the natural area.

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 discussed 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) on which the natural area occurs. The quadrangle code contains information on latitude and longitude, and identifies the location of the quadrangle.

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

NATURAL HERITAGE RESOURCE SUMMARY TABLE: A synopsis of the rare species and significant natural communities that occur on the site.

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 and actual threats to the site and its elements.

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

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

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, e.g. by protecting recharge zones,
- land intended to mitigate 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. Precise element locations within site boundaries are therefore 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. Due to the limitations imposed by an eight-month inventory, not all of the potential natural areas in the region were field checked. Future discoveries of significant natural areas in the study region are expected, particularly in western Suffolk.

SITE REPORTS

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	C2	-	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.

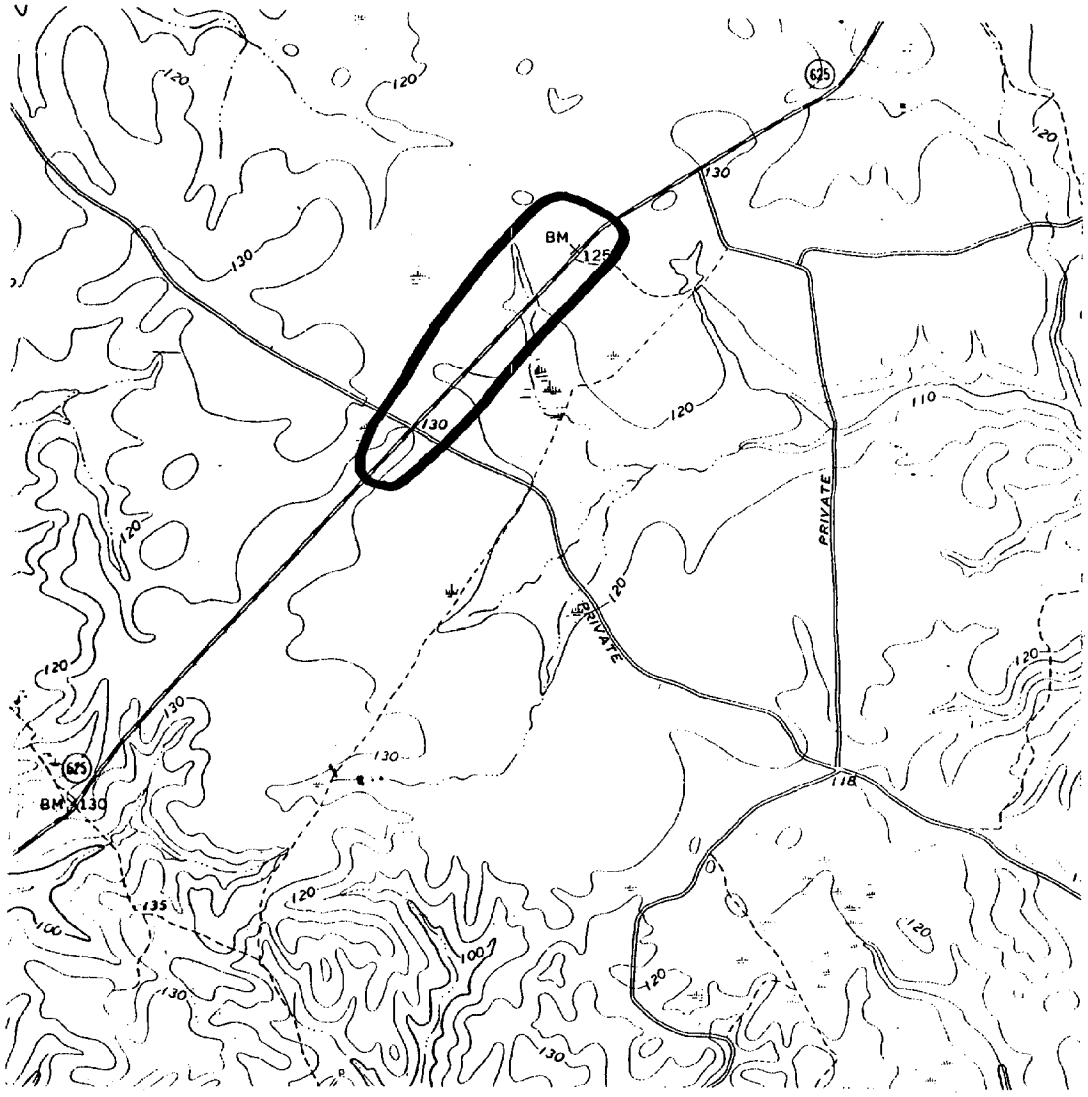
MANAGEMENT RECOMMENDATIONS: Monitor roadside management activities to ensure the health of the coneflower population. Investigate the use of prescribed burning as a management technique.

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 1:24000

1 MILE
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1 KILOMETER

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 Gary Williamson, recognized authority on wetland forest vegetation, this site has more pristine bald cypress (Taxodium distichum) - water tupelo (Nyssa aquatica) vegetation than any other area encountered in Virginia. It is in fact one of the very best old growth cypress swamps in the United States. 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 could be characterized as virgin forest.

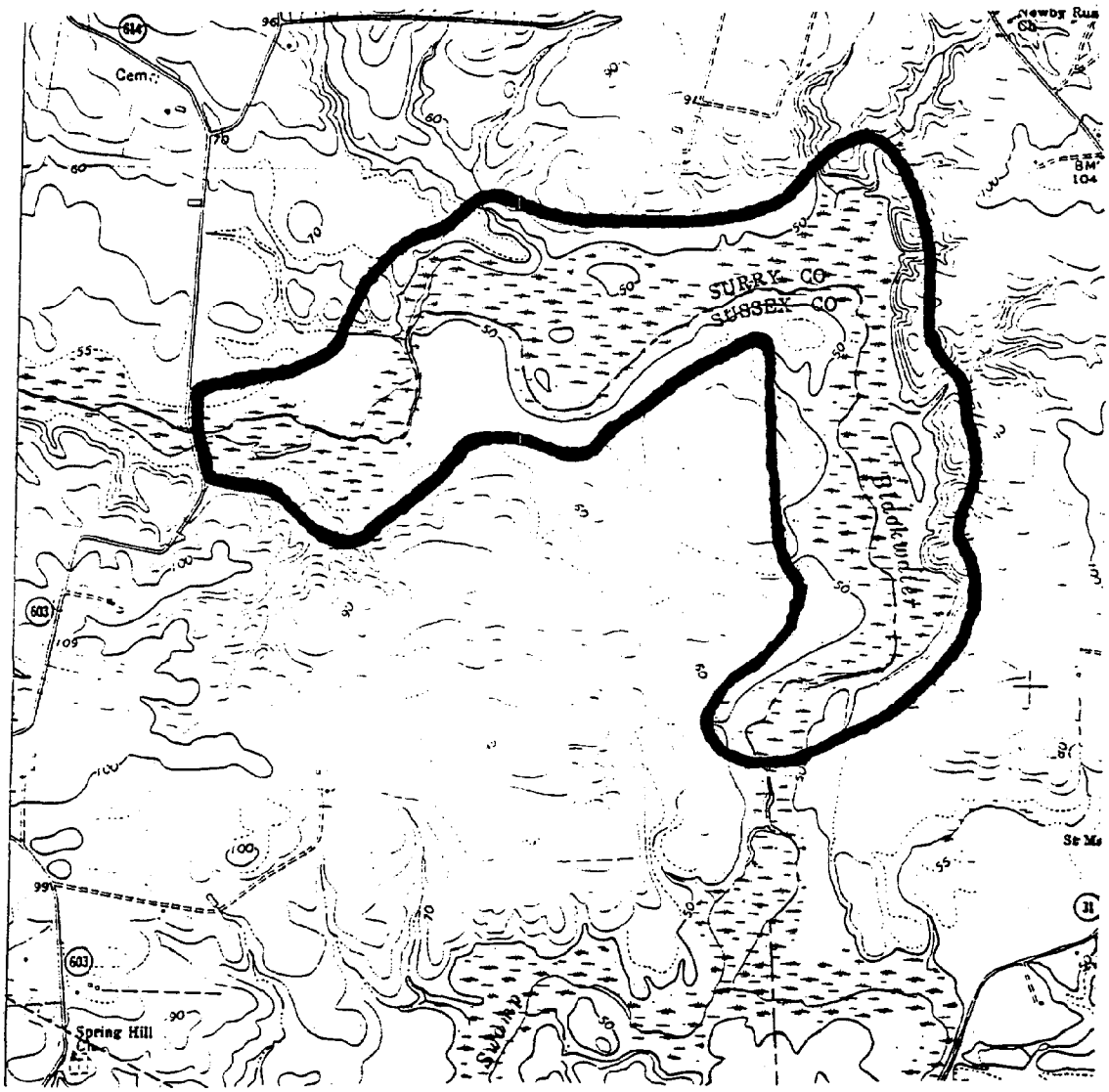
BOUNDARY JUSTIFICATION: The conservation planning boundary contains the extraordinary old growth forest plus a modest amount of upland buffer land necessary to mitigate negative impacts to the forest from adjacent land uses.

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: The site is in private ownership.

PROTECTION RECOMMENDATIONS: The site supports one of the Nation's best cypress-tupelo swamps, and as such represents an irreplaceable and awe-inspiring natural treasure. Permanent protection is needed.



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

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) - water tupelo (Nyssa aquatica) bottomland forest (see cover illustration). 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 very best old growth cypress swamp vegetation remaining in the United States.

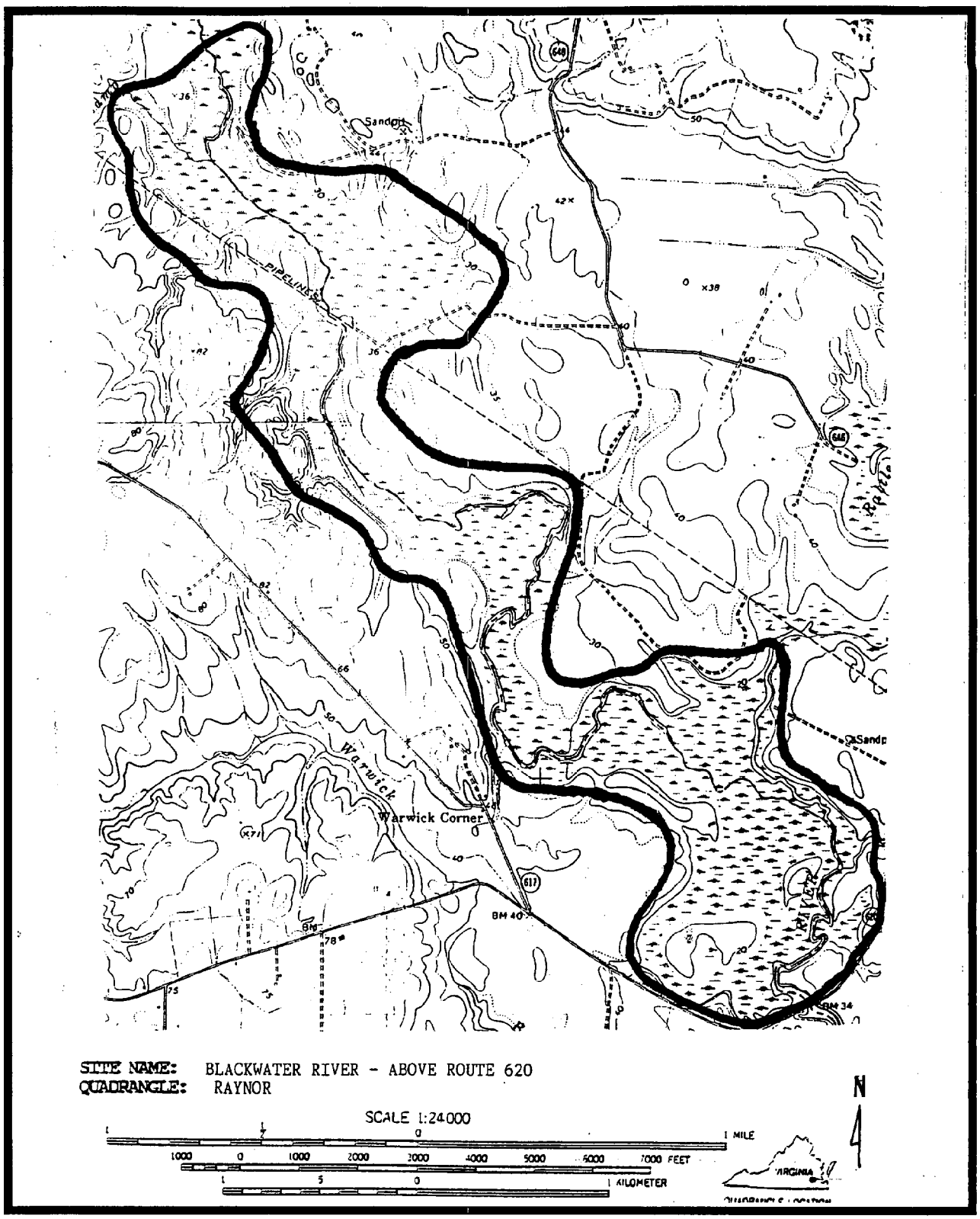
BOUNDARY JUSTIFICATION: The conservation planning boundary contains the extraordinary old growth forest plus a modest amount of upland buffer land necessary to mitigate negative impacts to the site.

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 in private ownership.

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


Sandpit
PIPELINES
Warwick Corner
BM 40
BM 34
SITE NAME: BLACKWATER RIVER - ABOVE ROUTE 620
QUADRANGLE: RAYNOR
SCALE 1:24000
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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.

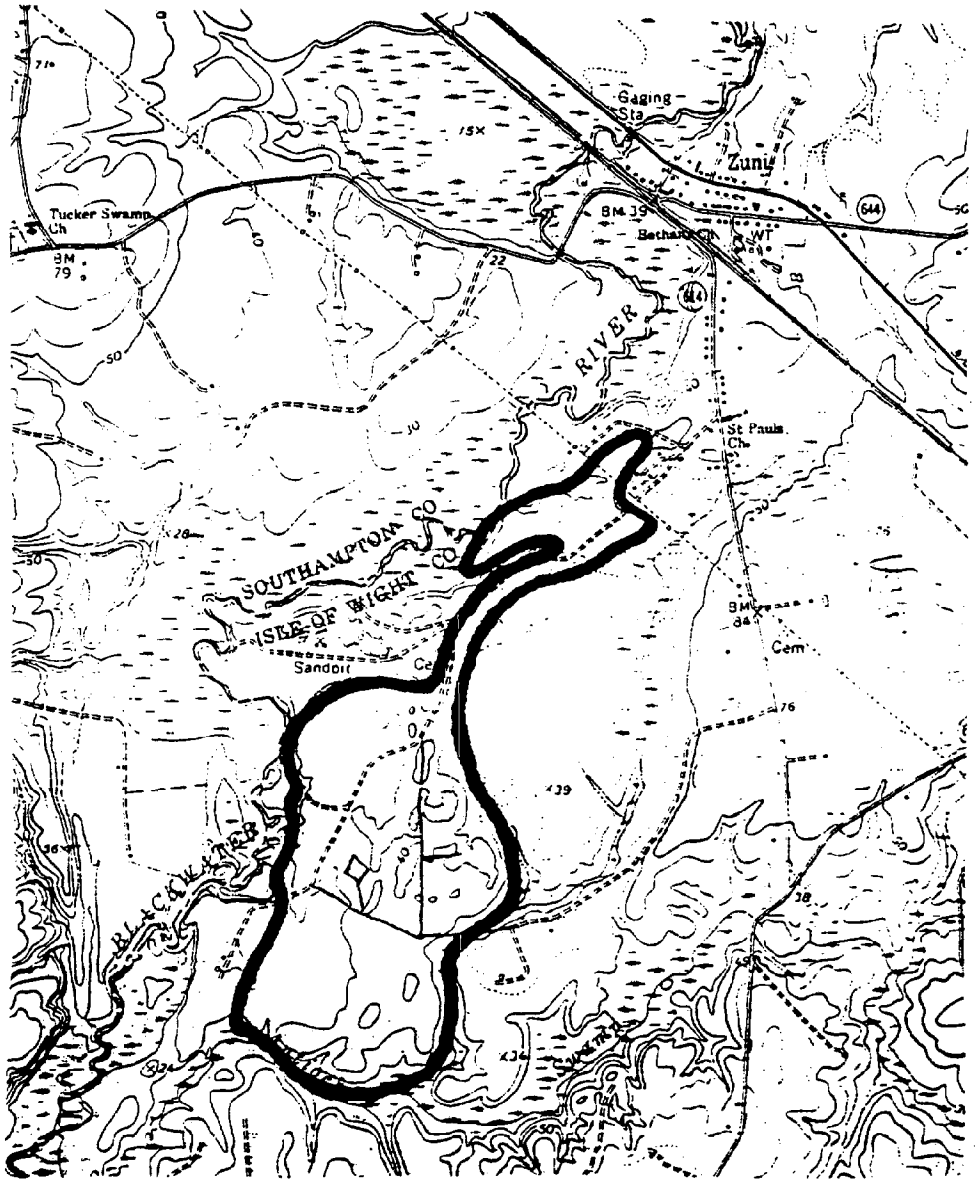
THREATS: The primary threat is continued development of undisturbed tracts for housing. Also, clear-cutting will significantly degrade the natural character of the forest and woodland vegetation, especially if followed by

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 in private ownership.

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

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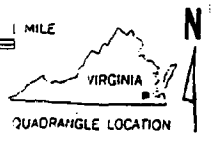
1 0 1 KILOMETER



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 one of Virginia's best examples of a mature loblolly pine (Pinus taeda) - 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 readily 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.

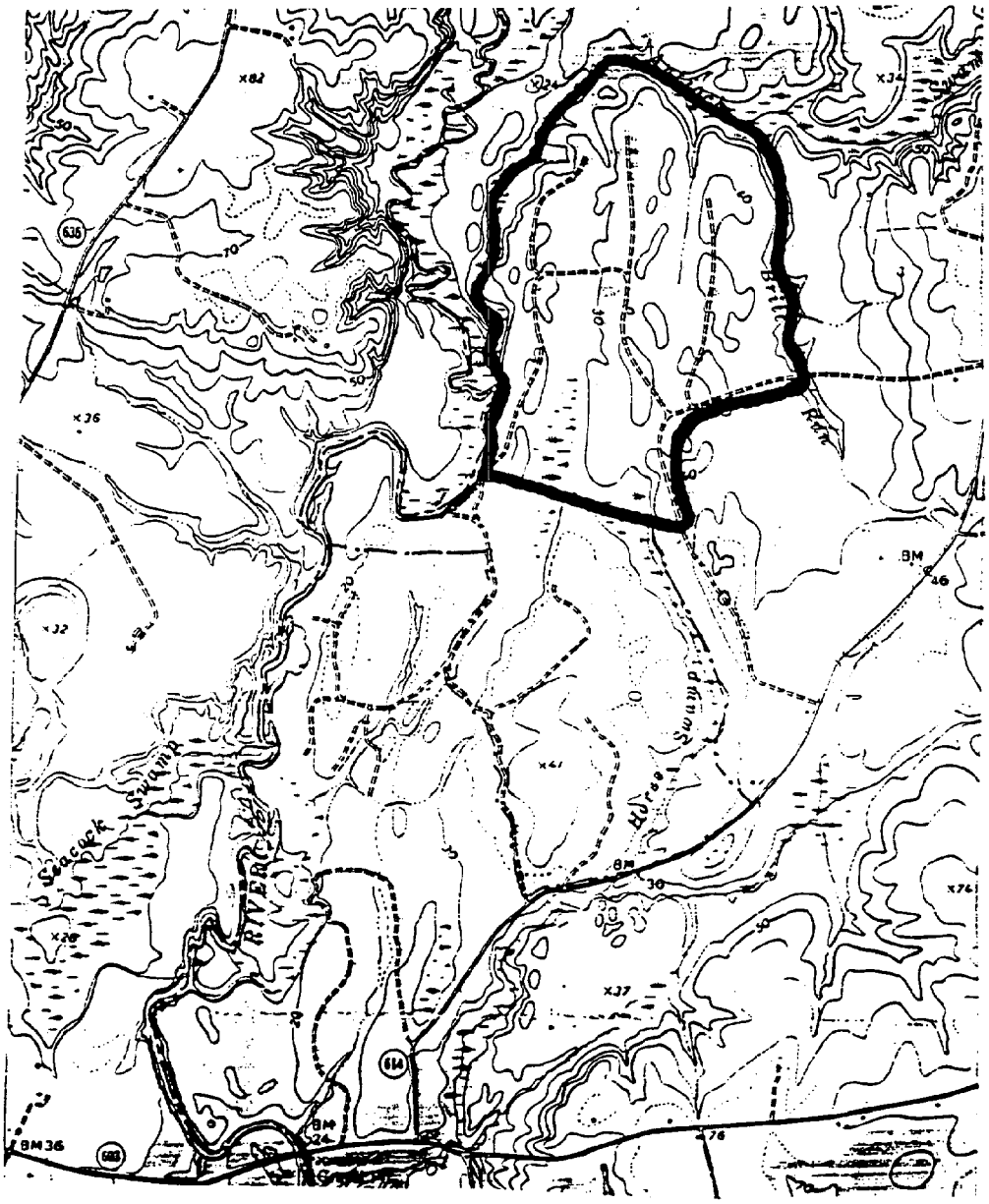
THREATS: Logging (especially if followed by herbicide treatment and conversion to pine plantation), lack of fire, and land development constitute threats to this important site.

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 in private ownership.

PROTECTION RECOMMENDATIONS: The site warrants the highest possible protection, not only for the mature forest and rare plants present, but because it is adjacent to the Blackwater Ecologic Preserve. Together these two sites would form a larger, more diverse, and more defensible core natural area preserve.



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

SCALE 1:24000

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

VIRGINIA

QUADRANGLE LOCATION

N

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	-	-	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
HABENARIA BLEPHARIGLOTTIS	WHITE FRINGED ORCHIS	G4	S2	-	-	D
HETEROTHECA GOSSYPINA	COTTONY GOLDEN-ASTER	G5	S1	-	-	D
JUNCUS ABORTIVUS	PINE BARREN RUSH	G4G5	S1	-	-	D
KALMIA ANGUSTIFOLIA	SHEEP-LAURL	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	SI	-	-	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 reverified.

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.

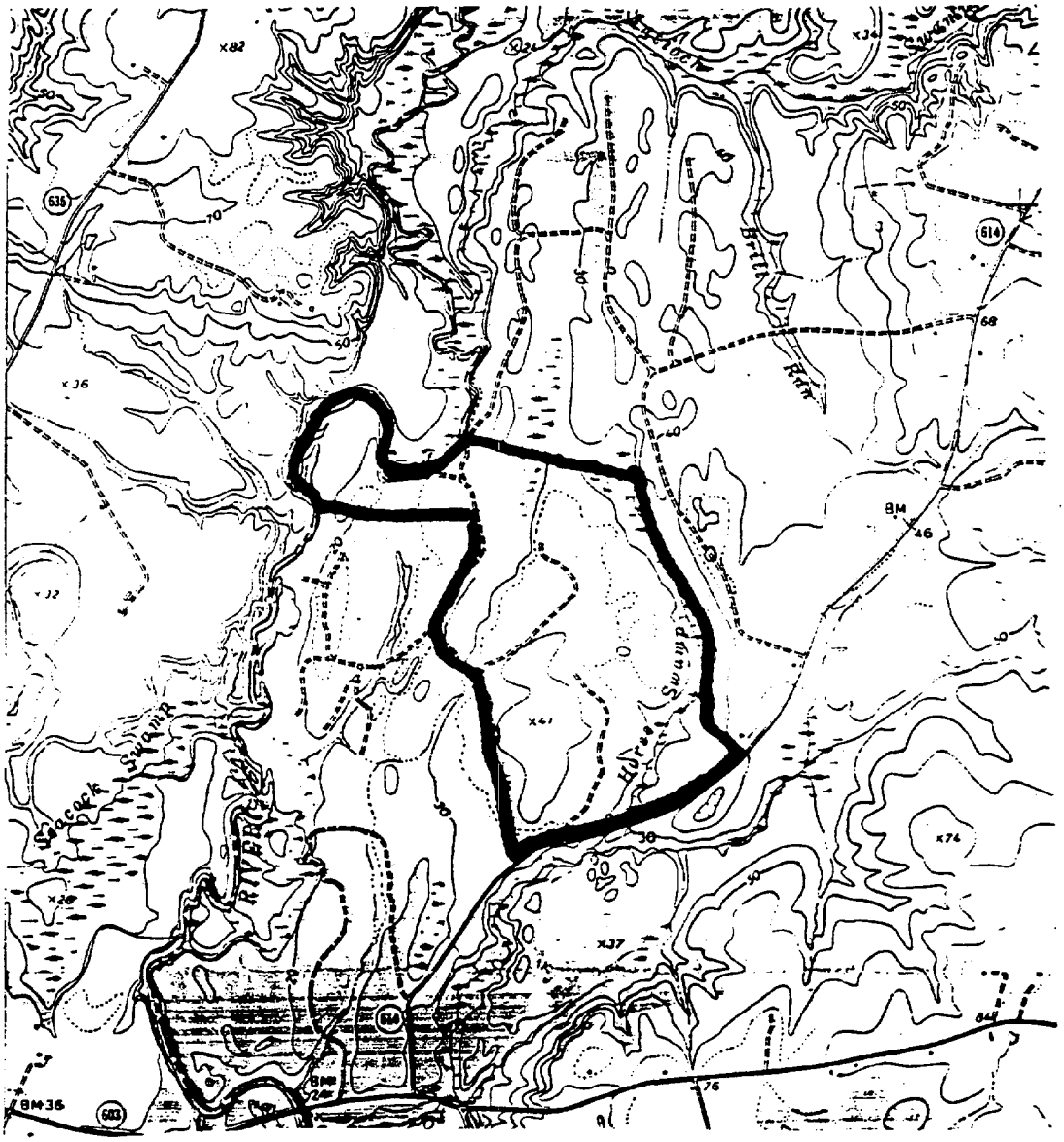
CURRENT STATUS: The site is owned by Old Dominion University, and is managed as a natural area.

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.

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

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 - HORSE SWAMP BARRENS

SIZE: ca. 150 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 south and east of Route 614, and north of Route 603. To the north lies 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	-	-	S1	-	-	BC
plants:						
CARPHEPHORUS BELLIDIFOLIUS	SANDY-WOODS CHAFFHEAD	G4	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
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 sometimes called "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. Recent selective logging has created canopy openings, giving the vegetation a woodland structure.

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

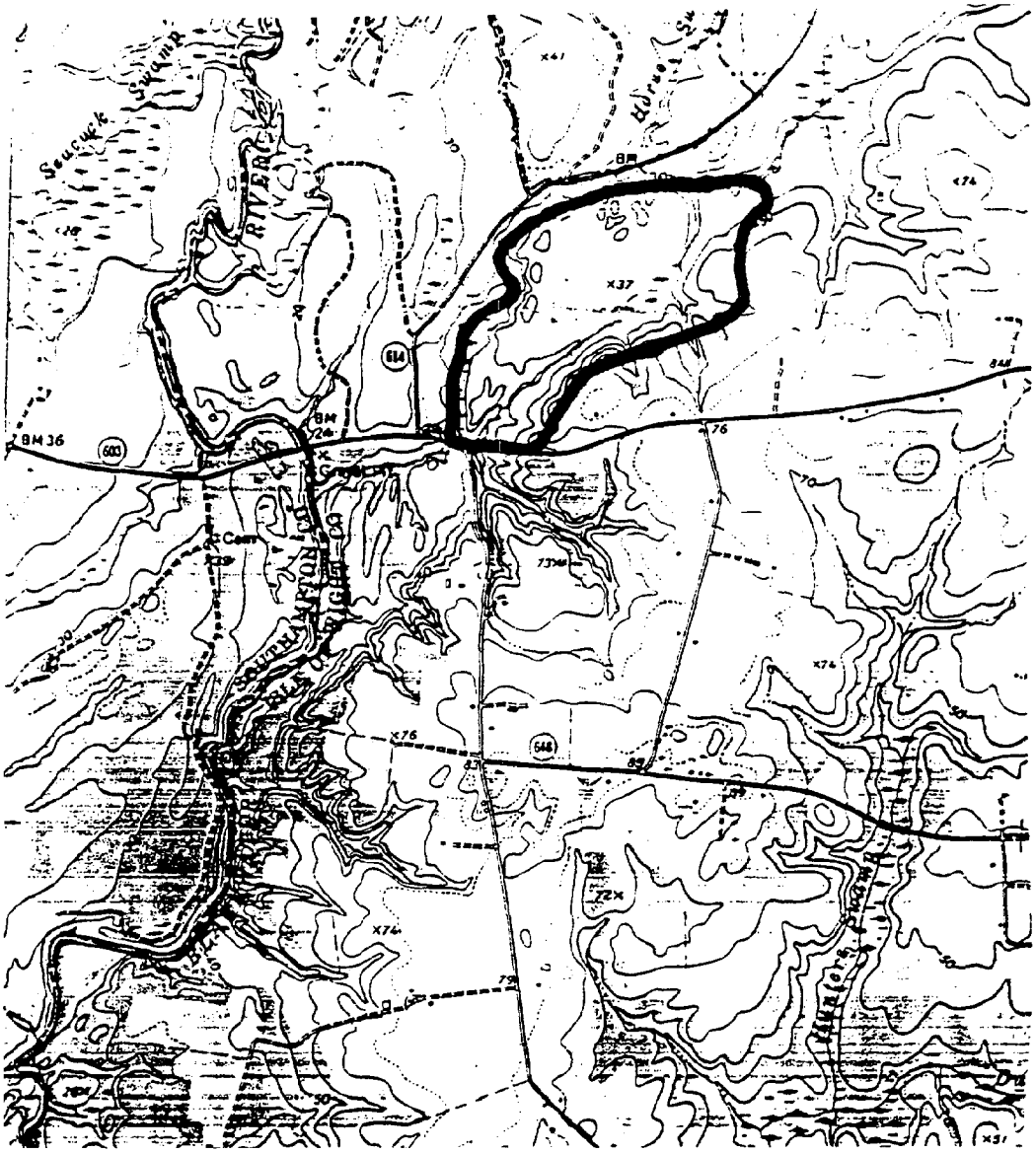
defensibility of the site. The northern boundary coincides with Horse Swamp, just south of Route 614. The Blackwater Ecological Preserve and a recent clear-cut lie to the north of the site. The boundary was drawn from aerial photograph interpretation and limited field surveys.

THREATS: Future logging will likely destroy 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 or industrial development are also serious threats.

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 Blackwater Ecologic Preserve (literally across the road) should be expected to 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 be converted 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 in private ownership.

PROTECTION RECOMMENDATIONS: The site is among the highest protection priorities in southeastern Virginia. Because it is immediately adjacent to the Blackwater Ecologic Preserve, this area could contribute to forming a larger, more diverse, and more defensible natural area preserve.



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

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.

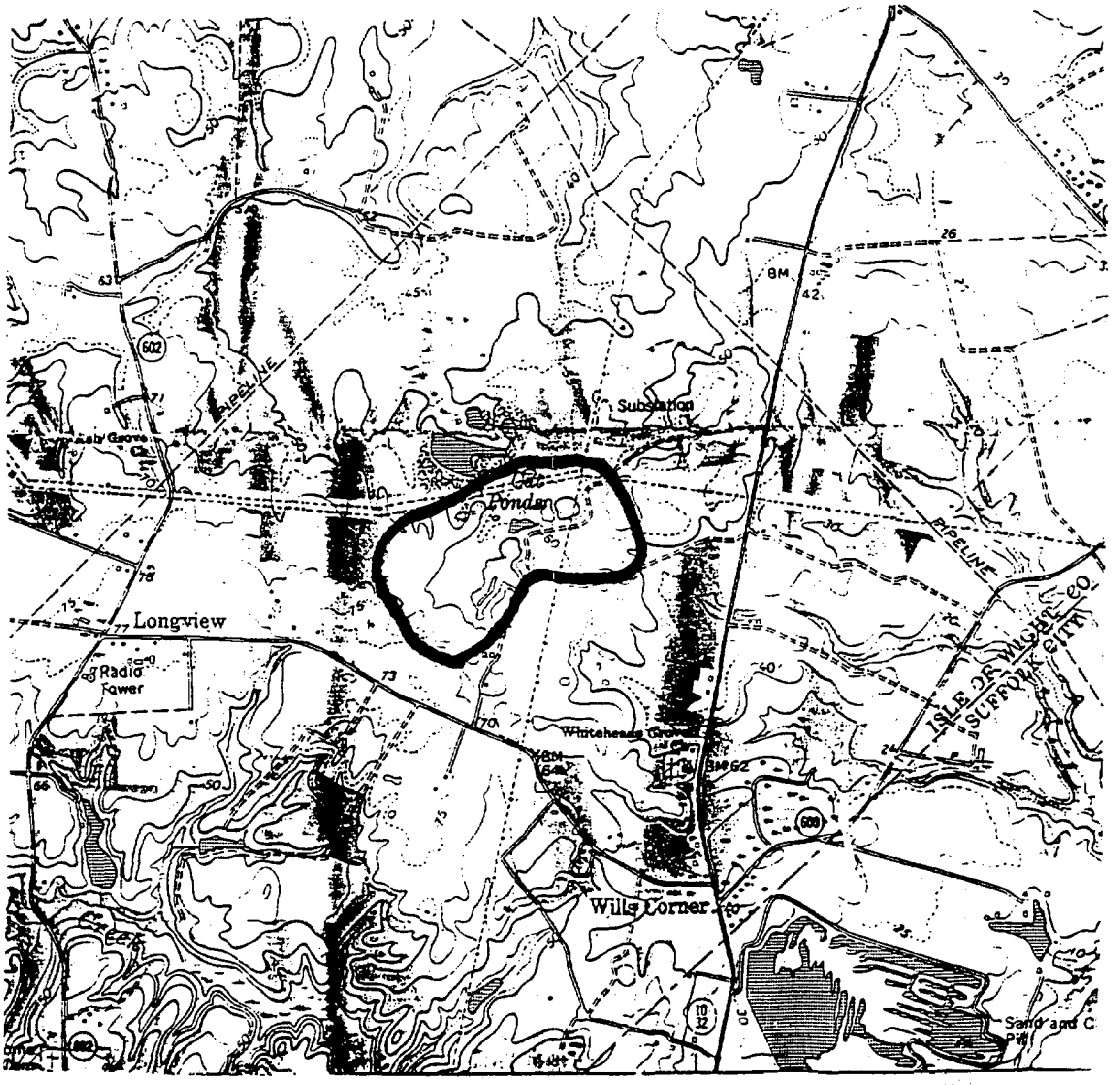
MANAGEMENT RECOMMENDATIONS: The many threats here have synergistically coalesced to cast a menacing shadow of doom over the entire area. If this site continues to be degraded, management will become a moot issue. Buffer strips of natural vegetation need to be established around each pond, and the condition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

CURRENT STATUS: The site is in private ownership.

PROTECTION RECOMMENDATIONS: The long term viability of this site is in doubt. 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

VIRGINIA
QUADRANGLE LOCATION

N

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.

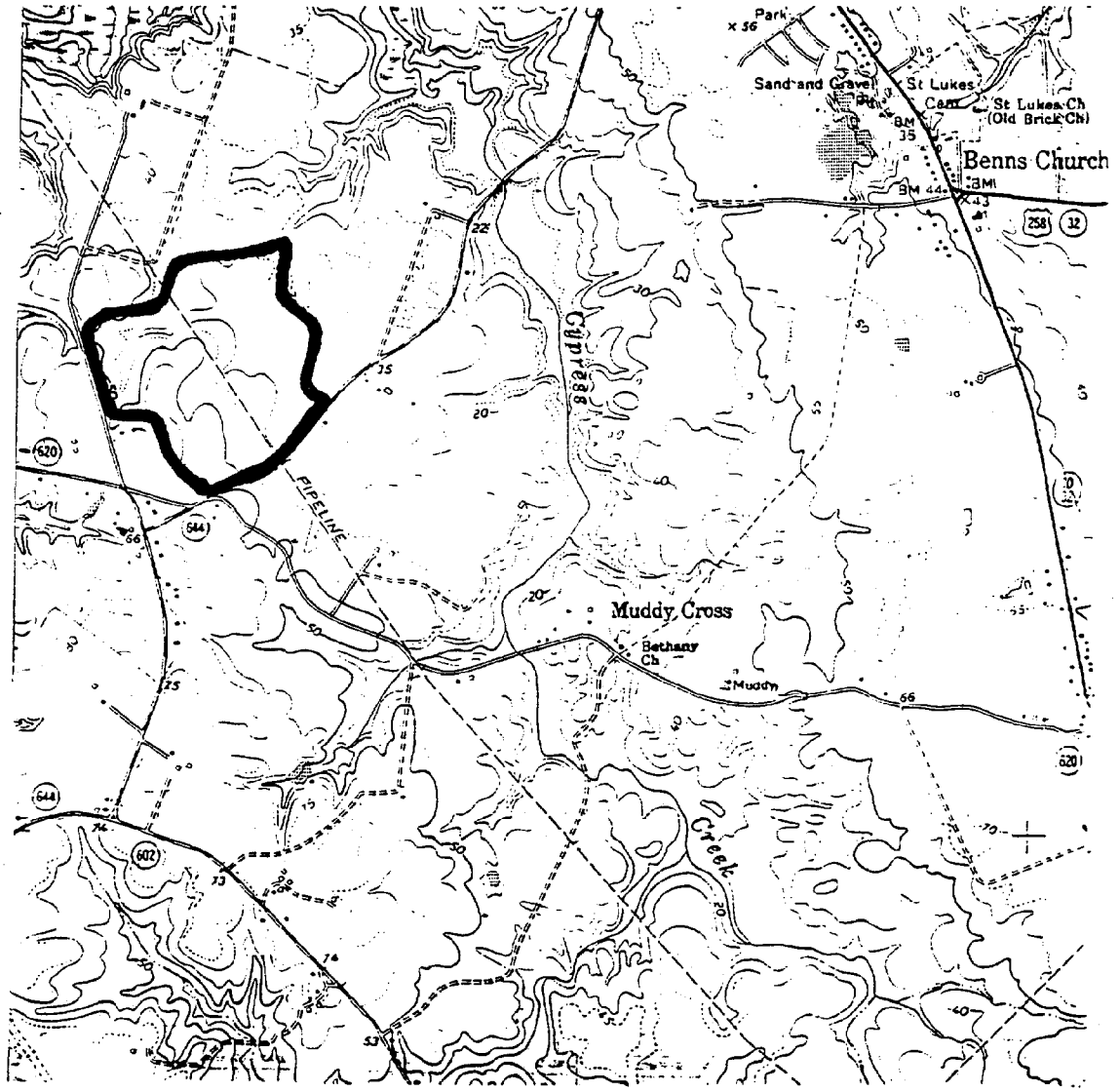
BOUNDARY JUSTIFICATION: The conservation planning boundary encompasses the cluster of seasonal ponds, plus the upslope land which drains into them. Additional upland buffer is included to mitigate future negative impacts to the site.

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 in private ownership.

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.



SITE NAME: MUDDY CROSS PONDS
QUADRANGLE: BENNS CHURCH

SCALE 1:24000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 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, providing 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

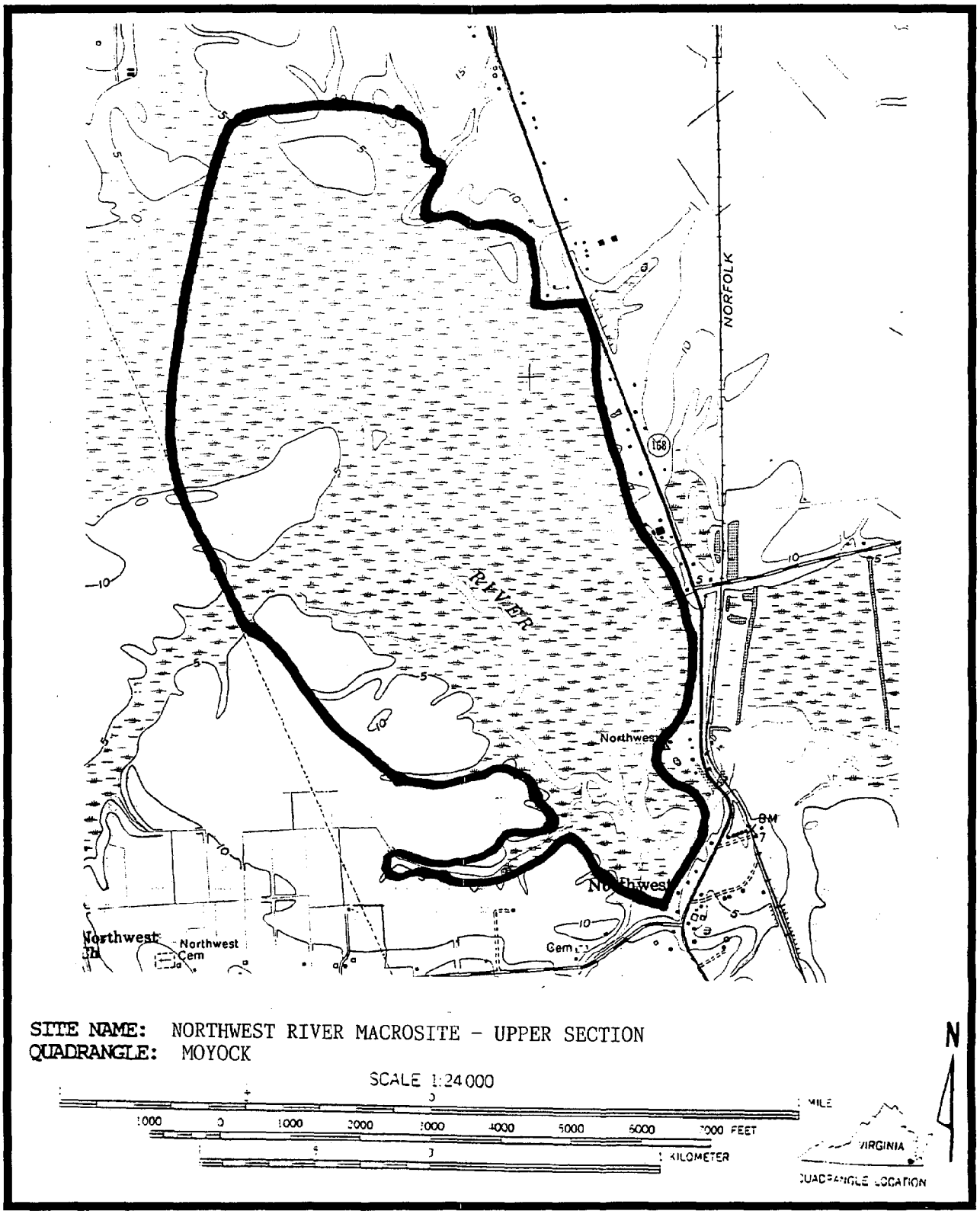
mitigate impacts from off-site land use activities. Much of the site was delineated using NHAP color-infrared photograph #325-172 taken on 4/24/82.

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 in private ownership.

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

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.

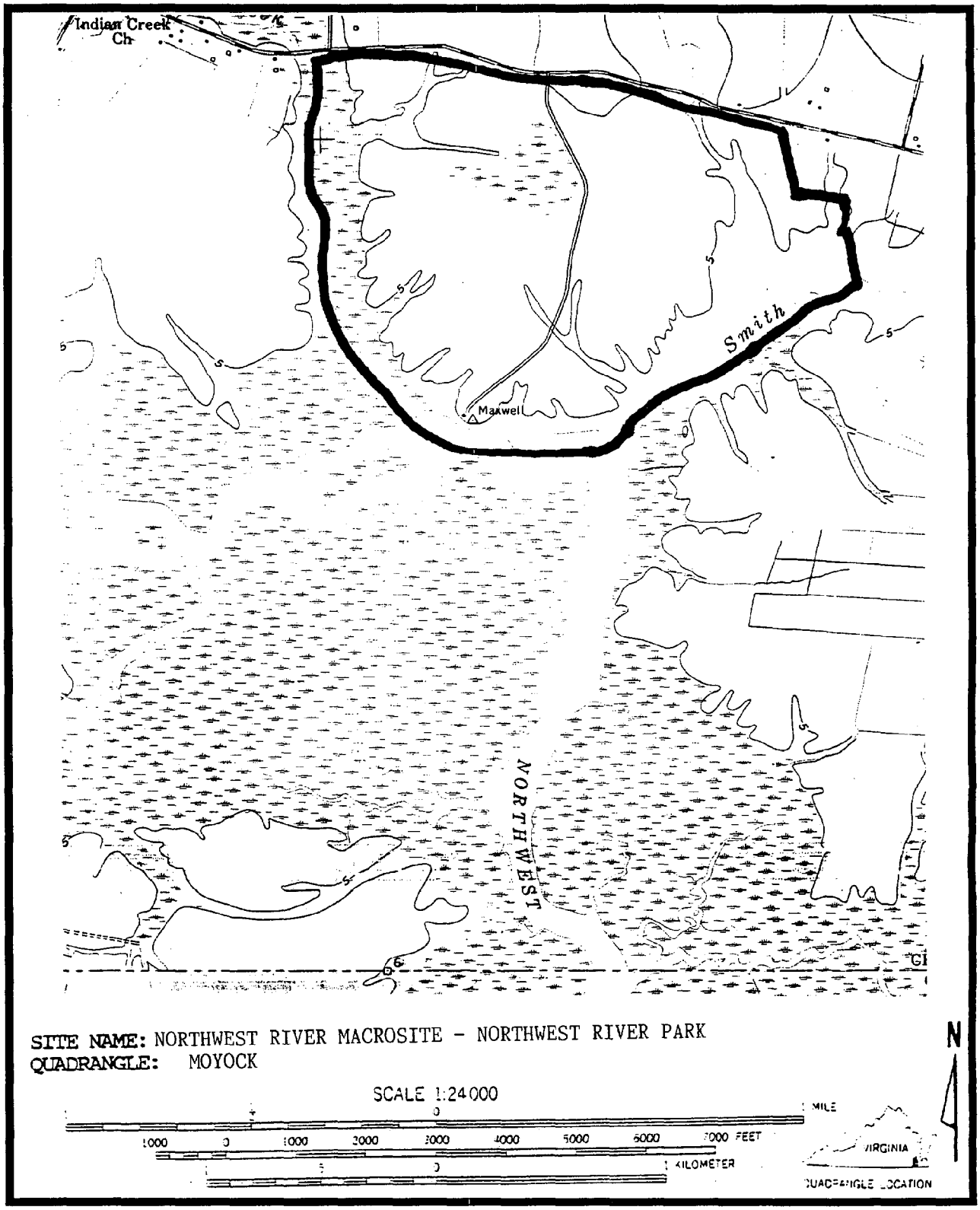
BOUNDARY JUSTIFICATION: The conservation planning boundary includes the forested habitat for the rare species in and directly adjacent to Northwest River Park. Because the Park's activities are integral to the viability of the rare species populations, park facilities are included in the boundary for 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.



SITE NAME: NORTHWEST RIVER MACROSITE - NORTHWEST RIVER PARK
QUADRANGLE: MOYOCK

SCALE 1:24000

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 MILE

1 KILOMETER

VIRGINIA

QUADRANGLE LOCATION

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	C2	-	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.

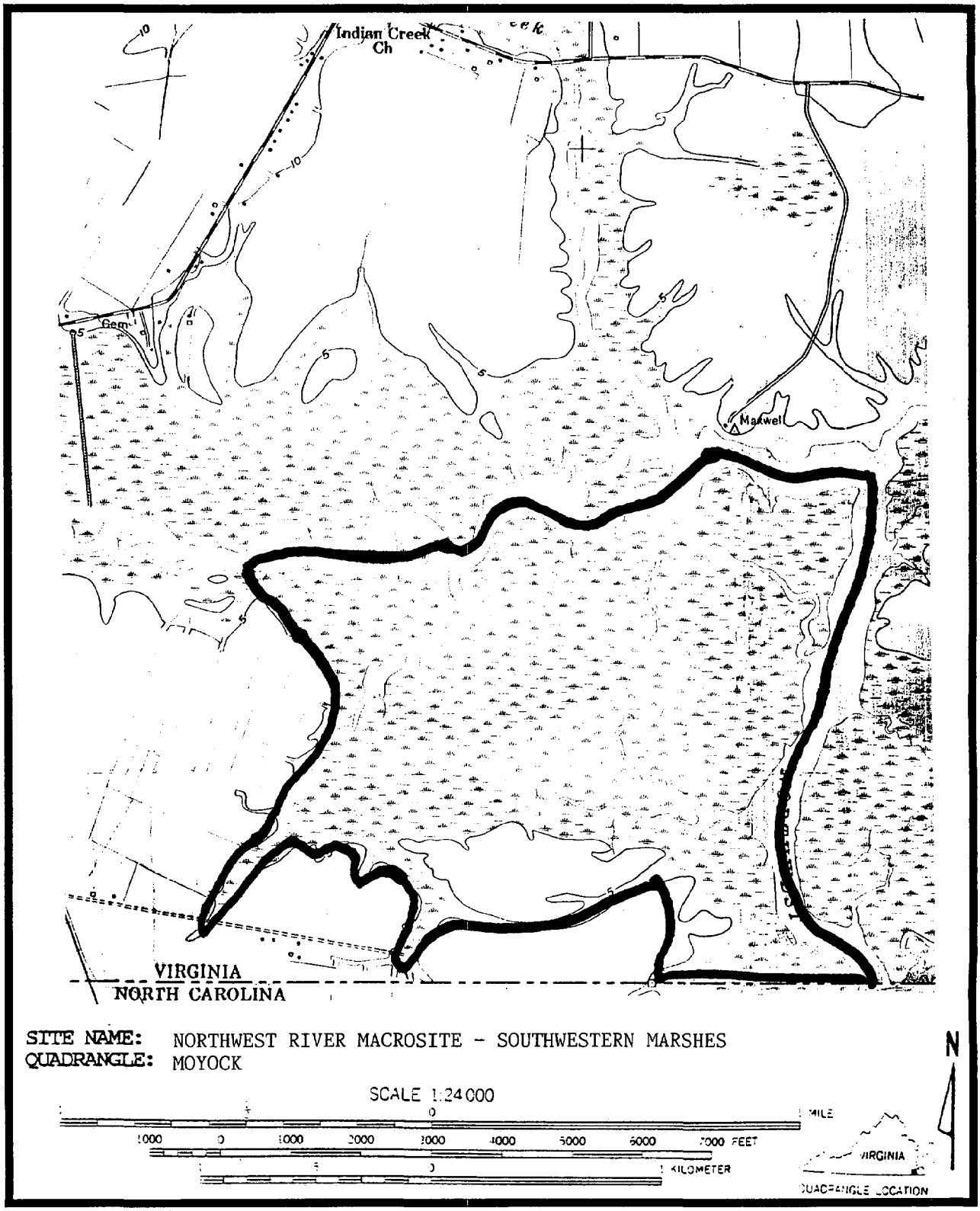
BOUNDARY JUSTIFICATION: The conservation planning boundary includes the wetland communities, rare species, and forested upland buffer. Forested tracts adjacent to the areas surveyed in the field were delineated with NHAP color-infrared photograph #325-172 taken on 4/24/82.

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 in private ownership.

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
Gem
Maxwel
VIRGINIA
NORTH CAROLINA
SITE NAME: NORTHWEST RIVER MACROSITE - SOUTHWESTERN MARSHES
QUADRANGLE: MOYOCK
SCALE 1:24000
MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
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	C2	-	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 water. 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.

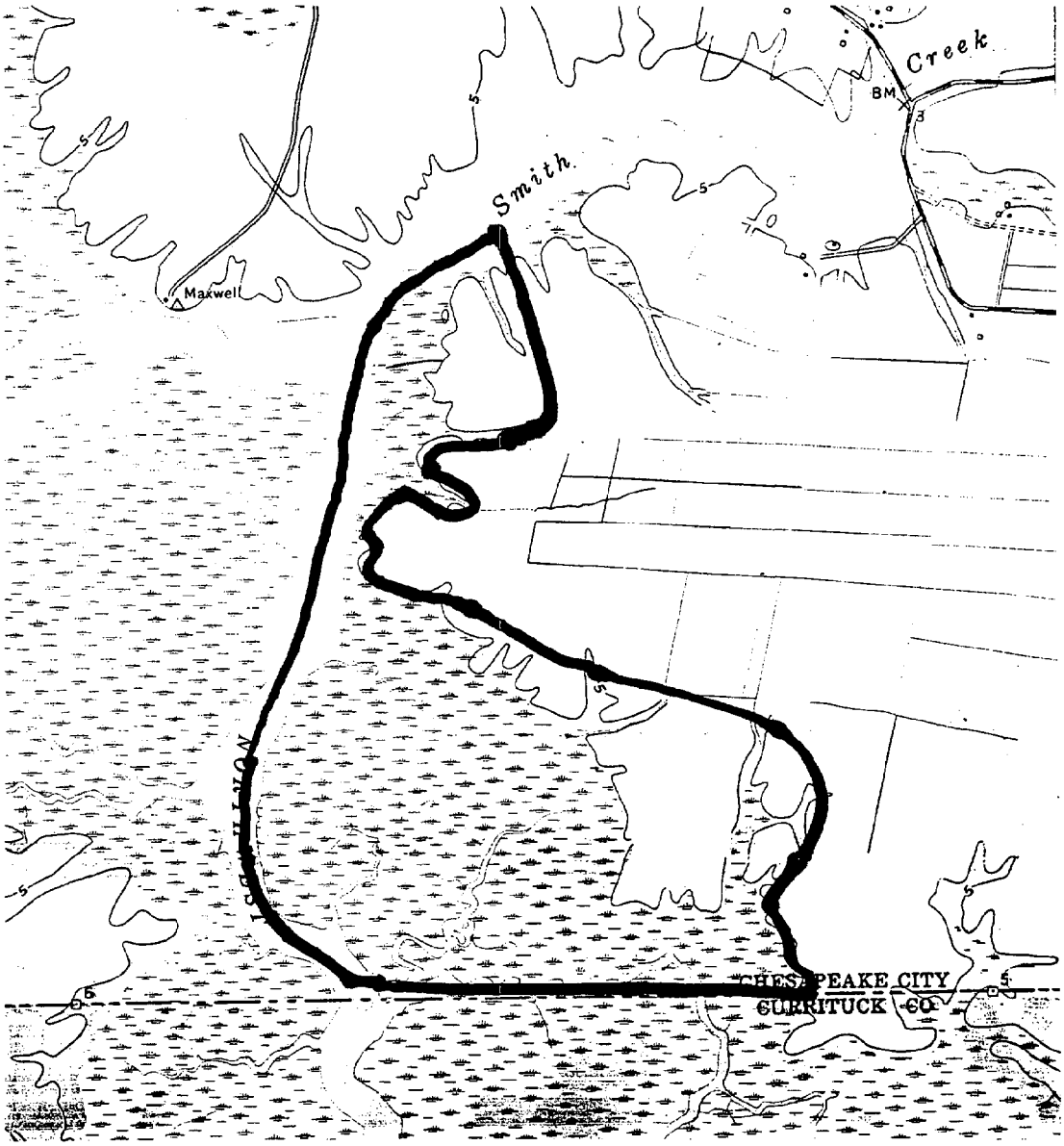
BOUNDARY JUSTIFICATION: The conservation planning boundary includes the wetland communities, the rare species, and upland buffer. Forested tracts adjacent to the areas surveyed in the field were delineated with NHAP color-infrared photograph #325-172 taken on 4/24/82.

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 in private ownership.

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.



SITE NAME: NORTHWEST RIVER MACROSITE - SMITH CREEK
QUADRANGLE: MOYOCK

SCALE 1:24000

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

N

VIRGINIA
QUADRANGLE LOCATION

DISMAL SWAMP MACROSITE - GREAT DISMAL SWAMP NATIONAL WILDLIFGE 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	C2	-	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	C2	LE	C
SYNAPTOMYS COOPERI HELALETES	DISMAL SWAMP SOUTHERN BOG LEMMING	G5T3	S3	3C	-	A
STYGOBROMUS ARAEUS	AMPHIPOD	G?	S2	C2	-	D
CHLOROCHROA DISMALIA	DISMAL SWAMP STINKBUG	G1	S1	C2	-	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., R.E. Schneider. 1990. Regional inventory for critical natural areas, wetland ecosystems, and endangered species habitats of the Albemarle-Pamlico estuarine region: Phase 1. A report to the Environmental Protection Agency. A/P Study Project No. 90-01. 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.

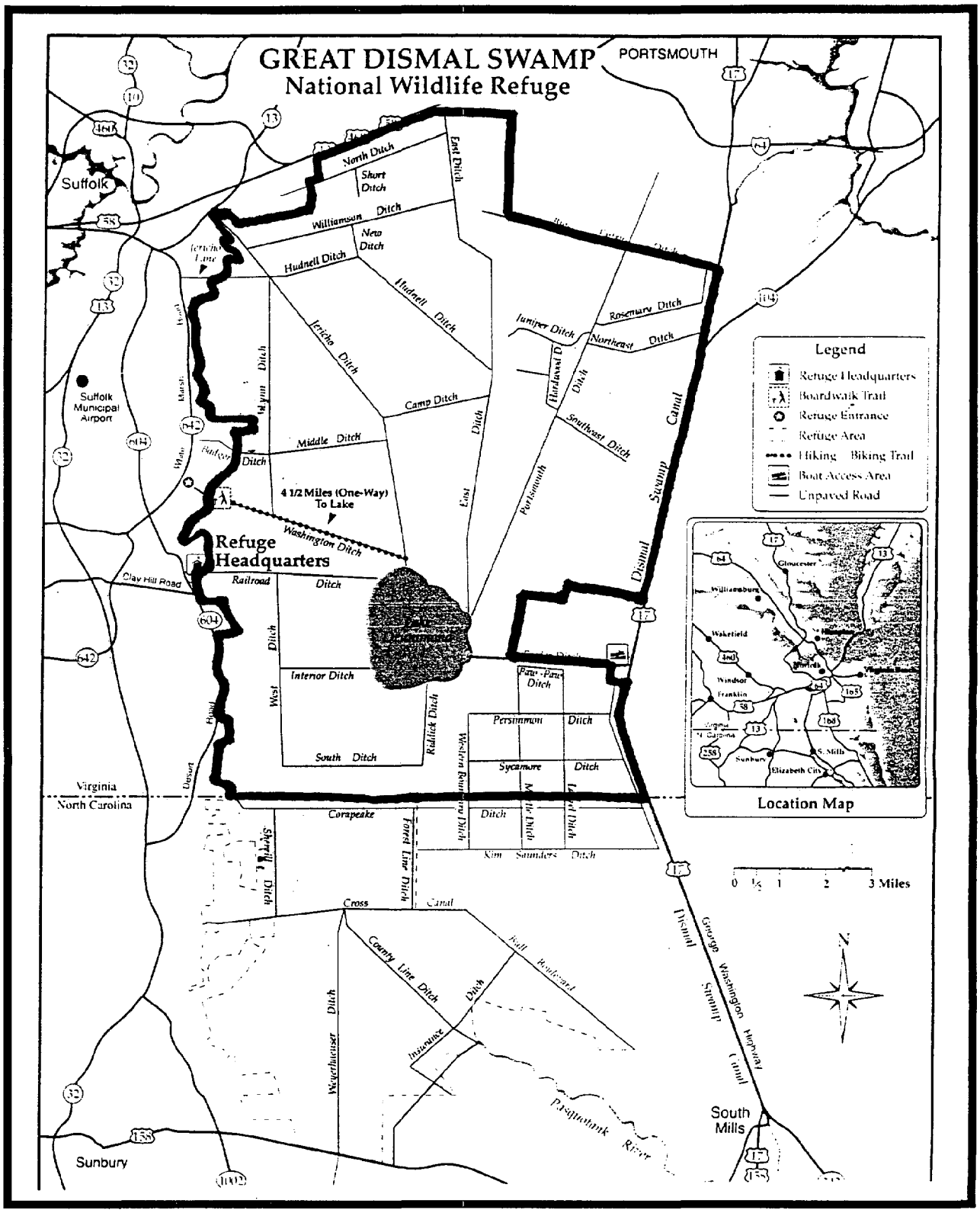
Mitchell, J.C., and D. Schwab. 1991. Canebrake Rattlesnake (Crotalus horridus atricaudatus Latreille). Pages 462-464 in J.N. McDonald and T. Skware, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, 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. Skware, 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
North Ditch
Short Ditch
East Ditch
Williamson Ditch
New Ditch
Hudnell Ditch
Jericho Ditch
Camp Ditch
Middle Ditch
Juniper Ditch
Rosemary Ditch
Northeast Ditch
Southeast Ditch
Dismal Swamp Canal
Portsmouth Ditch
4 1/2 Miles (One-Way) To Lake
Washington Ditch
Refuge Headquarters
Railroad Ditch
Clay Hill Road
Interior Ditch
West Ditch
Riddick Ditch
South Ditch
Paw-Paw Ditch
Persimmon Ditch
Sycamore Ditch
Virginia
North Carolina
Corapeake
Forest Line Ditch
Kim Saunders Ditch
Cross Canal
County Line Ditch
Weyerhaeuser Ditch
Insurance Ditch
Ball Boulevard
Pasquotank River
Sunbury
South Mills
Dismal Swamp Canal
George Washington Highway
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
N

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 relatively 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, the natural hydrology should be restored, to the extent possible. Fire was a natural disturbance at this site, and regular prescribed burning should be used to simulate, or approximate, original forest conditions.

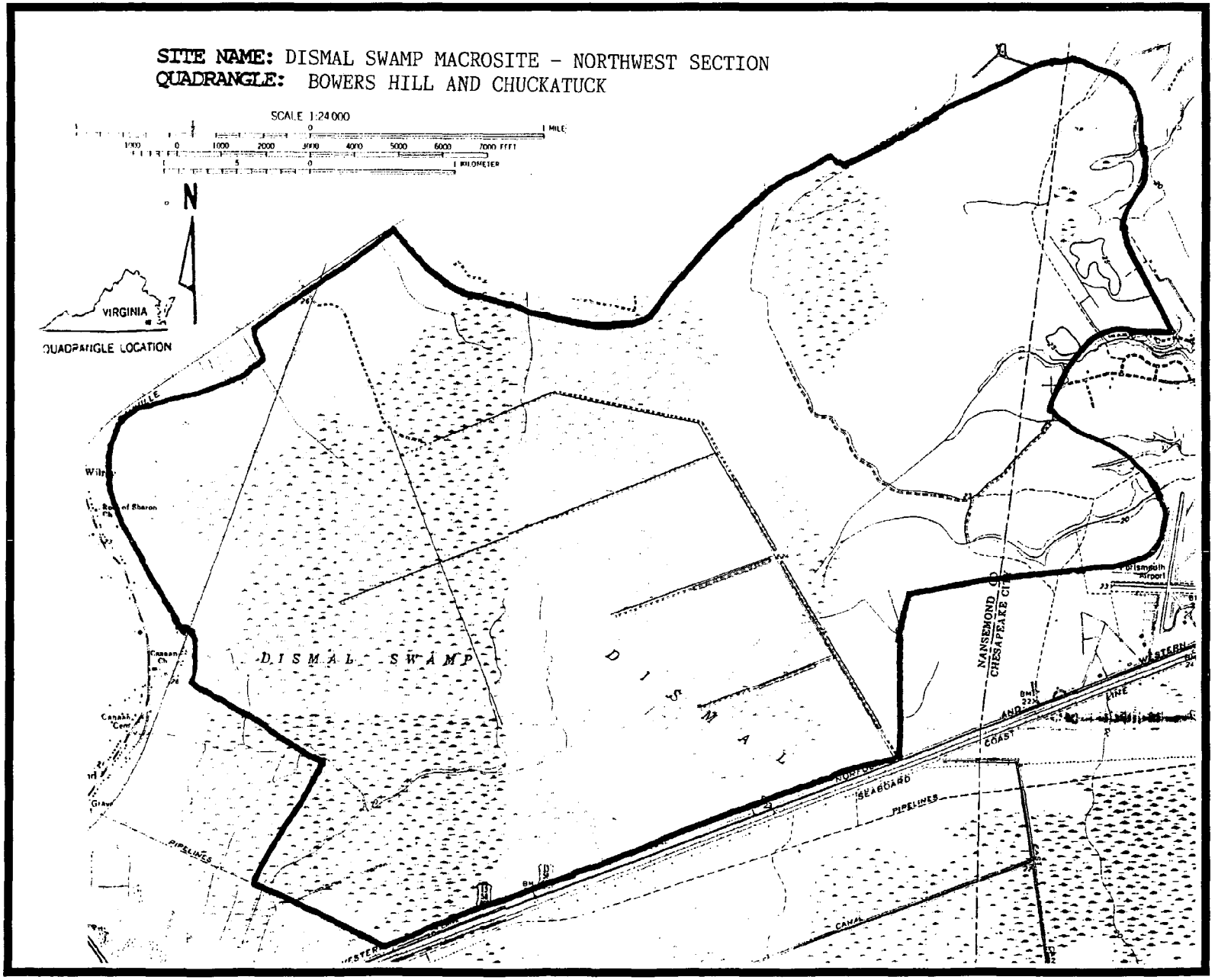
CURRENT STATUS: The tract is in private ownership.

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

REFERENCES:

Mitchell, J. C., and D. Schwab. 1991. Canebrake Rattlesnake (Crotalus horridus atricaudatus Latreille). Pages 462-464 in J.N. McDonald and T. Skware, 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
MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
KILOMETER
N
VIRGINIA
QUADRANGLE LOCATION
DISMAL SWAMP
NANSEMOND CO
CHESAPEAKE CITY
Suffolk Airport
SEABOARD
COAST
LINE
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 in public ownership. Most of the site is in private ownership.

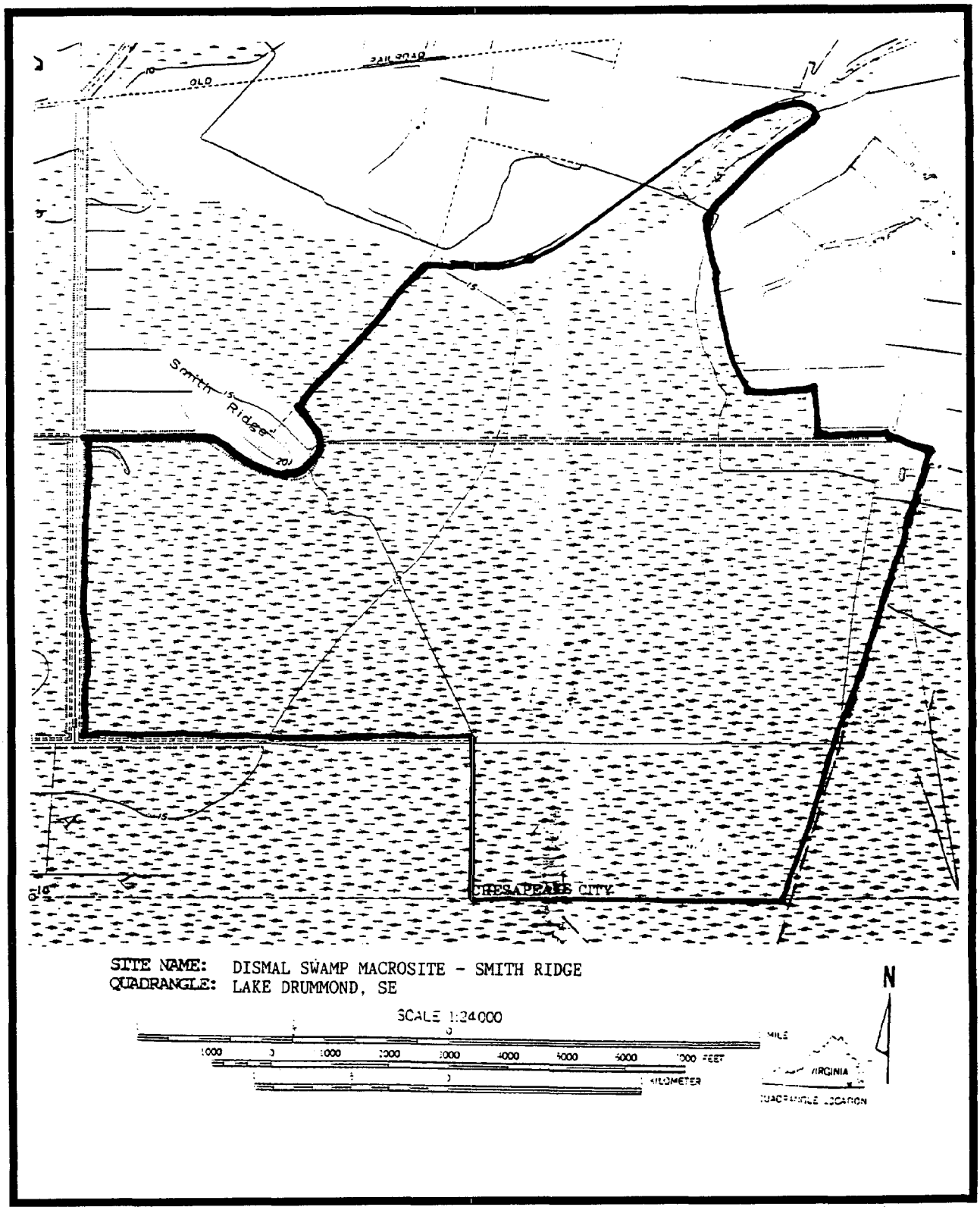
PROTECTION RECOMMENDATIONS: Any of several protection tools should be used to protect the natural heritage resources. The status of the proposed regional landfill should be closely monitored.

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. Skware, 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.


RAILROAD
OLD
Smith Ridge
CHESAPEAKE CITY
SITE NAME: DISMAL SWAMP MACROSITE - SMITH RIDGE
QUADRANGLE: LAKE DRUMMOND, SE
SCALE 1:24000
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
KILOMETER
MILE
VIRGINIA
N

SEASHORE STATE PARK AND NATURAL AREA

SIZE: 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 in public ownership; 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.

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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.

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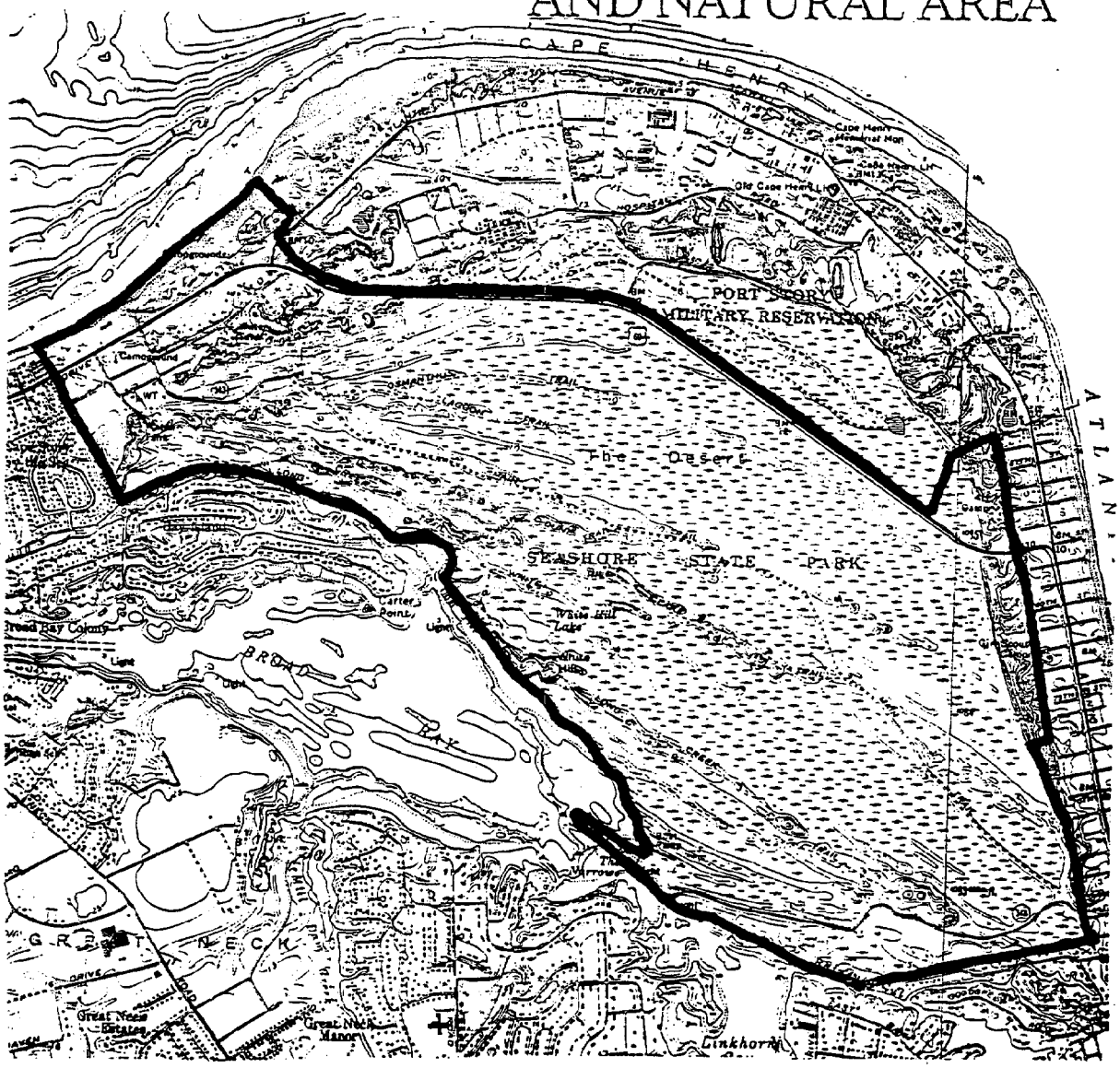
SEASHORE STATE PARK AND NATURAL AREA



QUADRANGLE: CAPE HENRY

SCALE 1:24000

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

KILOMETER

MILE

VIRGINIA

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	C2	-	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.

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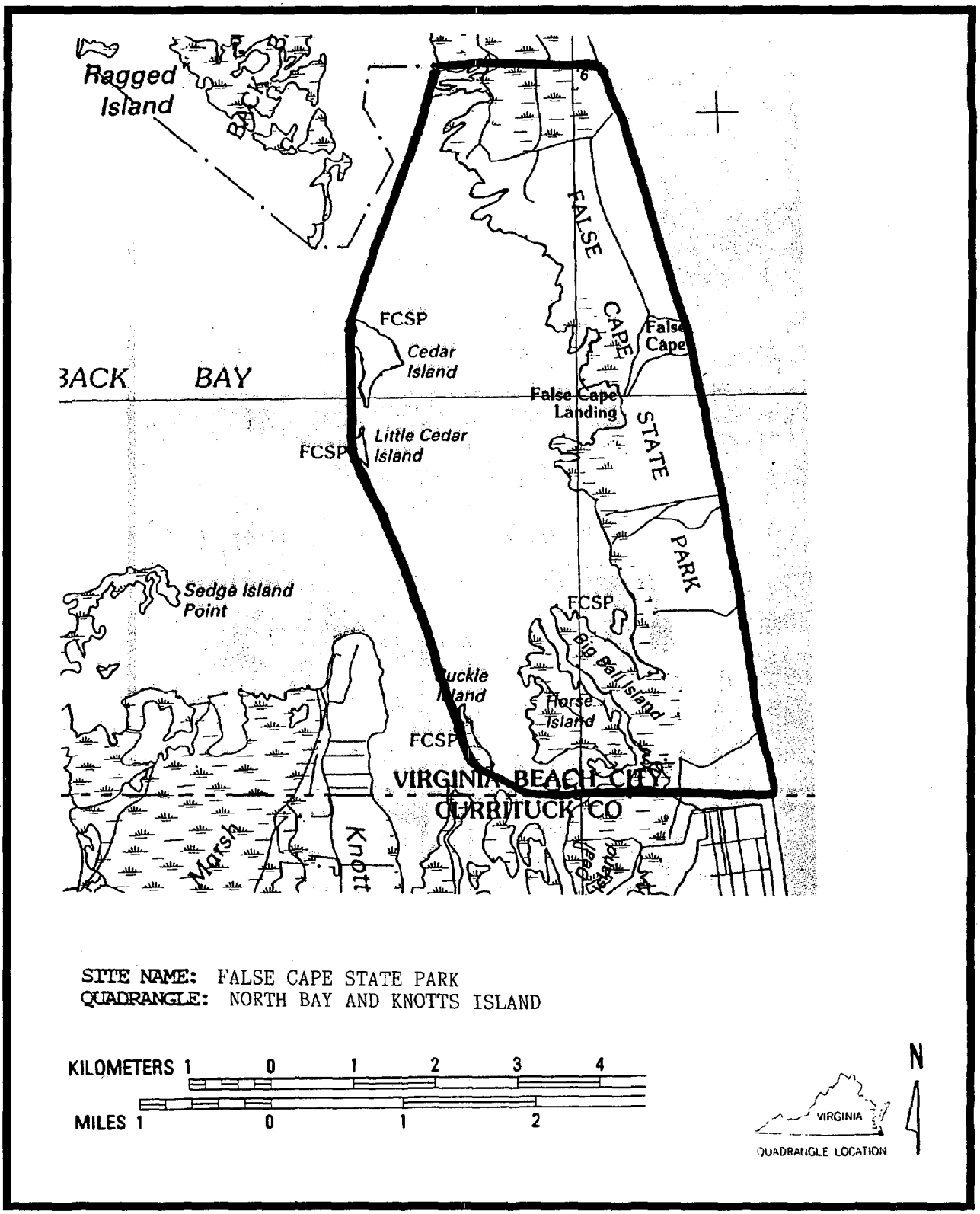


SITE NAME: FALSE CAPE STATE PARK
QUADRANGLE: NORTH BAY AND KNOTTS ISLAND

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	C2	-	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).

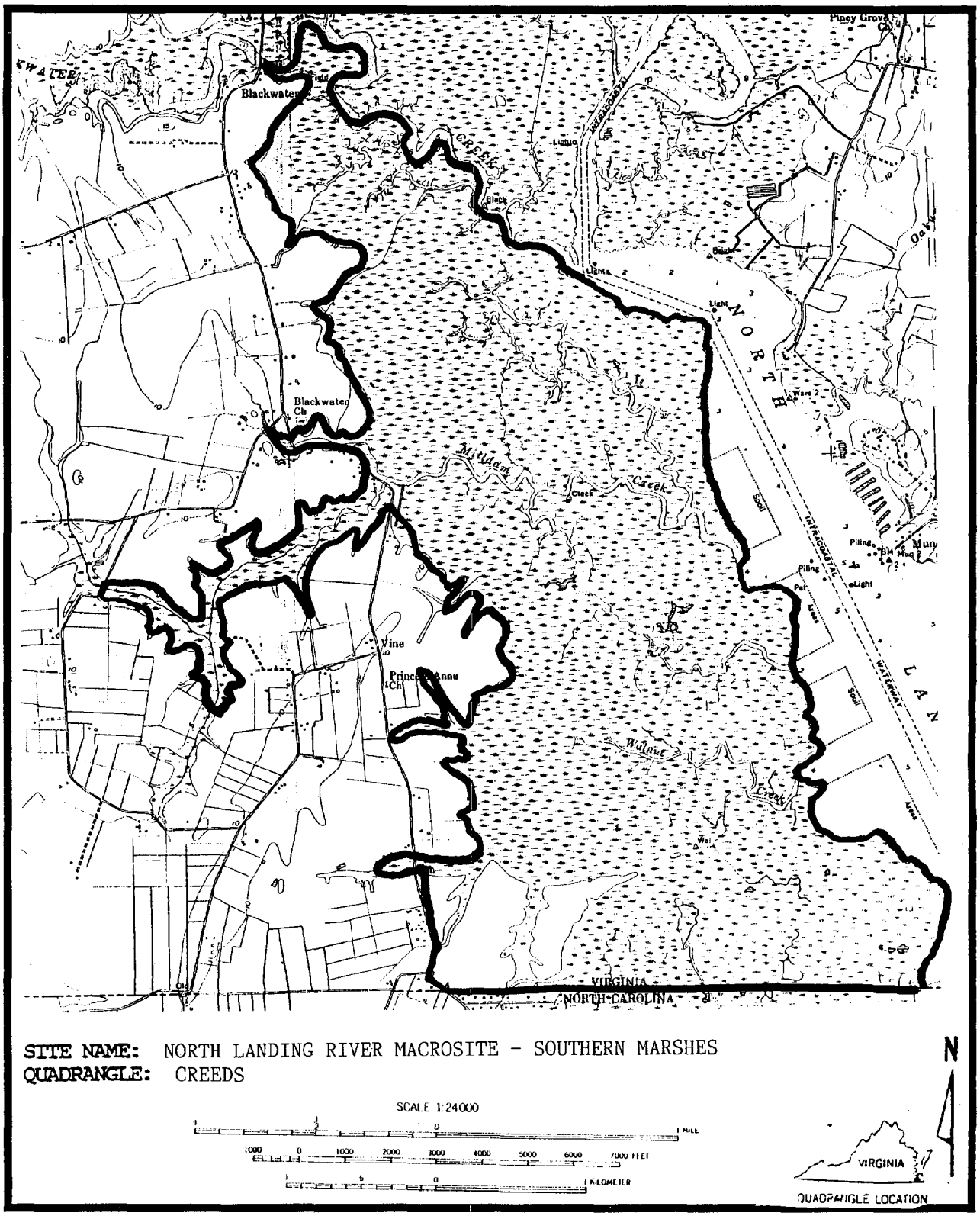
BOUNDARY JUSTIFICATION: The conservation planning boundary includes the community, rare species, and buffer necessary to mitigate imapcts from off-site land uses. Areas not field-checked were delineated using NHAP color-infrared photograph #313-147 taken on 4/2/82.

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 in private ownership.

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.



SITE NAME: NORTH LANDING RIVER MACROSITE - SOUTHERN MARSHES
QUADRANGLE: CREEDS

NORTH LANDING RIVER MACROSITE - NORTH LANDING RIVER NATURAL AREA PRESERVE

SIZE: 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	C2	-	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.

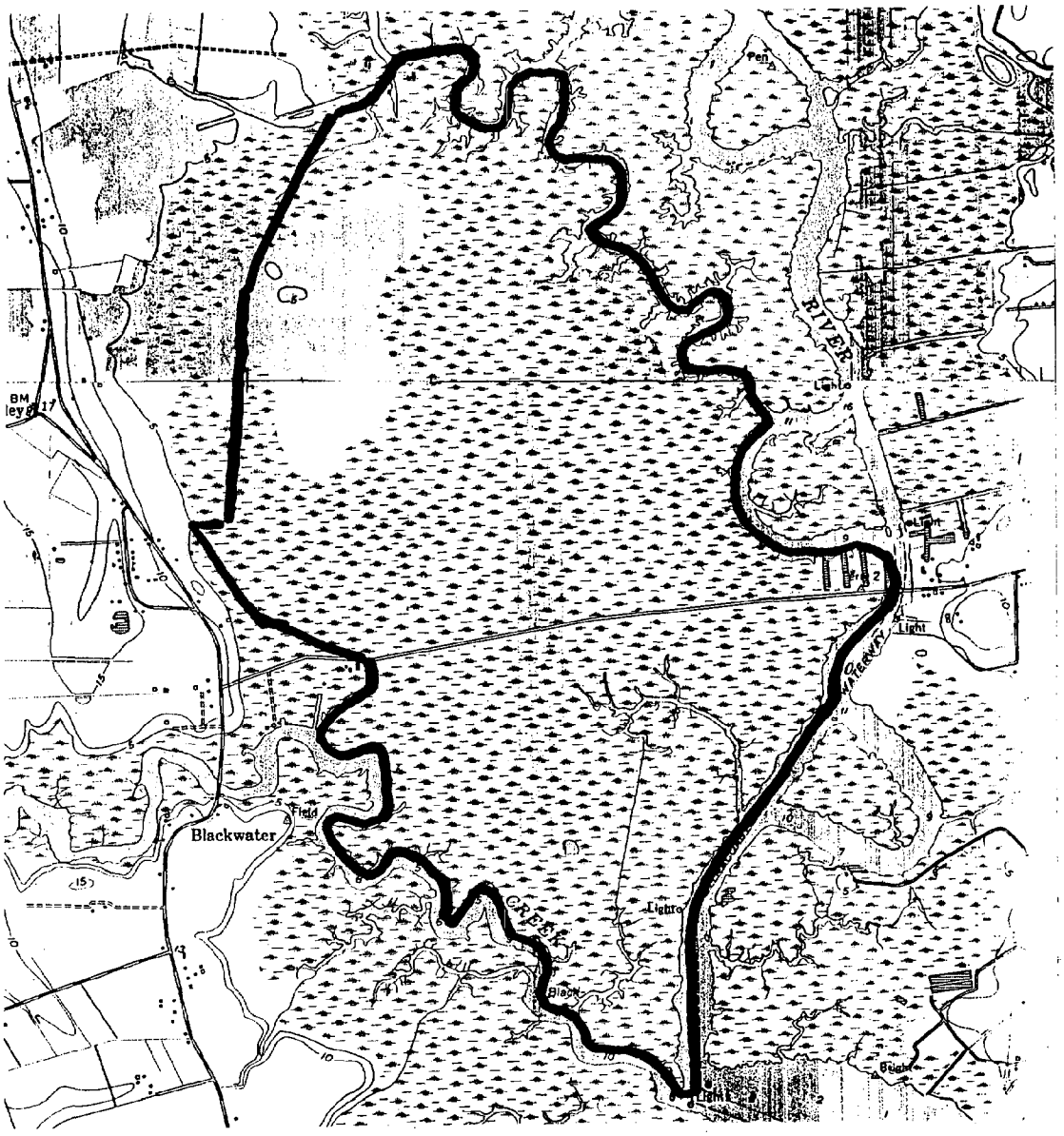
CURRENT STATUS: The site managed as a natural area preserve by the Virginia Department of Conservation and Recreation's Division of Natural Heritage. The Preserve is a dedicated natural area, which provides the strongest level of protection to natural heritage resources through formal recognition and 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	C2	-	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.

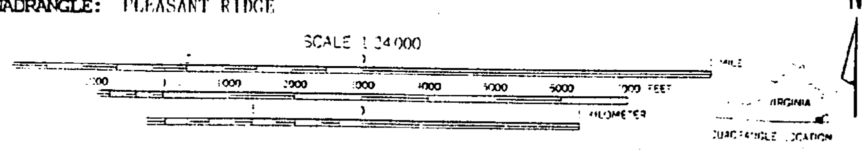
CURRENT STATUS: The site is in private ownership.

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



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	C2	-	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.

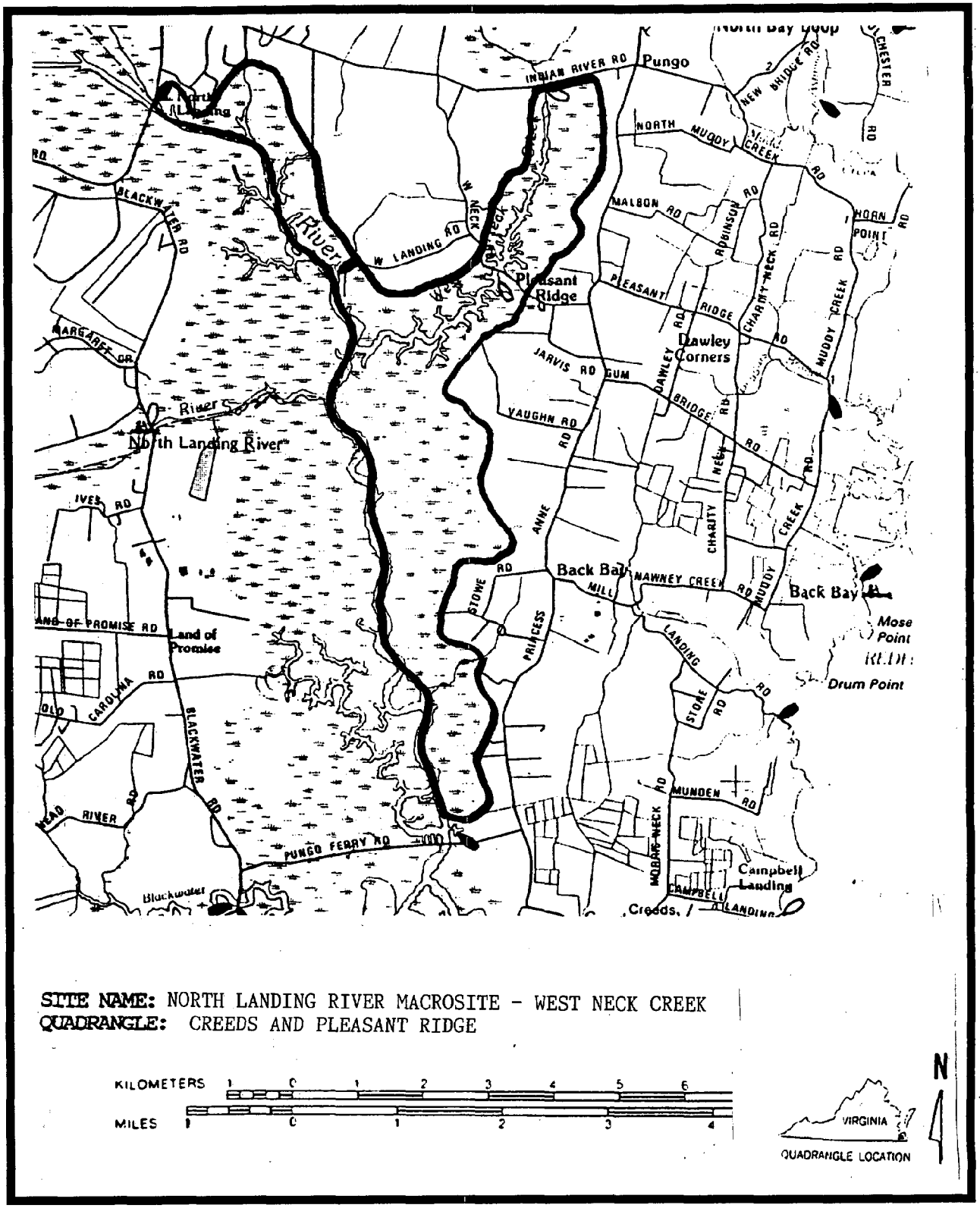
MANAGEMENT RECOMMENDATIONS: The marshes and cedar swamp communities require periodic fire for their long-term maintenance. Develop and implement a prescribed burning management plan. Monitor rare species populations and the spread of common reed.

CURRENT STATUS: The site is in private ownership.

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	-	-	C
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.

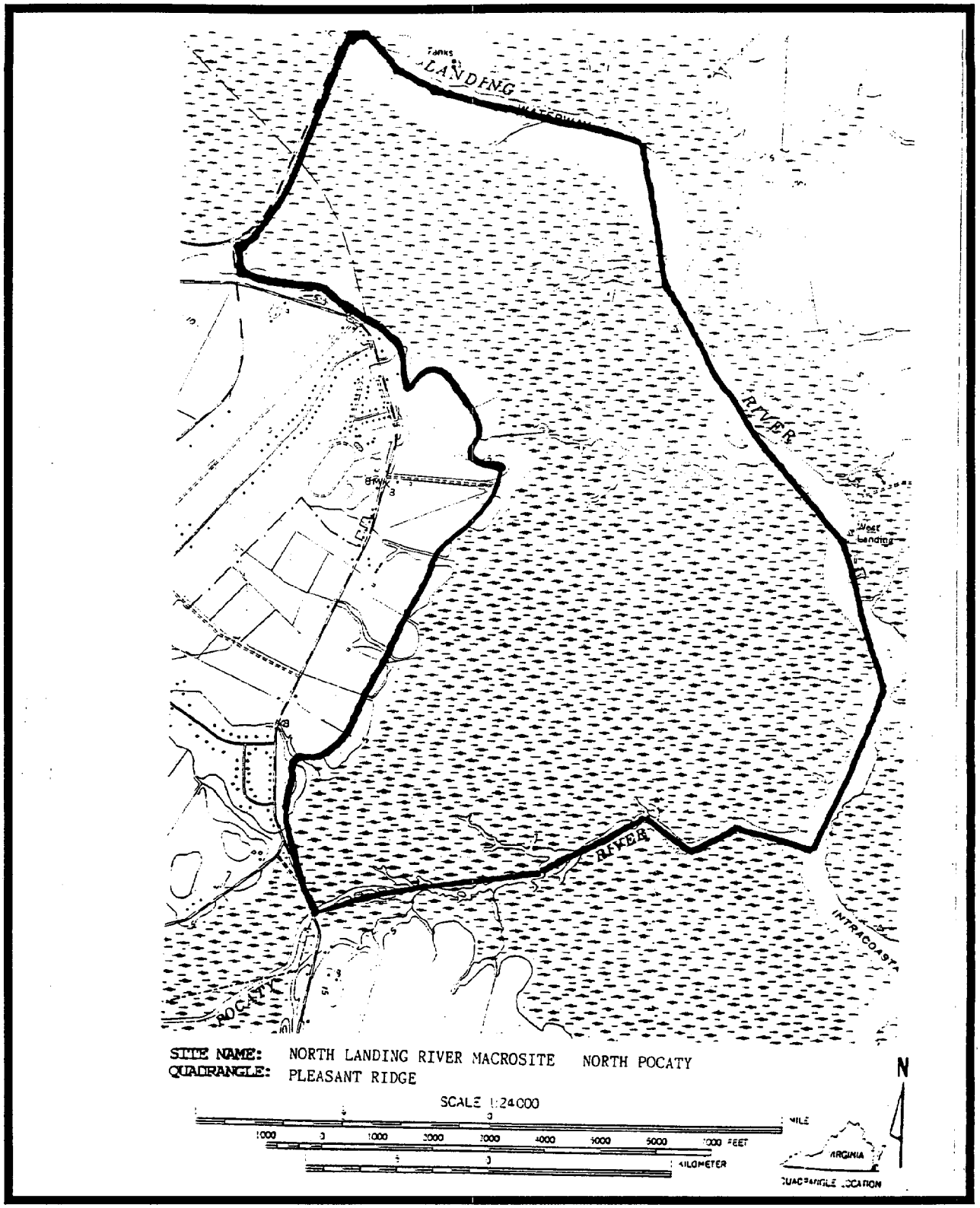
MANAGEMENT RECOMMENDATIONS: Develop and implement a prescribed burning management plan to maintain the distinctive pocosin vegetation and rare plants such as Atlantic white cedar.

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. Skware, editors. Virginia's Endangered Species: Proceedings of a Symposium / Coordinated by Karen Terwilliger. The McDonald and Woodward Publishing Co., Blacksburg, VA.


LANDING
RIVER
RIVER
POCATY
INTRACOASTAL
SITE NAME: NORTH LANDING RIVER MACROSITE NORTH POCATY
QUADRANGLE: PLEASANT RIDGE
SCALE 1:24000
MILE
1000 0 1000 2000 3000 4000 5000 6000 FEET
KILOMETER
N
VIRGINIA
QUADRANGLE LOCATION

NORTH LANDING RIVER MACROSITE - GUM SWAMP

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

LOCALITY: City of Chesapeake and City of Virginia Beach

QUADRANGLE: Pleasant Ridge **QUADRANGLE CODE:** 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	C2	-	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.

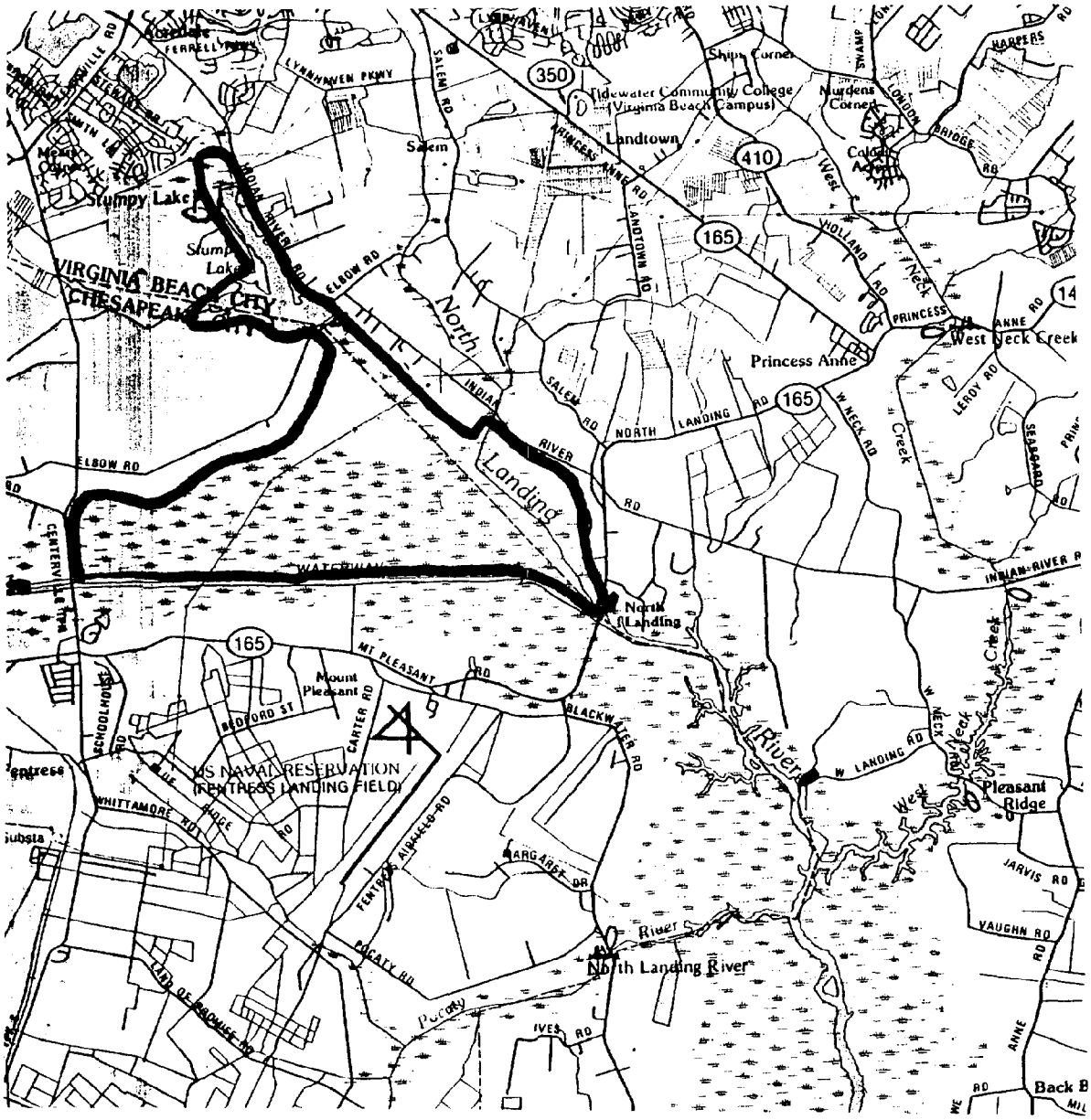
MANAGEMENT RECOMMENDATIONS: The forested portions of this site should remain in their natural state. Such conditions would benefit most rare species currently known from the area. Baseline information on all of the rare species is needed.

CURRENT STATUS: Most of the site is in private ownership. 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 water 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. Skware, 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

RECOMMENDATIONS

1. **Participate fully in the development of local protection tools.** Most of the 24 natural areas described in this report are unprotected. The Division of Natural Heritage and the Council on the Environment 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. In the fall of 1992, the Division will work in partnership with the City of Virginia Beach to refine the conservation planning boundaries, develop a geographic information system data layer, and initiate a land owner contact program. Proposals have been developed to expand this protection planning work to include Northwest River wetlands and the entire Albemarle-Pamlico Estuarine Study Region in Virginia. Finally, the Division hopes to develop site management plans for Department of Conservation and Recreation lands and Nature Conservancy lands within the North Landing River and Northwest River wetland systems. These plans will address topics such as prescribed burning, exotic species control, and rare species monitoring.

2. **Include the Division of Natural Heritage 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 Natural Heritage staff 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 Natural Heritage staff as soon as possible.

3. **Expand public awareness of the need for protecting natural areas.** The rapid rate of human population growth and intensified land use activities throughout southeastern Virginia have placed natural lands in jeopardy. Natural areas not only provide biological diversity values, but they also provide recreational opportunities for the public, and, in general, 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 represents a breakthrough in natural area protection and awareness; this area was established specifically for its outstanding natural history values. A recent public opinion survey of 300 adult citizens in Virginia indicated that 82% were in favor of land conservation. The many unprotected natural areas throughout southeastern Virginia can only benefit from the increased awareness of natural area values - citizens are realizing that inappropriate land use activities are steadily destroying <u>their</u> natural heritage.

4. **Increase cooperation among pertinent organizations.** 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.

5. **Properly manage natural areas in southeastern Virginia.** The first step is to develop management programs for public and private conservation lands. The Department of Conservation and Recreation can assist local agencies in developing management plans. The Department's Division of Natural Heritage is interested in working with other agencies and organizations to conduct research and develop techniques for maintaining or restoring natural areas.